

Committee for Enterprise, Trade & Investment

Report on the Committee's Inquiry into Developing the Northern Ireland Economy through Innovation, Research & Development

**Together with the Minutes of Proceedings of the Committee Relating to the Report,
Written Submissions, Memoranda and the Minutes of Evidence**

**Ordered by the Committee for Enterprise, Trade & Investment
to be printed on 24 May 2012
Report: NIA 42/11-15**

**REPORT EMBARGOED
UNTIL COMMENCEMENT OF
DEBATE IN PLENARY**

Membership and Powers

Powers

The Enterprise, Trade & Investment Committee is a Statutory Committee established in accordance with paragraphs 8 and 9 of the Belfast Agreement, Section 29 of the Northern Ireland Act 1998 and under Assembly Standing Order 46. The Committee has a scrutiny, policy development and consultation role with respect to the Department of Enterprise, Trade & Investment and has a role in the initiation of legislation.

The Committee has power to:

- Consider and advise on Departmental Budgets and Annual Plans in the context of the overall budget allocation;
- Approve relevant secondary legislation and take the Committee stage of relevant primary legislation;
- Call for persons and papers;
- Initiate inquiries and make reports; and
- Consider and advise on matters brought to the Committee by the Minister for Enterprise, Trade & Investment.

Membership

The Committee has 11 members, including a Chairperson and Deputy Chairperson, and a quorum of five members.

The membership of the Committee is as follows:

Democratic Unionist Party	Gordon Dunne Stephen Moutray Paul Frew ¹ Robin Newton ^{4, 6}
Green Party	Steven Agnew
Sinn Féin	Daithí McKay (Deputy Chairperson) Phil Flanagan Jennifer McCann ²
Social Democratic and Labour Party	Alban Maginness (Chairperson) Patsy McGlone ⁵
Ulster Unionist Party	Sandra Overend ³

1 With effect from 24 October 2011 Mr Paul Frew replaced Mr David McIlveen
 2 With effect from 23 January 2012 Ms Jennifer McCann replaced Ms Sue Ramsey
 3 With effect from 06 February 2012 Mrs Sandra Overend replaced Mr Mike Nesbitt
 4 With effect from 27 February 2012 Mr Paul Givan replaced Mr Robin Newton
 5 With effect from 23 April 2012 Mr Patsy McGlone replaced Mr Alasdair McDonnell
 6 With effect from 21 May 2012 Mr Robin Newton replaced Mr Paul Givan

Table of Contents

List of Abbreviations and Acronyms used in the Report	v
Executive Summary	1
Summary of Recommendations	9
Introduction	11
Key Issues and Findings	13
Conclusions & Recommendations	57
Appendices	
1. Minutes of Proceedings	69
2. Minutes of Evidence	91
3. Rapporteur Meetings	265
4. Written Submissions to the Committee	283
5. Research Papers	617

List of Abbreviations and Acronyms used in the Report

ADS	Aerospace Defence Security
AFBI	Agri Food Biosciences Institute
BERD	Business Expenditure on Research and Development
BMC	Belfast Metropolitan College
CBI	Confederation of British Industry
CEO	Chief Executive Officer
CIIF	Creative Industries Innovation Fund
CIP	Competitiveness and Innovation Framework Programme
DARD	Department of Agriculture and Rural Development
DEL	Department of Employment and Learning
DETI	Department of Enterprise, Trade and Investment
ECF	Enterprise Capital Funds
EIPs	European Initiative Platforms
EIT	European Institute of Innovation and Technology
ERA	European Research Area
ERRIN	European Regions Research and Innovation Network
EU	European Union
HMRC	Her Majesty's Revenue and Customs
FE	Further Education
FP7	Framework Programme 7
GB	Great Britain
GVA	Gross Value Added
HE	Higher Education
HEIF	Higher Education Innovation Fund
HIE	Highland and Islands Enterprise
INI	Invest Northern Ireland
INTERREG	Interregional co-operation programme
IP	Intellectual Property
IRDG	Industry Research and Development Group
IREP	Independent Review of Economic Policy
KTP	Knowledge Transfer Partnership

LEAs	Local Enterprise Agencies
MEP	Member of the European Parliament
MNI	Manufacturing Northern Ireland
MoU	Memorandum of Understanding
NDPB	Non Departmental Public Body
NI	Northern Ireland
NIACE	Northern Ireland Advanced Composites & Engineering
NILGA	Northern Ireland Local Government Agency
NISP	Northern Ireland Science Park
NRC	Northern Regional College
PFG	Programme for Government
QUB	Queen's University Belfast
R&D	Research and Development
RAE	Research Assessment Exercise
RDAs	Regional Development Agencies
RISAP	Regional Innovation Strategic Action Plan
RoI	Republic of Ireland
SBRI	Small Business Research Initiative
SE	Scottish Enterprise
SEK	Swedish Krone
SERC	South Eastern Regional College
SFA	Selective Financial Assistance
SFC	Scottish Funding Council
SME	Small & Medium Sized Enterprises
SSAC	Scottish Science Advisory Council
SWC	South West College
TSB	Technology Strategy Board
UCD	University College Dublin
UK	United Kingdom
USA	United States of America
UU	University of Ulster
VINNOVA	Swedish Research Council and the Agency for Innovation Systems
ZIM	Central Innovation Programme for SMEs

Executive Summary

Background and Purpose of the Inquiry

1. The Committee became aware early in the current mandate, of evidence that levels of innovation and research and development (R&D) in Northern Ireland were not as high as would have been expected given the opportunities and programmes that are currently available. Additional evidence had come from the report on the Independent Review of Economic Policy (IREP) calling for improved structures and increased levels of support for innovation and R&D.
2. The Treasury consultation on rebalancing the Northern Ireland economy noted the particularly low level of business expenditure on R&D. It further noted that R&D and innovation are particularly low when compared to successful small economies in Europe several of which are in more peripheral locations than Northern Ireland. Over the past five years business expenditure on R&D in Northern Ireland has averaged 0.69% of Gross Value Added (GVA) compared to 1.23% for the UK as a whole. Business expenditure on R&D in Northern Ireland is heavily focused on a small number of companies, with just 10 companies accounting for around 57% of all business R&D investment in 2009.¹
3. In the current economic climate, and with decreasing levels of Selective Financial Assistance available to companies in Northern Ireland, the Committee considers it essential that the opportunities to invest in R&D are fully exploited. There are perceived difficulties in attracting high levels to Northern Ireland due to issues such as the large number of small businesses here compared to other parts of the UK, the small number of universities and difficulties in attracting high levels of R&D to Northern Ireland.
4. The purpose of the inquiry was to identify barriers faced by organisations in availing of opportunities for support for innovation, research & development and to bring forward recommendations on how these barriers can be overcome to maximise support for innovation, research & development opportunities for the benefit of the Northern Ireland economy.

The Current Position

5. There is a wide range of opportunities available for business and academia to become involved in innovation and R&D. This ranges from international R&D programmes and large EU programmes such as Framework Programme 7 and others to opportunities provided by individual local councils. In between are UK-wide programmes, programmes specific to Northern Ireland, for which Invest NI has responsibility and programmes which are run on a cross-border basis, mainly through InterTradelreland.
6. The Committee was impressed with the numerous positive comments from respondents regarding the support they received from Invest NI representatives and from InterTradelreland. It is evident that the work being done on the ground to support organisations involved in R&D is undertaken in a positive and professional manner and is very much appreciated by those who benefit from the support.
7. Other UK regions have their own specific programmes to provide support for R&D. The Republic of Ireland has a high level of success in R&D, as do countries such as Finland, Sweden and Germany. The Committee considered the mechanisms used by these countries as appropriate benchmarks for the direction in which Northern Ireland should move in the future.

1 Rebalancing the Northern Ireland Economy; HM Treasury Consultation, March 2011

8. Evidence to the inquiry is largely supportive of the currently available programmes to support R&D. Their content is considered mostly appropriate to the needs of those organisations becoming involved in R&D. However there were concerns expressed regarding how these programmes are integrated, managed, communicated and administered. One notable example is the low level of venture capital available in Northern Ireland given the high demand. Another is the lack of involvement of the Executive in the Small Business Research Initiative (SBRI), especially given the high level of success of Northern Ireland companies participating in the programme in GB. Concern was widely expressed regarding lower than expected levels of uptake of funding under Framework Programme 7 (FP7). Many respondents also commented on the need for Northern Ireland to be in a better position to avail of opportunities under Horizon 2020, the successor to FP7, which commences in 2014.

Barriers faced by Organisations

9. During the course of the Inquiry barriers to organisations becoming involved in R&D have been identified by organisations from all sectors and of all sizes. Barriers range from simple issues such as lack of awareness of opportunities and lack of knowledge and skills required to become involved to issues relating to funding, risk, difficulties in commercialising R&D and the complexities involved in the funding processes.
10. There is an evident lack of awareness of the opportunities and support available for innovation and R&D. This is especially the case for, but not solely confined to, Small and Medium Sized Enterprises (SMEs). Many organisations may be aware that opportunities may exist but have no awareness of their own eligibility to avail of those opportunities. In some cases this may extend to companies not realising that the work they are doing actually constitutes R&D. Sometimes the key barrier may be that an organisation does not know how to access the support that may be available.
11. Where there is some knowledge and understanding of available opportunities and support there are still many cases where that support is not sufficient to overcome the lack of capacity and capability within the organisation to avail of those opportunities. Many companies do not have the resources available in terms of people, time and finances to avail of opportunities and the available support is insufficient to help them in overcoming these barriers. Even if resources were to be made available to support organisations, many would still lack the knowledge and skills necessary to go through the application process and to engage in R&D projects. There have been suggestions that the FE and HE sector is well placed to provide support in this regard.
12. Issues were raised regarding the nature and level of funding that is available to support R&D. These included problems with access to finance, low levels of funding and the limited sources of finance that respondents believe are available. Some respondents raised concerns regarding the absence of specialist resources, lack of up-front support and the need for more consistency in research and development funding.
13. A number of respondents from both the private and public sectors raised concerns about the limited availability of opportunities for business-led R&D and for support for the commercialisation of R&D. There was general agreement across Government, business and academia that commercialisation of research is where the long-term benefits of increased innovation and R&D will be realised. It was felt that more opportunities for business-led R&D will lead to a greater focus on commercialisation.
14. In acknowledging that there will always be risks associated with participation in R&D respondents believe more could be done to assist businesses to become aware of those risks and to manage them. Perceptions of risk may often be enough to deter a company from getting involved in R&D, especially if there is the perception that the business itself may be at risk if limited resources have to be allocated with no certainty of success. Intellectual Property (IP) risks were cited as a key barrier to collaboration between businesses.

Collaboration is considered to be essential to R&D success. Examples of successful collaboration in leading R&D economies such as Sweden, Finland and Israel were cited as examples of how concerns between companies can be overcome and risks relating to issues such as IP can be managed.

15. The most common risk cited by respondents as a barrier to participation in R&D is the high level of, what is considered, unnecessary and repetitive bureaucracy involved in the programmes and in the administrative processes that are required. This was a major concern regarding EU funded programmes. The Committee recognises that there is little that can be done at implementation level to change this, however there may be opportunities to influence in relation to Horizon 2020. There were also concerns regarding the level of bureaucracy associated with programmes administered at a more local level. The Committee recognises and supports the need for accountability in all funded programmes. The Committee also appreciates that Invest NI has been working to improve the administration of programmes and that much work has been done to eliminate some of the unnecessary bureaucracy. There may be opportunities in this regard to further review processes and streamline programmes to identify and eliminate duplication and unnecessary bureaucracy.
16. Many of the barriers highlighted in the report impact on organisations of all types and sizes from all sectors. These barriers are however magnified for many SMEs and micro-businesses. Small businesses do not have the flexibility and resource to become fully focused on innovation and R&D and still concentrate on the day-to-day running of the business and planning for the future. These businesses need greater levels of hands-on support to enable them to participate in the often complex processes involved in many of the support programmes for R&D. This support may involve every aspect of the process, including support to increase knowledge and skills, support navigating the range of opportunities to determine the most appropriate route to innovation and R&D, help with identifying and managing risks and support through the complexities involved in the process from application to evaluation.

Strategic Approach to Innovation and R&D

17. According to the EU Commission representative in Belfast, Europe's average growth rate has been structurally lower than that of its main economic partners. This is largely as a result of a productivity gap that has widened over the last decade due to differences in business structures combined with lower levels of investment in R&D and innovation, insufficient use of information and communications technologies, reluctance in some parts of society to embrace innovation, barriers to market access and a less dynamic business environment.² The United Kingdom just makes it into the top ten countries for innovation according to the Global Innovation Index³ and is ranked 6th in Europe behind Switzerland, Sweden, Finland, Denmark and the Netherlands. As stated above, levels of innovation and R&D in Northern Ireland are particularly low when compared to successful small economies in Europe and other regions of the UK. Therefore, much work is needed if Northern Ireland is to achieve its potential and achieve the appropriate levels of innovation and R&D as a region.
18. Much positive work is being done to develop and grow the capability within Northern Ireland to become involved in innovation and R&D. It is recognised within DETI that R&D can play a significant role in attracting Foreign Direct Investment (FDI) and economic growth. There have been calls from respondents for the prioritisation of sectors and DETI has done this through the Programme for Government and the Economic Strategy. While much is being done at a strategic level there is also evidence that there is considerable disconnection between programmes, between Government, business and academia and within each of the three sectors. The work DETI is doing at a macro level to develop the R&D agenda from an international perspective is essential to grow the economy through Foreign Direct Investment.

2 Appendix 4, EU Commission, Belfast Office Written Submission

3 Global Innovation Index – Accelerating Growth and Development; Dutta, S. (Editor); INSEAD, 2011

It is also important to drive innovation and R&D within Northern Ireland and support indigenous business of all sizes and academia to engage now and with any new opportunities which may arise in the future. Many respondents have informed the Committee of the need for a more holistic, better coordinated and planned approach across all sectors and at all levels.

19. The infrastructure that is currently in place to support R&D has largely evolved from established support mechanisms as the role of R&D has rapidly developed over the past number of years. Considering the expected future impact of R&D as a key economic driver, a clear vision for innovation and R&D must be developed and implemented, including policies, strategies, structures, systems and processes which are custom-designed specifically to meet the long-term challenge of maximising the potential for Northern Ireland businesses and academia at all levels to take advantage of the existing and future opportunities for innovation, research and development (Recommendation 1).
20. There is considerable evidence that the appropriate structures are not in place to fully support innovation and R&D in a holistic and coordinated manner. Despite the best efforts of DETI and Invest NI, the absence of an appropriate structure is a major barrier to Government developing a more holistic and coordinated approach. Many respondents have suggested the establishment of a single organisation or single point of contact with direct links to business and academia, tasked with supporting all types of organisations. There would be a role for this organisation or unit in gathering market intelligence on R&D from all available sources including benchmarking against regions considered leaders in the field. It would also be the appropriate location for developing, streamlining and improving programmes and processes for innovation and R&D and for ensuring these programmes and processes meet the needs of businesses of all sizes, universities, FE colleges and research institutions. In the first instance, there is a need for a high-level steering group to oversee and set the strategic direction for all R&D activity. A high-level steering group should be established comprising Government, business and academia to advise on policy and oversee the integration and coordination of all R&D activity across all three sectors at all levels (Recommendation 2). The steering group should be involved in setting the vision for innovation and R&D.
21. Below this level a completely new structure is required in the form of a single unit to integrate and coordinate all innovation and R&D activity. It should have four key responsibilities:
 - i. Improving Government knowledge and information on innovation and R&D by gathering knowledge and information through, research, networking and collaboration to identify and learn from good practices; and to identify the contribution that can be made at all levels by Government, business and academia.
 - ii. Developing programmes systems and processes to meet the needs of business and academia by providing programmes of assistance for innovation and R&D; providing support to understand and navigate programmes; and providing support for administering programmes from application to evaluation.
 - iii. Implementing support for innovation and R&D through promotion of opportunities, educating and mentoring, practical support through projects, awareness programmes for support available and for specific programmes (such as Horizon 2020 and the Small Business Research Initiative).
 - iv. Developing and supporting a culture of innovation and R&D across Government, business and academia at all levels in Northern Ireland (Recommendation 3).

Integration and Coordination of Innovation and R&D

22. It is not considered necessary to wait until the establishment of a new structure in order to progress the four key responsibilities outlined above. Innovation and R&D are key priorities for

Government and work should commence now to integrate and coordinate the approach. This should be done in a manner that will enable these responsibilities to be integrated into the new structure as it is developed.

23. It is essential that there is understanding of the contribution that can be made by Government, business and academia at all levels in order to develop programmes, systems and process that can take advantage of the opportunities that exist both now and in the future. Information and knowledge of good practice in other regions needs to be gathered and applied to the Northern Ireland situation. Northern Ireland must become more connected in Europe. The required knowledge and understanding must be gained and shared in order to enable business and academia to work with EU programmes for R&D including FP7 and Horizon 2020. Other sources of support for R&D coming from outside Northern Ireland also need to be developed. This includes developing the venture capital opportunities to help meet growing demand and involvement in the Small Business Research Initiative. It is also important to look inwardly to understand the capabilities, the weaknesses and the potential that exist inside Northern Ireland. There must be a comprehensive knowledge and understanding of what Government, business and academia can contribute to increasing the level and quality of innovation and R&D. Learning from good practices in other countries, developing the ability for Northern Ireland to engage in Europe and understanding the capabilities, the gaps and the potential that exist inside Northern Ireland are the three critical elements to provide the knowledge and understanding required to assist in developing the appropriate infrastructure for innovation and R&D. Therefore, a mechanism should be put in place and resource allocated to undertake the following functions:
 - i. To identify and learn from good practices in innovation and R&D in other countries and regions.
 - ii. To engage regularly with other sources of support such as EU institutions, venture capital firms and the Technology Strategy Board to gain a comprehensive understanding of and influence the initiatives and support programmes that are available for R&D.
 - iii. To gain a comprehensive understanding of the strengths, weaknesses, and potential that exists in Government, business and academia in Northern Ireland to contribute to innovation and R&D.
 - iv. To use the knowledge and understanding gained to inform the development of appropriate systems and processes, to support and improve the capacity and capability of organisations at all levels to participate in innovation and R&D (Recommendation 4).
24. For Northern Ireland to make the most of the opportunities available for innovation and R&D, the programmes, systems and processes that are put in place to implement and support those opportunities must be appropriate to the needs of the wide variety of businesses which may wish to avail of them. They must also meet the needs of universities, FE colleges and research institutions. This must be done efficiently and effectively. Given the large number of respondents from all sectors and of all sizes who are experiencing difficulties in accessing and availing of opportunities, there is much still to be done to align programmes, systems and processes to the needs of those who seek to use them. Programmes for innovation and R&D meet the needs of users. Therefore, Government, business and academia should work together to review and, where necessary, improve programmes developed within Northern Ireland and influence programmes being developed elsewhere, so as to balance the needs of business and academia with those of the Executive (Recommendation 5). In order to ensure that the processes in place to support those programmes are appropriate to the users' needs, Government, business and academia should work together to review and improve existing support processes and, where appropriate, develop new practical measures of support for all innovation and R&D programmes (Recommendation 6). In order to ensure that the level of bureaucracy associated with the administrative processes for innovation and R&D are sufficient to meet accountability requirements without being overly complex or

unnecessary, Government, business and academia should work together to review and, where necessary, improve the administrative processes for R&D programmes developed within Northern Ireland so as to balance the needs and capabilities of business and academia with the needs of the Executive (Recommendation 7).

25. The level of awareness and understanding of innovation and R&D needs to be increased. Programmes of education and mentoring are required and awareness sessions will be required for new programmes such as Horizon 2020 and the Small Business Research Initiative and practical support measures will be required to assist business and academia throughout programmes. A long-term strategy and implementation plan should be developed with appropriate resources provided for promotion of opportunities for R&D, educating and mentoring, practical support through projects and awareness programmes for support available for specific schemes (Recommendation 8).
26. Recommendations have been made for a vision and strategic approach to innovation and R&D. New structures have been recommended from the top down to support innovation and R&D, to develop and implement new and improved programmes and support mechanisms and to raise awareness, knowledge and understanding of innovation and R&D at all levels across Government, business and academia. However, for Northern Ireland to achieve long-term success in R&D as a region and for R&D to make the contribution needed to drive and develop the economy, there must be a culture of R&D across all sectors at all levels. A clear and consistent message and approach must be continuously promoted by Government, business and academia across Northern Ireland to the effect that innovation, and R&D are key drivers for economic growth and will be supported at all levels (Recommendation 9).

Short-Term Measures to Improve Uptake of R&D

27. Throughout the course of the inquiry there were a number of issues raised which the Committee believes can and should be addressed individually. These are largely 'quick fixes' which can be implemented without undue delay. By addressing these issues the message will be sent out that Northern Ireland is serious about addressing the barriers to organisations becoming involved in innovation and R&D.
28. The need for mentoring has been established for all programmes including Framework Programme 7. Mentoring would be particularly welcomed by SMEs and micro-businesses to assist in identifying the type of support best suited to individual companies and to support companies throughout the process. Invest NI should explore ways to open up innovation and R&D mentoring schemes to all businesses which need it. This should include consideration of the contribution that could be made by third parties such as local councils, FE colleges and Local Enterprise Agencies (Recommendation 10).
29. The Committee recognises the high levels of expenditure that businesses undergo to become involved in R&D and the impact this high expenditure can have on cash-flow. Government also recognises this as a problem and, in recognition, has cut the target period for payment of invoices by Government departments from 30 days to 10 days. In the same spirit, the target time period for payment of grants, following receipt of an accurate record of expenditure should be reduced immediately to 30 days with consideration given to how this can be reduced further in the future (Recommendation 11).
30. The Committee was impressed with the high level of success of Northern Ireland companies tendering under the Small Business Research Initiative. The Committee was however disappointed to learn that opportunities do not exist for these progressive companies and others to tender under the SBRI for contracts within Northern Ireland. This constitutes a significant gap in both the innovation and R&D infrastructure here and in the procedures for procurement. The Department of Finance & Personnel must take steps to introduce and promote the Small Business Research Initiative across Government departments, agencies and NDPBs (Recommendation 12).

31. Given the importance of venture capital to small, early-stage, high-technology, knowledge-based companies, there seems to be little resolve to deal with the issue as a priority. DETI recognises that venture capital is critical and has informed the Committee that it is committed to growing a flourishing venture capital environment. The Department of Enterprise, Trade & Investment must work with others including the universities, NISP, AFBI and venture capital companies to develop a strategy and plan to increase the level of venture capital available in Northern Ireland (Recommendation 13).
32. Some respondents have indicated the need to take advantage, at the earliest stage, of the opportunities available in Horizon 2020. This should involve a process of matching Northern Ireland's research base to the funding priorities of Horizon 2020. Focus should be on the knowledge and experience achieved and business networks created through EU participation. Therefore, preparation for Horizon 2020 should commence immediately, including an assessment of what Northern Ireland can offer, in business and academia, in relation to the funding opportunities available through Horizon 2020 (Recommendation 14).
33. A number of respondents, including Invest NI have suggested that there would be benefits in appointing a Chief Scientific Officer to advise on policy and to lobby on behalf of the Northern Ireland research base and maximise its strengths. There have been calls for a high level science steering committee to lead a science strategy for Northern Ireland. The Executive should explore the benefits of establishing high level structures for science including the appointment of a Northern Ireland Chief Scientific Officer and a science steering committee (Recommendation 15).

Summary of Recommendations

Vision for Innovation and R&D

1. A clear vision for innovation and R&D must be developed and implemented, including policies, strategies, structures, systems and processes which are custom-designed specifically to meet the long-term challenge of maximising the potential for Northern Ireland businesses and academia at all levels to take advantage of the existing and future opportunities for innovation, research and development.

Structures to Support Innovation and R&D

2. A high-level steering group should be established comprising Government, business and academia to advise on policy and oversee the integration and coordination of all R&D activity across all three sectors at all levels.
3. A completely new structure is required in the form of a single unit to integrate and coordinate all innovation and R&D activity. It should have four key responsibilities:
 - i. Improving Government knowledge and information on innovation and R&D by gathering knowledge and information through, research, networking and collaboration to identify and learn from good practices; and to identify the contribution that can be made at all levels by Government, business and academia.
 - ii. Developing programmes systems and processes to meet the needs of business and academia by providing programmes of assistance for innovation and R&D; providing support to understand and navigate programmes; and providing support for administering programmes from application to evaluation.
 - iii. Implementing support for innovation and R&D through promotion of opportunities, educating and mentoring, practical support through projects, awareness programmes for support available and for specific programmes (such as Horizon 2020 and the Small Business Research Initiative).
 - iv. Developing and supporting a culture of innovation and R&D across Government, business and academia at all levels in Northern Ireland.

Improving Government Knowledge and Information

4. A mechanism should be put in place and resource allocated to undertake the following functions:
 - i. To identify and learn from good practices in innovation and R&D in other countries and regions.
 - ii. To engage regularly with other sources of support such as EU institutions, venture capital firms and the Technology Strategy Board to gain a comprehensive understanding of and influence the initiatives and support programmes that are available for R&D.
 - iii. To gain a comprehensive understanding of the strengths, weaknesses, and potential that exists in Government, business and academia in Northern Ireland to contribute to innovation and R&D.

- iv. To use the knowledge and understanding gained to inform the development of appropriate systems and processes, to support and improve the capacity and capability of organisations at all levels to participate in innovation and R&D.

Improving Programmes, Systems and Processes

5. Government, business and academia should work together to review and, where necessary, improve programmes developed within Northern Ireland and influence programmes being developed elsewhere, so as to balance the needs of business and academia with those of the Executive.
6. Government, business and academia should work together to review and improve existing support processes and, where appropriate, develop new practical measures of support for all innovation and R&D programmes.
7. Government, business and academia should work together to review and, where necessary, improve the administrative processes for R&D programmes developed within Northern Ireland so as to balance the needs and capabilities of business and academia with the needs of the Executive.

Implementing Support

8. A long-term strategy and implementation plan should be developed with appropriate resources provided for promotion of opportunities for R&D, educating and mentoring, practical support through projects and awareness programmes for support available for specific schemes.

Developing and Implementing a Culture of Innovation and R&D

9. A clear and consistent message and approach must be continuously promoted by Government, business and academia across Northern Ireland to the effect that innovation, and R&D are key drivers for economic growth and will be supported at all levels.

Additional Short-Term Measures to Improve Uptake of R&D

10. Invest NI should explore ways to open up innovation and R&D mentoring schemes to all businesses which need it. This should include consideration of the contribution that could be made by third parties such as local councils, FE colleges and Local Enterprise Agencies.
11. The target time period for payment of grants, following receipt of an accurate record of expenditure should be reduced immediately to 30 days with consideration given to how this can be reduced further in the future.
12. The Department of Finance & Personnel must take steps to introduce and promote the Small Business Research Initiative across Government departments, agencies and NDPBs.
13. The Department of Enterprise, Trade & Investment must work with others including the universities, NISP, AFBI and venture capital companies to develop a strategy and plan increase the level of venture capital available in Northern Ireland.
14. Preparation for Horizon 2020 should commence immediately, including an assessment of what Northern Ireland can offer, in business and academia, in relation to the funding opportunities available through Horizon 2020.
15. The Executive should explore the benefits of establishing high level structures for science including the appointment of a Northern Ireland Chief Scientific Officer and a science steering committee.

Introduction

Background

16. The Independent Review of Economic Policy (IREP), which reported in September 2009 noted,

“The promotion of innovation and R&D – including business sophistication and, at the regional level, technology transfer – is the most important long term driver of productivity. This is essential for NI to move up the value chain.”
17. The report recognised the time-limited availability of Selective Financial Assistance due to changes in EU State Aid rules. It highlighted the need to incentivise innovation and R&D and to produce business-led, commercially relevant results. The report recommended that most assistance, currently delivered through SFA should be redirected to provide greater levels of support to innovation and R&D.⁴
18. Following a briefing from Assembly Research and Information Services in June 2011, the Committee agreed to commission research into Research and Development (R&D) activity in Northern Ireland and the level of R&D in Northern Ireland within a UK/European/global context. Following consideration of Research Reports the Committee agreed that it would be appropriate to conduct an inquiry into the future role innovation, research and development can play in developing the Northern Ireland economy.
19. In agreeing the Terms of Reference for the Inquiry, the Committee agreed to include provision for the use of a Rapporteur to lead the collection and analysis of evidence and to oversee the drafting of the Inquiry report. The Rapporteur role included taking evidence at informal meetings with key stakeholders. This approach enabled the Committee to widen the range of stakeholders from whom evidence was taken without increasing the duration of the Inquiry.
20. “Europe’s average growth rate has been structurally lower than that of our main economic partners, largely due to a productivity gap that has widened over the last decade. Much of this is due to differences in business structures combined with lower levels of investment in R&D and innovation, insufficient use of information and communications technologies, reluctance in some parts of our societies to embrace innovation, barriers to market access and a less dynamic business environment”.⁵

Terms of Reference

21. The Committee critically examined the mechanisms in place in government for providing assistance to micro businesses, small and medium sized enterprises, large businesses and academia to avail of opportunities for innovation, research and development at international, EU, UK, cross-border, Northern Ireland and local government levels. The Inquiry identified barriers faced by organisations here in availing of opportunities for support for innovation, research & development and makes recommendations on how policies, procedures and practices can be improved in order to maximise opportunities to support innovation, research and development for the benefit of the Northern Ireland economy.
22. Specifically, the Committee:
 - Examined the current policies, programmes and opportunities available to support innovation, research and development at international, EU, UK, cross-border, Northern Ireland and local government levels;

4 Independent Review of Economic Policy; DETI and Invest NI, September 2009

5 Appendix 4, EU Commission, Belfast Office Written Submission

- Examined the current policies, procedures and practices being deployed to assist organisations to avail of those opportunities;
- Compared the assistance provided in Northern Ireland with that provided at regional level in England, in the other devolved administrations, in the Republic of Ireland and in other EU member states;
- Assessed the appropriateness of current policies, procedures and practices in assisting organisations to avail of opportunities for innovation, research and development; and
- Identified actions to be taken by the UK Government, Northern Ireland Executive, DETI, other NI departments, Intertradelreland, universities, businesses and business support organisations and local councils.

Approach to the Inquiry

23. The Committee made a specific call for evidence from identified key stakeholders and a general call for evidence through the Assembly website. On the basis of written evidence submitted, the Committee decided which organisations and individuals to invite to provide oral evidence to the Committee.
24. The Committee undertook visits, as appropriate, to gain a practical understanding of the issues involved and the problems faced by key stakeholders.
25. The Assembly Research and Library Services undertook research into the following areas to inform the Committee:
 - Research & Development strategy, expenditure and constraints in Northern Ireland;
 - Assistance provided to support organisations to avail of research and development opportunities at regional level in England, in the other devolved administrations, in the Republic of Ireland and in other selected EU member states;
 - Identification of the best performing universities in the UK and Rol for Research and development.
 - Identification of international best practice in research and development.
 - Identification of both regional and sector-specific initiatives in the UK.
26. The Committee used the services of a Rapporteur in conducting the inquiry. However the Committee harnessed the knowledge and experience of all its members in collecting, and analysing the evidence for the inquiry and in determining conclusions and recommendations.
27. Those providing written evidence to the Committee were asked to respond by 16th December 2011. Oral evidence was taken between 9th February 2012 and 29th March 2012.

Key Issues and Findings

Current Policies, Programmes and Opportunities for R&D

Local Government

28. Local authorities have implemented a number of schemes under the various European Structural Funds aimed at providing early stage R&D support to micro-businesses.⁶ This type of support is principally aimed at encouraging businesses to engage in R&D for the first time and provides direct mentoring support for the participant businesses.⁷
29. According to the Northern Ireland Local Government Association (NILGA) councils are involved in the process by signposting local businesses to opportunities which they otherwise would not be aware of. Their experience of dealing on a one-to-one basis with their local business community allows them to identify opportunities which can be harnessed and developed through appropriate programmes and contacts which can be essential to the development of innovative concepts and turn them into exploitable products.⁸
30. Lisburn City Council's Innovation Networks Programme aims to place innovation and research at the core of local business development activity and to develop strategic innovation partnerships between businesses located in the Lisburn City Council area and third level education and research centres. Local companies will be encouraged to increase levels of R&D by identifying and developing appropriate new technologies, new processes, new systems and new products that will add value, and improve overall business competitiveness and profitability. In the 2009-2010, the Innovation Networks Programme assisted sixteen local companies to grow their business through increased levels of investment in R&D. The project also enabled businesses to have access to the world class research and new technologies developed by the University of Ulster staff which will provide opportunities to launch new commercially viable products and enter new markets. In the past year, the programme has resulted in one business achieving an Energy & Environment Innovation Award at the 2010 Sustainable Ireland Awards. In addition, another business reported an expected turnover of £60k generated directly from the project over the next five years. Moreover, cumulative collaborative R&D funding secured over next 5 years is anticipated to be £317k.⁹
31. Castlereagh Borough Council offers an Economic Development Services Function to local businesses. For local businesses this offers:
 - Grants advice and support; Business development programmes and mentoring;
 - Links to partner programmes offering support and development; and
 - Tourism development and collaborative support and marketing projects.
32. In September 2011, Castlereagh Borough Council launched the 'Evolution Project'. The project maximises the support available through www.nibusinessinfo.co.uk by the facilitation of an audit benchmarking process. It also puts in place an itinerary of support built around the specific needs of business participants/applicants. All stakeholders have signed up to a memorandum of understanding with a lead consultant managing a pool of 'specialist associates on behalf of the Council.

6 Appendix 4, Belfast City Council Written Briefing

7 Appendix 4, Belfast City Council Written Briefing

8 Appendix 4, NILGA Written Submission

9 www.lisburncity.gov.uk

33. Belfast City Council's Stepping Stone program is principally aimed at encouraging businesses to engage in R&D for the first time and provides direct mentoring support for the participant businesses. The Stepping Stone to Success Program helps companies, in particular micro-businesses working in technologically isolated environments, to bridge the technology competency gap and facilitate innovation. It provides face-to-face contact with experienced professionals who can advise on routes to innovative solutions which are specifically tailored to the needs of the individual company. Immediate advice is available on industry best practice, equipment specification, process improvement and on general technical problem solving. The program identifies areas which are blocking growth or disadvantaging companies relative to their competitors.¹⁰
34. Craigavon Borough Council's 'You Can Develop It' programme works to encourage and support Craigavon companies to implement significant improvements that will help accelerate their growth; and develop their capacity in an increasingly competitive marketplace. Companies are guided on how to think strategically and behave innovatively to take their product/service forward. This will mean the concurrent development of new products and the development of management resulting in the accelerated growth.¹¹ The programme provides mentoring and coaching to assist companies in innovation strategy, assist local companies in the research and development lifecycle and encourages local business to develop their capacity.
35. Newry and Mourne District Council has an active role in economic development. Its Economic Development Unit is involved in sourcing all aspects of funding and this includes, EU (INTERREG, Rural Development). Furthermore, the Council is actively on board with all relevant Government Departments. Newry and Mourne District Council has dedicated officials to advise, signpost, apply for funding and implement projects.
36. These projects have been framed with the aim of establishing sustainable relationships between the local research communities within universities and colleges and business base.

Northern Ireland

37. Up until 2011, Northern Ireland's key R&D strategy document was the Regional Innovation Strategic Action Plan 2008-2011. The plan sought to meet Public Service Agreement 1 – 'promote higher-value added activity through innovation and the commercial exploitation of R&D'.¹² Delivery on this agreement was measured through average annual growth in business expenditure on R&D (BERD). There were two central targets related to this:
 - Increase SME annual growth in BERD by 8%; and
 - Increase larger company growth in BERD by 5%.¹³
38. The Action Plan's strategic objectives are at Table 1 in Assembly Research paper NIAR 281-11 at Appendix 5. The range of objectives presented combines a multi-sectorial approach covering the private, public, and education sectors, with a multi-level outlook that is regional, national and international.¹⁴ The financial contribution committed in the Action Plan is £360m over a three-year period; this includes £170m from Invest Northern Ireland and £90m from the innovation fund.
39. Invest NI's corporate plan (2008-2011) set targets similar to those outlined by the Department above. The plan made a commitment to:
 - Secure Research & Development investment commitments of £120m;
 - Assist 300 companies to engage in Research & Development for the first time;

10 www.belfastcitycouncil.gov.uk/businessprogrammes/steppingstones.asp

11 Appendix 4, Craigavon Borough Council Written Submission

12 www.detini.gov.uk/eco-dev-pubs-4

13 Ibid

14 Appendix 5, R&D Policy, Performance & Barriers, Assembly Research Paper

- Increase the commercialisation of intellectual property from Northern Ireland's university and company research base; and
 - Support MATRIX (the NI Science and Industry Panel), which will advise DETI on policies to better target resources to technology areas of greatest future potential and exploit core niche strengths in the R&D and science base.¹⁵
40. The Committee considered the final progress report on the RISAP at its meeting on 1st December and wrote to the Minister welcoming the achievement of the Plan's objectives. The Committee is currently awaiting the successor to the RISAP, the Action Plan for R&D, Innovation and Creativity. The Committee suggested to the Minister that, when this plan is developed, it would be appropriate to include objectives which demonstrate clear outcomes and benefits including objectives, with annual targets, directly related to increasing the number of companies, the number of locally owned companies and the number of SMEs investing in R&D as well as objectives for increasing the overall spend on R&D in Northern Ireland.
41. MATRIX is a Northern Ireland business led expert panel which advises government on the commercialisation of R&D and science and technology. MATRIX provides advice across areas such as key R&D and science and technology affecting business innovation and emerging strategic technology issues affecting the Northern Ireland economy. MATRIX also plays a role in promoting a culture of innovation and raising the profile of R&D and science and technology, with particular regard to commercial activities. The panel's key objectives range from increasing the economic return from science and technology to promoting the importance of R&D and science and technology in Northern Ireland.
42. The Programme for Government (PFG) introduced three targets, which impacts on Northern Ireland's R&D landscape. The first is to 'support £300m investment by businesses in R&D, with at least 20% coming from Small and Medium sized Enterprises'. Should the 20% target for small and medium enterprises be reached this would equate to £60m in R&D investment from companies of this size over the three year life span of the PFG.¹⁶
43. A second business focused target is to 'support 200 projects through the Creative Industries Innovation Fund'. This target is to be brought forward by the Department of Culture, Arts and Leisure. Whilst not exclusively linked to business R&D, the Creative Industries Innovation Fund (CIIF) has assisted in the development of innovation within business in Northern Ireland.¹⁷
44. The final target focuses on the higher education sector and sets a target of increasing places in courses of economic relevance in the subjects of Science, Technology, Engineering and Mathematics. The increase equates to 1180 additional places staggered over a period of three years.¹⁸ The additional places will be spread across Northern Ireland's universities and further education institutes.
45. R&D is seen as key to rebalancing and rebuilding the Northern Ireland economy, The Department of Enterprise, Trade and Investment's Economic Strategy details how this can be achieved. The Economic Strategy identifies the challenges to R&D and innovation in Northern Ireland such as the need for diversification in target areas and the need to provide greater emphasis on the support of high technology manufacturing industries. The Strategy indicates that R&D and innovation are cross-departmental and presents strategies that reflect this. It also highlights the cross-departmental key actions for further development and contains medium to long-term goals for R&D including:
- The evolution of the NI Science Park into an Open Innovation Centre;

15 Ibid

16 Appendix5, R&D Policy, Performance & Barriers, Assembly Research Paper

17 Ibid

18 Ibid

- Ensuring there is an alignment of publically funded research with economic goals to increase potential for knowledge transfer between business and academia;
- Exploration into the commercialisation of publicly funded research and public sector Intellectual Property;
- Nurturing innovation through public procurement; identification of areas of collaboration between the health sector and business; and
- Examining the establishment of an Innovation Council.¹⁹

46. There is a range of resources available to Northern Ireland businesses wishing to participate in R&D. These include NI specific resources such as Invest NI grants. A summary of funding available for R&D and innovation in Northern Ireland is detailed in Assembly Research Paper NIAR 921-11 at Appendix 5.

Cross-Border

47. InterTradelreland works on a cross-border basis supporting SMEs in North/South trade and business development. The organisation has a particular focus on R&D and Innovation through the Innova programme, which offers businesses an opportunity to participate in cross-border R&D partnerships. Additionally, FUSION is an all-island technology transfer programme that offers support packages worth up to £29,500 to undertake a 12 month innovation project. It also offers businesses general advice on R&D and innovation whilst offering assistance with some EU funding programmes such as Framework Programme 7. InterTradelreland has established an All-Island Innovation Programme which plays an important role in the organisation of innovation lectures and workshops. More detail on the support offered by InterTradelreland is included in the organisation's written submission to the Inquiry at Appendix 4.

48. Although there are no structures in place at regional level to support cross border cooperation on innovation and R&D at a local level an example was provided to the Committee of a cross border partnership between two local councils. A European economic development office has been established in Newry to work with an existing office in Dundalk. A Memorandum of Understanding (MoU) has been agreed between Newry & Mourne District Council and Louth Local Authorities in order to support and promote the economic development and competitiveness of the region.²⁰ The MoU should provide opportunities for cross border cooperation on innovation and R&D.

United Kingdom

49. R&D and Innovation policy for the UK Government was outlined in the Blueprint for Technology, published in November 2010. The strategy aims at making the UK Government the 'most technology friendly in the world' and seeks to drive economic productivity through 'high-growth, high-tech innovative businesses'.²¹ The strategy seeks to remove barriers to and incentivise Innovation and R&D by establishing the right framework for enterprise and investment; maintaining competitive advantage through industries which already possess and have potential to maintain competitive advantage; and reducing the gap between innovation and commerciality.²² The Strategy outlines measures to ensure delivery of these objectives:

- A consultation on the taxation of intellectual property, R&D Tax Credits, the potential for creating a Patent Box and the Dyson Review recommendations;
- Maintaining the science budget in cash terms of the Spending Review period with resource spending of £4. 6 billion a year;

19 Ibid

20 www.newryandmourne.gov.uk/documents/Memorandumofunderstanding-finalVer8-24.9.10.pdf (Accessed 3rd May 2012)

21 Appendix5, R&D Policy, Performance & Barriers, Assembly Research Paper

22 Ibid

- A series of regulation simplifications;
 - a ‘one-in-one-out’ rule whereby no regulation is brought in without another regulation being cut by at least the same amount;
 - ending the culture of ‘tick-box’ regulation;
 - ‘sunset clauses’ for regulations and regulators to ensure that the need for each is regularly reviewed;
 - Afford the public ‘the opportunity to challenge the worst regulations’; and
 - Bringing ‘new discipline to the implementation of EU rules, so that British businesses are not disadvantaged relative to their European competitors and ensure gold-plating is stopped’.
 - The provision, over four years, of £200m to fund the establishment of ‘an elite network of Technology and Innovation Centres’;
 - Creating ‘the most competitive environment in the developed world for venture capital and early-stage investment’;
 - The establishment of the UK Innovation Fund, which comprises of £150m government and £175m of private investment; and
 - Introduce a Small Business Research Initiative (SBRI) to provide R&D procurement contracts to businesses to develop new and innovative products and services.²³
50. Equity gaps in R&D can be addressed using Enterprise Capital Funds (ECF). They are temporary funds, subject to specific deadlines and take the form of public and private money. The ECF has no specific regional or sectorial targets, nor, is it specifically a research and development/ innovation focussed project. Rather it is targeted at encouraging enterprise and productivity growth. The government will contribute up to £25m to a specific fund, or twice the private capital, whichever is lower.²⁴ Investments from Enterprise Capital Funds must be in UK based SMEs or to fund the UK operations of SMEs.
51. Research and Development Tax Credits is a scheme administered by HMRC which permits businesses to claim corporation tax relief on expenditure on R&D that has been undertaken by the business. Under the SME Scheme (businesses with fewer than 500 employees) 200% corporation tax relief is allowed for. Under the Large Company Scheme, businesses can claim 130% corporation tax relief on qualifying R&D costs.²⁵

European Union

52. Programmes and policies at regional, national and European level operate under an umbrella concept called The European Research Area (ERA). The ERA involves all R&D activities in Europe which involve a transnational perspective.²⁶ The ERA seeks to create a European wide market for research that meets the needs of industry, the scientific community and citizens, and which is characterised by a flow of highly mobile competent researchers. The ERA seeks a research infrastructure that is fully integrated and accessible to research teams from Europe; Research institutions engaging in public-private cooperation and partnerships forming research clusters and networks for knowledge transfer; research programmes and priorities, that emphasise jointly-programmed public research investment; and a research area that is open to the world.²⁷

23 Appendix5, R&D Policy, Performance & Barriers, Assembly Research Paper

24 Appendix1, R&D and Innovation – strategy and support in the UK, Scotland, Wales and Republic of Ireland, Assembly Research Paper

25 www.hmrc.gov.uk accessed 27th April 2012

26 Appendix1, R&D and Innovation – strategy and support in the UK, Scotland, Wales and Republic of Ireland, Assembly Research Paper

27 Appendix5, Framework Programme 7, Assembly Research Paper

53. Framework Programme 7 (FP7) is the principal delivery mechanism of research policy and funding at a European level. FP7 has a lifespan of seven years between its implementation in 2007 and its completion in 2013. The budget for the programme over its seven year cycle is €50.5bn with an additional €2.7bn made available for its first five years through the Euratom programme.²⁸ Activities funded through FP7 must have a 'European Added Value'. To meet this objective projects often have a transnational element, incorporating consortia of participants from different member and non-member states.²⁹
54. FP7 is made up of five programmes: The Cooperation Programme; The Ideas Programme; The People Programme; The Capacities Programme; and The Eurotom Programme. Of these, the greatest proportion of funding is earmarked for the Cooperation Programme - €32,365m. This programme focuses on research into areas such as Health, Energy and Environment.³⁰
55. As of 1 April 2011, Northern Ireland organisations have participated in 110 projects, with a requested financial contribution of €30m. Northern Ireland Participation in FP7 has been highest in the Higher Education sector which makes up 65% of total participation.³¹
56. A detailed analysis of Framework Programme 7 can be found in Assembly Research paper NIAR 636-11 at Appendix 5.
57. Horizon 2020 will be the successor to FP7 running from 2014 to 2020. It will bring together all existing EU research and innovation funding currently provided through FP7, the Competitiveness and Innovation Framework Programme (CIP) and the European Institute of Innovation and Technology (EIT). The different types of funding provided by the existing programmes will be brought together into a single coherent, flexible framework. It will provide funding for every stage of the innovation process from basic research to market uptake, in line with the EU's commitments under the "Innovation Union".³² Horizon 2020 will have three strategic objectives:
 - Strengthening the EU's position as a world leader in science;
 - Ensuring Europe is an attractive location to invest in research and innovation; and
 - Tackling the major societal issues affecting the lives of European citizens.

International

58. The US Ireland R&D Partnership is highlighted in the written submission from InterTradelreland at Appendix 4. It is considered a unique alliance between the three jurisdictions to address common research challenges in nanotechnology, sensor technology, telecommunications, energy & sustainability and a range of health areas. In oral evidence, InterTradelreland representatives stated that although the process has been slow to get established, it is now at the stage that participants in the programme are branded as being world-class in whatever area they are working.³³

Summary of Assistance Provided for R&D in Other Regions

England

59. In England local areas are offered the opportunity to take control of their future economic development. Local Enterprise Partnerships are locally-owned partnerships between local

28 Ibid

29 Ibid

30 Appendix5, Framework Programme 7, Assembly Research Paper

31 Ibid

32 <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/848&format=HTML&aged=1&language=EN&guiLanguage=en>

33 Appendix 2, InterTradelreland Hansard

authorities and businesses and play a central role in determining local economic priorities and undertaking activities to drive economic growth and the creation of local jobs. They are also a key vehicle in delivering Government objectives for economic growth and decentralization, whilst also providing a means for local authorities to work together with business in order to quicken the economic recovery. As Local Enterprise Partnerships are based on more meaningful economic areas, they will be better placed to determine the needs of the local economy along with a greater ability to identify barriers to local economic growth³⁴ The UK Government's coalition programme supports the creation of Local Enterprise Partnerships as replacement of the Regional Development Agencies (RDAs).

60. There have been 39 partnerships announced thus far. Priorities relating to innovation and R&D include:
- Greater Manchester Local Enterprise Partnership: Capitalizing on the area's world class research, science and innovation capability;
 - Cumbria Local Enterprise Partnership: Driving enterprise, innovation and growth in the Cumbrian economy, delivering real long-term growth in the most efficient and effective ways possible through both our rural and urban based businesses; and
 - North Eastern Local Enterprise Partnership: Promoting productivity, enterprise and business growth through developing innovation and exploiting research and development capabilities.³⁵
61. A Local Enterprise Partnership Network has been established to enable Local Enterprise Partnerships to come together to discuss shared issues, engage with Government and share knowledge and best practice. It is also intended to be a gateway to news and information of importance to Local Enterprise Partnerships.

Scotland

62. The Scottish Economic Strategy places R&D and innovation amongst a number of broader strategic objectives. It seeks to:
- Support the development of innovation and its commercialisation;
 - Invest in universities and the creative industries, and tailor Scottish life sciences to assist in the development of key sectors – creative industries; energy (including renewables); financial and business services; food and drink (including agriculture, and fisheries); life sciences; sustainable tourism; and universities;
 - Develop a skills base that is responsive to the needs of business; and
 - Support innovative low carbon technology to assist transition to a low-carbon economy.
63. R&D and innovation policy is driven by a number of agencies. The first is the Scottish Science Advisory council (SSAC). The SSAC advises the Scottish Government's Chief Scientific Officer on specific issue and science related policy with a view to promoting economic growth and ensures that it has a diverse membership across a range of stakeholders. Scottish Enterprise (SE) is a development agency that facilitates R&D and innovation policy. SE offers a range of grants and supports including SMART Scotland, R&D Grants, Seven Framework Programme, R&D Tax Credits and access to the Winning through Innovation Programme. The Highlands and Islands Enterprise (HIE) is a development agency that focuses specifically on these regions in Scotland. The HIE offers finance and support through funding schemes, Small Business Research Initiatives and grants aimed at supporting collaboration between businesses and academia. The Scottish Funding Council (SFC) is the final agency. The SFC is

34 Regeneration and Economic Growth <http://www.communities.gov.uk/regeneration/economicgrowth/localenterprisepartnerships> (Accessed 24/04/12)

35 Local Enterprise Partnerships Summaries, <http://www.communities.gov.uk/localgovernment/local/localenterprisepartnerships/summaries/> (Accessed 24/04/12)

the main funding body for Scottish universities and colleges. Funding from the SFC supports strategic initiatives in universities including research activities and general funding for teaching activities.³⁶

Wales

64. The 2011 policy document 'Economic Renewal: A new direction' outlines the Welsh Government's current policy on R&D and Innovation. Welsh policy includes a range of measures intended to encourage innovation and R&D. It contains commitments to:
- Address under-used business incubation capacity; and
 - Adopt a more focused approach, tackling barriers to investment in R&D and innovation.
65. Funding for R&D in Wales supports industrial research, experimental development, and exploitation. This funding is labelled as repayable finance, it is however, not repayable. Funding is also available at a local level through the Local Investment Fund, tailored toward SMEs. Private investment is facilitated through Finance Wales. Early stage finance is focussed upon technology businesses. Funding for the Higher Education Sector is delivered by The Higher Education Funding Council for Wales. Funding is broken down into teaching, research and postgraduate research.³⁷

Republic of Ireland

66. There are a number of actors involved in the delivery of R&D and innovation policy in RoI. The Department of Jobs, Trade and Innovation published the key strategy document, Science for Technology and Innovation (2006), containing measures they seek to promote:
- Academic research;
 - Graduate schools;
 - Commercialisation;
 - Industrial research;
 - Public sector research;
 - Public awareness; and
 - Cross-border and international cooperation.
67. In the RoI 50% of R&D funding is drawn from business enterprises, with the government providing 31% of funding. The largest share of Government funding is allocated to the higher education sector through the Higher Education Authority. Funding and support for R&D and innovation in business is offered through Enterprise Ireland. This includes:
- R&D Stimulation Grant;
 - R&D Fund: Small Projects;
 - R&D Fund: Large Projects;
 - Innovative High Potential Start Up support;
 - Funding for collaborate on Research and Development Projects with Colleges and/or Companies;
 - Innovation Vouchers;
 - R&D Advocates Scheme;

36 Appendix1, R&D and Innovation – strategy and support in the UK, Scotland, Wales and Republic of Ireland, Assembly Research Paper

37 Appendix1, R&D and Innovation – strategy and support in the UK, Scotland, Wales and Republic of Ireland, Assembly Research Paper

- Innovation Partnership Programme;
 - Applied Research Enhancement;
 - Technology Centres; and
 - Support accessing FP7 funding and other EU streams.³⁸
68. IDA Ireland and InterTradelreland both offer support and funding opportunities through grant aid. However, InterTradelreland offer programmes such as the FUSION programme - offering companies the opportunity to employ graduates – and The Innova programme which offers business grants for carrying out an innovation programme in partnership with a company from Northern Ireland.
69. Enterprise Ireland is the government organisation responsible for the development and growth of Irish enterprises in world markets. They provide supports for both companies and researchers in Higher Education Institutes to develop new technologies and processes that will lead to job creation and increased exports. Services provided by Enterprise Ireland include:
- Incentives to stimulate in-company R&D – new product, service and process development to ensure sustainability, and growth through the evolution of products and services.
 - Assistance with R&D collaboration - with research institutions, to develop and bring to market new technologies, products or processes.
70. Companies in RoI can also claim for 25% R&D tax credit.

Finland

71. The Ministry of Employment and the Economy and Ministry of Education and Science are responsible for the Finnish innovation system at departmental level. VEKES is the main funding agency providing grants of €600m annually. Finland performs well across a number of indicators: The region's human resource performance is strong; the region is marked by high business investments; and Finnish SME cooperation in innovation has been growing at a faster rate than the EU average. The National Innovation Strategy (2008) outlines the current research and innovation policy. It is based on ten principles:
- reinforcing the competence base;
 - broad-based innovation activity;
 - internationalisation of the innovation environment and operating in a world without borders;
 - strong and networked innovation centres;
 - internationally competitive system of training and higher education;
 - developing the Finnish environment to support growth businesses;
 - strengthening demand and user orientation;
 - central government's corporate steering and a systemic approach;
 - resources for innovation activity; and
 - International review of the innovation system.³⁹

Sweden

72. The Ministry of Enterprise, Energy and Communications and the Ministry of Education are both responsible for innovation and research policy. The Swedish Research Council and

38 Appendix1, R&D and Innovation – strategy and support in the UK, Scotland, Wales and Republic of Ireland, Assembly Research Paper

39 Appendix1, EU Innovation Policy – Best Practice, Assembly Research Paper

the Agency for Innovation Systems (VINNOVA) are the agencies responsible for delivery of innovation and research policy. VINNOVA has a range of responsibilities in the delivery of innovation policy:

- Investing in research and innovation;
- Improving the innovation capacity of SMEs – which includes coaching and facilitating their promotion in international partnerships;
- Promoting global links – through bilateral linkages and through participating in EU R&D programmes;
- Policy development; and
- Utilising the Country's innovation infrastructure – which includes a strong research and innovation environment, testing and demonstration sites, incubation facilities, and the relationship that exist amongst the 'triple helix'.⁴⁰

73. The country's research and innovation system has a number of strengths:

- High-levels of investment in R&D – in 2009 total Swedish R&D investment amounted to 112bn Swedish Krone (SEK);
- A concentration of large global corporations with a culture of R&D investment;
- An internationally linked economy (although with some distance to market);
- An export orientated market that is fuelled by innovation; and
- A long tradition of cooperation within a 'triple helix' – Academia, Government and Industry.⁴¹

74. Sweden's research and innovation focus is on health, biotechnology and transport with a focus on promoting excellence in Universities and linking academia to business.

Germany

75. In Germany, the federal government and the 16 L nder each has roles and responsibilities in the delivery of innovation policy. At federal level, the Federal Ministry of Education and Research and the Federal Ministry of Economics and Technology are responsible for research and innovation. There are more than 20 organisations - across Germany's governance system - responsible for the delivery of policy formulated at federal or state level. Current policy is a response to specific research and innovation challenges:

- Funding innovation - German policy is to offer a range of financial support mechanism to SMEs including venture capital (the High-tech start-up fund), loan programmes and grants. In 2008 the Central Innovation Programme for SMEs (ZIM) was launched. In 2009 and 2010 ZIM had an annual budget of €300m, rising to €500m from 2011.
- Keeping pace with global technology trends – federal government launched a series of 17 'Thematic R&D Programmes', which target policy and funding at specific technological areas.
- Adapting Germany's education system to meet the needs of rapidly evolving requirements of technology and innovation – the Federal Government has have reformed vocational training courses, introducing new, 'modern' courses and improving the supply of further education, including additional financial incentives for employees.
- Continuing the strong tradition of industry-science link ups – A number of policies have been adopted to ensure this tradition continues. The region has also introduced the

40 Appendix1, EU Innovation Policy – Best Practice, Assembly Research Paper

41 Ibid

Research Bonus to strengthen the ability of universities and public research institutions to co-operate with SMEs.⁴²

76. Case studies on regional innovation systems – including Baden-Württemberg, Germany - can be found in Assembly Research paper NIAR 850-11 are included at Appendix five.

Academia Involvement with Business in R&D

Further Education Colleges

77. Further Education Colleges engage with business through a range of projects and initiatives. The aim of these is to increase collaboration with business in a knowledge sharing capacity.
78. The Belfast Metropolitan College (BMC) has used the Knowledge Transfer Partnership (KTP) as a vehicle for research engagement between the College and local businesses. The experience gained from the KTP has led to an exploration of Framework Program 7 initiatives. BMC contend that the establishment of networks for sharing information and developing ideas is crucial to supporting R&D. BMC's own knowledge network - Club Met - facilitates business to business engagement and access to a range of resources at the college which provide research and development support.
79. The Northern Regional College (NRC) has outlined an Economic Engagement Strategy. The strategy aims to develop relationships between the college and organisations through value added services. The college's engagement with business is classified into three categories: Strategic Partners; Stakeholders; and Consumers.
80. The South West College (SWC) has provided an on-the-ground practical R&D support presence through its InnoTech Centre. The Centre is assisting business to become more competitive through research and development. An example of the SWC's involvement with business is illustrated in the Kilkeel Development Association, where nine SMEs have partnered to research a sustainable vision, incorporating renewable technologies and sustainable development.

Queen's University Belfast

81. In the written evidence submission, QUB indicated that there are a variety of funding schemes that currently exist to incentivise collaboration between business and academia. QUB have been successful in many of these schemes including the Knowledge Transfer Partnership, which has been beneficial to university collaboration with business.
82. A major factor in QUB's success is QUBIS Ltd which, over the past 25 years, has created more than 50 high technology companies and over 1,000 jobs, and is continuing to make a very significant contribution to the local economy generating an expected turnover of £104m in 2010.⁴³
83. In exchange for an entrepreneur's time and initial investment QUBIS Ltd will provide an investment, the use of university facilities and university intellectual property.
84. QUB contends that having a level of expertise closer to academics and businesses linked into academia makes a huge difference.

*"It has allowed us, since November 2011, to put forward 11 funding applications to a value of up to £30 million."*⁴⁴

42 Appendix1, EU Innovation Policy – Best Practice, Assembly Research Paper

43 Appendix1, Identification of Best Performing Higher Education Institutions for R&D in the UK and ROI, Assembly Research Paper

44 Appendix 2, QUB Hansard

85. QUB considers it important to engage with business much earlier in the research process and insists collaboration is about;

“understanding what the problems of industry and companies are and ensuring that our research pieces are tuned to those needs and that we work in partnership”⁴⁵

University of Ulster

86. In the oral briefing from the University of Ulster (UU), representatives reported that they have witnessed a higher degree of engagement from business into university research and a higher outflow of research into the economy.⁴⁶

87. Furthermore, UU noted that there is a much higher degree of engagement from academics in business activities. They indicated:

“We reckon that, in 2011, around 37 our academics are working with companies today”⁴⁷

88. As a result of this engagement, academics are seeing the institutional benefits from engaging with industry, both to their teaching and research activities.

89. UU indicate that the criteria have changed in the Research Assessment Exercise (RAE) and Research Excellence Framework to place a higher emphasis on impact. UU explained what the changes meant:

‘That is the translation of research outputs into the economy, including providing competitiveness for industry; policy inputs and impacts; and societal inputs and impacts.’⁴⁸

90. The success of UU in collaborating with business is a result of their work with spin-off companies. Innovation Ulster Ltd is a legally constituted vehicle through which the University of Ulster engages commercially with the business community and investors.⁴⁹ Profits and surpluses from commercial activity are brought back into the University for distribution to the academic community and associated faculties and schools.

91. Innovation Ulster Ltd is evidence of UU’s commitment to play a key role in Northern Ireland’s economic and social development.

92. The primary role of the Innovation Services Team within the Office of Innovation is to translate the University’s knowledge and technology (Intellectual Property) into marketable products and services in the most effective and timely manner possible. This is achieved primarily through the following mechanisms:

- Spinouts / New Business Ventures
- Technology Licences
- Consultancy
- Collaborative Development Projects⁵⁰

Universities in the Republic of Ireland

93. Trinity College Dublin nurture strong research capabilities and develop new ways to exploit this resource, an Innovation Centre was founded in 1986. In addition to fostering links between industry and the academic research base, the Innovation Centre also serves as an

45 Appendix 2, QUB Hansard

46 Appendix 2, UU Hansard

47 Appendix 2, UU Hansard

48 Appendix 2, UU Hansard

49 Appendix1, Identification of best performing Higher Education Institutions for R&D in the UK and ROI, Assembly Research Paper

50 Innovation Ulster Ltd, <http://oi.ulster.ac.uk/office-of-innovation/what-we-do> (Accessed 30/04/12)

incubator for small businesses which spin-off from research.⁵¹ Over 40 companies have been set up, creating over 1,000 jobs.

94. Nova UCD, the Innovation and Technology Transfer Centre, is the hub of innovation and knowledge transfer activities at University College Dublin. Nova UCD's vision is to become an international leader in the commercialisation of research and other knowledge-intensive activity for the benefit of the economy and society. Since 2004, €3.6 million has been generated from commercialisation research and 56 start-ups have availed of Nova UCD's incubation facilities. Furthermore, 16 new spin-offs have been incorporated with Changing Worlds, a technology company, acquired by Amdocs for \$60 Million.⁵²

Appropriateness of Current Mechanisms for R&D

General Appropriateness of Opportunities

95. There was general support among respondents for most of the programmes in place for supporting R&D. Both QUB⁵³ and Banbridge District Council⁵⁴ believe that generally, programmes are appropriate to support R&D that is both research driven and business led. NILGA believes that there are ample opportunities for businesses and academia to become involved in research and development.⁵⁵ However, in its written submission, QUB stated that the current range of programmes to support R&D is sometimes disconnected, overly complex and can operate in isolation. They state that programmes could benefit from being considered holistically and comprehensively with a focus on greater simplification.⁵⁶ NILGA supports the contention that programmes may be disconnected when it states that too many potentially crossover and compete with one another.⁵⁷
96. In the opinion of Almac representatives, in order to ensure commercial return for R&D, more opportunities are required for business-led initiatives to facilitate industrial organisations opportunities to lead more programmes. The company states that, compared to the number of academic-led opportunities, there is a substantial shortage of opportunities for business to take the lead.⁵⁸ In relation to the type of support offered, Almac states that much of their research is long-term. They state that the available support is for too short a period and the models do not generally suit the type of research the company does. For example, they are presenting pipelines that run for seven or eight years. They informed the Committee that funding is typically for two to three years duration. They are left with a deficit to fund to try to get products to market. Work is being held back because, although some projects are very good, they cannot take them forward as they do not have the finance. They believe a five to six year programme would be more suitable.⁵⁹
97. ADS informed the Committee that small companies require market driven projects to achieve a faster return on their investment. They believe that collaboration with universities can provide small companies an effective means of R&D participation. However, they state that, according to SMEs with which they have contact, this is not always practical for business as some programmes are focused more on academic research than on market driven

-
51. Appendix1, Identification of best performing Higher Education Institutions for R&D in the UK and ROI, Assembly Research Paper
52. Appendix1, Identification of best performing Higher Education Institutions for R&D in the UK and ROI, Assembly Research Paper
53. Appendix 4, QUB Written Submission
54. Appendix 4, Banbridge District Council Written Submission
55. Appendix 4, NILGA Written Submission
56. Appendix 4, QUB Written Submission
57. Appendix 4, NILGA Written Submission
58. Appendix 4, Almac Ltd Written Submission
59. Appendix 2, Almac Ltd Hansard
-

opportunities.⁶⁰ In oral evidence to the Committee, ADS stated that their members believe more focus needs to be centred on funding for SMEs.⁶¹

98. Opportunities are not very appropriate for micro-businesses with fewer than 25 employees according to Cirdan Imaging.⁶² They state that such companies constitute over half of the businesses in Northern Ireland. They consider the systems too bureaucratic and state that micro-businesses have difficulty with cash-flow constraints, showing matching funding and the grants are often too low a level to sufficiently cover the real cost of innovation. Hence, they are not attractive for many small businesses. Northern Regional College also believe that measures to ensure compliance with criteria for funding can act as a barrier to smaller companies.⁶³

99. There are a large number of support programmes available for R&D. DETI officials informed the Committee that a number of programmes in Invest NI could be clustered together and in that way, would work much more effectively together than they do apart.⁶⁴ In response to a question from the Committee relating to the potential for confusion arising from the wide range of support available from a range of public and private providers, the Department responded that an exercise is currently underway to map the key programmes and the support for organisations wishing to become involved in R&D.⁶⁵ In its written evidence to the Committee, Invest NI highlighted its 'Innovation Escalator' approach to providing support for R&D through its range of interventions. This is outlined at Appendix 4, in Appendix A to the written submission from Invest NI. In oral evidence, Invest NI representatives defended the organisation's programme for R&D stating that they consider it one of the most flexible in the UK. The Committee was informed that Invest NI has revised its support to maximise its flexibility through the introduction of a single grant for R&D. It has also allocated a growing proportion of its budget to activity incentivising R&D with 80% of the R&D budget going directly to businesses through R&D grants.⁶⁶

Innovation Vouchers

100. Innovation vouchers were seen by many respondents as an appropriate means for businesses to get on to the Innovation ladder. For example, Belfast Metropolitan College stated that they represent a very credible first step into the research arena for businesses.⁶⁷ They consider the process simple, and informed the Committee that Invest NI has tried to make it as easily accessible as possible.⁶⁸ The CBI agree with this, stating that Innovation Vouchers almost force an initial engagement that can lead to a Knowledge Transfer Partnership or a Fusion Programme and, eventually, on to larger research grants such as Invest NI funding or Innova.⁶⁹

101. A number of organisations, including Northern Regional College,⁷⁰ Newry & Mourne District Council⁷¹ and Belfast City Council⁷² report that many local micro-businesses can be excluded through what they see as over rigorous conditions in relation to eligibility criteria for the scheme such as the requirement to hold a current valid Company Registration Number.

60 Appendix 4, ADS Written Submission

61 Appendix 2, ADS Hansard

62 Appendix 4, Cirdan Imaging Ltd Written Submission

63 Appendix 4, NRC Written Submission

64 Appendix 2, DETI Hansard

65 Appendix 4, DETI Written Submission No.2

66 Appendix 2, Invest NI Hansard

67 Appendix 4, BMC Written Submission

68 Appendix 2, BMC Hansard

69 Appendix 2, CBI Hansard

70 Appendix 4, NRC Written Submission

71 Appendix 4, Newry & Mourne DC Written Submission

72 Appendix 4, Belfast City Council Written Submission

102. While supporting the concept, Belfast Metropolitan College suggest that the current model for awarding Innovation Vouchers could be reviewed. They state that vouchers are awarded in three £4k sums to a business however they believe that, if a business could acquire £12k in one lump sum it would allow for greater depth of research study and more effective outcomes. If this model was then rolled out through a clustering approach within sectors, they believe much greater returns could be achieved. They consider FE colleges to be well equipped to undertake such an approach.⁷³

Research and Development Tax Credits

103. There was much support among respondents for R&D tax credits. ADS state that it is widely viewed as an efficient mechanism for incentivising R&D and stimulating investment in innovation.⁷⁴ The CBI believe they take some of the risk out of innovation and the process seems to work well.⁷⁵ ADS consider them key for both large and small businesses investing in R&D and have been a tremendous boost for such companies.⁷⁶ UCD state that, within the UK, the R&D tax credit system has been seen to be beneficial to both large and small companies. They suggest Northern Ireland could lead the way in expanding these schemes.⁷⁷ Manufacturing Northern Ireland believe the awareness of R&D tax credits needs to be improved.⁷⁸ Asidua Ltd informed the Committee Chairperson that there is a lot of confusion regarding the availability of tax credits to those companies which have received assistance from Invest NI for the same R&D project. They indicated that most companies are not aware of how the tax credit system works and called for Invest NI to clear up the confusion on the matter.⁷⁹
104. Invest NI acknowledge that there has been a misconception that support for R&D from Invest NI cannot be accessed along with tax credits. They concede that the level of uptake of tax credits is low but that it is increasing. The reasons may be a combination of two factors: firstly, companies may not realise that tax credits are available for the R&D work they are undertaking; and secondly, organisations may not realise that the work they are doing actually counts as R&D from the perspective of Her Majesty's Revenue & Customs (HMRC). Invest NI representatives informed that Committee that there is an awareness issue that needs to be addressed. Invest NI have started to address this through the production of a booklet on R&D tax credits in association with HMRC.⁸⁰

Knowledge Transfer Partnerships

105. The CBI consider Knowledge Transfer Partnership programmes a useful step on the R&D ladder. They informed the Committee that KTPs provide good opportunities for businesses.⁸¹ Invest NI consider KTPs an excellent means of starting to get companies involved in collaborating with the research base.⁸²
106. QUB state that the recent evaluation of KTP programmes, has resulted in a significant drop in KTPs between the universities and SMEs within Northern Ireland. They believe that, as a result, QUB, which led the UK by a considerable distance, has seen other UK regions catch up dramatically. They informed the Committee that the evaluation and appraisal is still going

73 Appendix 4, BMC Written Submission

74 Appendix 4, ADS Written Submission

75 Appendix 2, CBI Hansard

76 Appendix 2, ADS Hansard

77 Appendix 4, UCD Institute of Physics in Ireland Written Submission

78 Appendix 4, MNI Written Submission

79 Appendix 3, Interview with Asidua Ltd

80 Appendix 2, Invest NI Hansard

81 Appendix 2, CBI Hansard

82 Appendix 2, Invest NI Hansard

on over a year later.⁸³ Belfast Metropolitan College state that additional KTP funding should be provided which is set against regional criteria and supports the types of projects emerging from the FE sector.⁸⁴ In oral evidence to the Committee, the College stated that it was one of the most successful colleges in the UK in respect of KTPs.⁸⁵ Representatives outlined how they have developed the programme to make it more suitable to SMEs. They informed the Committee that recent changes to the criteria have meant that it has gone back to being more pure research-driven and more academic resulting in the KTP proposals of many companies not being considered innovative enough. They informed the Committee that they have been told that the success of a KTP programme is now based on the quality of the resulting journal paper rather than on commercial success. QUB informed the Committee that KTPs in Northern Ireland have declined by 30% since the start of an additional review in October 2010 and the absence of funding at regional level. They believe the national assessment framework currently employed is not necessarily attuned to the needs of Northern Ireland as a region.⁸⁶ The University of Ulster is of a similar view. They informed the Committee that the University has lost two years of enhanced funding to industry which means that opportunities have been lost for Northern Ireland companies to have an Impact. They stated that they have reduced the level of activity by 16% at a time when the importance of innovation to the economy is being highlighted.⁸⁷ QUB did, however, inform the Committee that a regional scheme will be launched later in the year and the changes made are likely to be positive.

107. In an interview with the Chair, the CEO of TSB outlined the current position with the Knowledge Transfer Partnership.⁸⁸ There are currently 44 live KTPs in Northern Ireland. They are considered a good means of transferring knowledge in universities to SMEs. Northern Ireland excels in KTPs with QUB the number one university in the UK in this area. There is an excellent economic return of £3 for every £1 invested. The UK review of the scheme ran alongside a reduction in budget and Invest NI conducted a Value for Money exercise following the review. The Scheme was relaunched in April 2012. According to the CEO of TSB, Northern Ireland's strength lies in the excellent higher education systems, strong SME base and expertise of Invest NI. Northern Ireland is now in a good place to take full advantage of KTPs and has a huge opportunity to be the UK exemplar for KTPs.

Venture Capital

108. The University of Ulster informed the Committee in oral evidence that venture capital is a very important tool to help exploit the economic value of research. Representatives explained that in order for spin-out companies to start on the back of R&D and engage with early-stage, high-technology, knowledge-based companies, there is reliance on private equity. They consider venture capital to be a key source of capital and believe a lot more is required in Northern Ireland. Representatives also informed the Committee that there has never been a greater demand for venture capital or so little available.⁸⁹ This view was supported by Cirdan Imaging Ltd.⁹⁰ NISP also consider the lack of venture capital to be a problem. They state that, when considered in isolation, Northern Ireland does have a venture capital scene with money deployed into early stage companies but when considered against that required to develop the entrepreneurial knowledge economy and the scale, structure and skill required to build new world class companies, it is entirely inadequate and insufficient. They believe there is a gap where researchers face difficulty finding early stage funding to develop and test

83 Appendix 4, QUB Written Submission

84 Appendix 4, BMC Written Submission

85 Appendix 2, BMC Hansard

86 Appendix 2, QUB Hansard

87 Appendix 2, UU Hansard

88 Appendix 3, Interview with Mr Iain Gray, CEO TSB

89 Appendix 2, UU Hansard

90 Appendix 3, Interview with Cirdan Imaging Ltd

prototypes and conduct market research.⁹¹ QUB agrees that addressing the lack of venture capital investment in Northern Ireland must be a priority.⁹²

109. In oral evidence to the Committee, representatives from NISP compared provision here with that in the Republic of Ireland.⁹³ Representatives from NISP reported that Northern Ireland is still far behind both the RoI and Scotland. They consider Northern Ireland to be too small and to have the disadvantage of not having any venture capital companies. They informed the Committee that, any comparison with other regions shows that Northern Ireland has a serious problem and that,

“...if we do not fix that problem, it will be the number one constraint to growing the types of company in the knowledge economy...”

110. NISP representatives explained to the Committee that quite a lot can be done to address the situation. NISP runs a venture capital forum to reach out to, and build relationships with, venture capital companies in Dublin and London. They believe offices could be established by these companies in Northern Ireland.
111. AFBI state that consideration should be given to easing the regulatory burden on venture capitalists and angel investors.⁹⁴
112. DETI officials acknowledged the importance of venture capital in oral evidence when they informed the Committee that venture capital is critical.⁹⁵ In response to a follow-up question from the Committee, the Department stated that, through Invest NI, InterTradeIreland and its support for NISP Connect, the Department is committed to growing a flourishing venture capital environment.⁹⁶

Higher Education Innovation Fund

113. In oral evidence QUB informed the Committee that HEIF is a critical funding mechanism as it allows the universities to have in place an infrastructure of people and expertise, working alongside academics and brokering on gaps with industry and business.⁹⁷ In its written evidence, the University states that the Higher Education Innovation Fund has been recently reviewed in England and maintained at existing levels despite the economic downturn due to good returns on investment. QUB further state that, despite this, recent funding within Northern Ireland over the current CSR period was reduced for HEIF. The University believes that, if collaborative R&D between academia and companies, together with the commercialisation of research (i.e. licensing and spin-outs) is to be taken seriously within Northern Ireland, then HEIF funding must be recognised as the core funding mechanism through which academia-business related R&D is brokered and developed.⁹⁸
114. In its oral evidence to the Committee, AFBI representatives reported that, because it is an NDPB rather than a university, the organisation is not eligible for several research and innovation support programmes in Northern Ireland, GB and RoI, including the HEIF. Representatives informed the Committee that the gap between R&D and commercialisation and innovation is well filled by HEIF. Representatives hoped something could be done to address the anomaly and suggested that a review could be undertaken to see whether support such as HEIF could be provided to research organisations such as AFBI.

91 Appendix 4, NISP Written Submission

92 Appendix 2, QUB Hansard

93 Appendix 2, NISP Hansard

94 Appendix 4, AFBI Written Submission

95 Appendix 2, DETI Hansard

96 Appendix 4, DETI Written Submission No.2

97 Appendix 2, QUB Hansard

98 Appendix 4, QUB Written Submission

NISP Connect

115. In oral evidence to the Committee, representatives from the Northern Ireland Science Park outlined details of the NISP Connect Programme. Around one thousand experienced business people in Northern Ireland have been enlisted. These business people are prepared to provide help, support, advice and expertise on a pro bono basis to help young, developing companies to grow and develop. NISP representatives explained that the programme understands that the researchers with whom business people are dealing are intelligent and fully competent in their field but need encouragement and enticed into the world of business. Part of the programme is about people learning to trust and respect each other so that when capital and business support is needed it can be provided in the most appropriate way.⁹⁹ QUB state that NISP Connect should continue to focus its activities on developing entrepreneurs and developing productive networks in partnership with stakeholders within the innovation ecosystem.¹⁰⁰ Representatives from AFBI were very supportive of the NISP Connect programme in their oral evidence to the Committee.¹⁰¹

Small Business Research Initiative

116. The Small Business Research Initiative is a UK wide programme 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. UCD called for the roll-out of the Small Business Research Initiative across government departments in Northern Ireland. They stated that this would incentivise Government departments to engage with small science-based businesses. Measures such as support for specific R&D projects will help to extract the maximum value from science-based industries.¹⁰²
117. In oral evidence to the Committee, NISP representatives stated that the Small Business Research Initiative is not used enough. They acknowledge that there are proposals in place to increase its use and stated that it would allow Government to procure at an early stage of development and, at the same time measure the benefits before going into real procurement.¹⁰³
118. Cirdan Imaging Ltd suggested in their written submission that the SBRI could be expanded with a regional version established. They suggest that Government should insist that public bodies set aside a portion of their budget to conduct R&D in conjunction with SMEs.¹⁰⁴ UCD supports a more creative approach to public sector procurement suggesting that a fixed proportion of public expenditure should be directed to foster science based businesses and support innovative solutions.¹⁰⁵
119. The CEO of the TSB outlined the role of the SBRI in laying down the challenge to businesses and looking for their ideas on how to find solutions to the challenges Government is facing. Government defines the problem and presents the opportunity for companies to come up with an appropriate solution. It is about Government articulating to small businesses the challenges Government departments are trying to resolve. He informed the Chairperson that Northern Ireland companies are geared up for SBRI in GB but are not yet getting the opportunities here. Northern Ireland companies account for 3% of SBRI applications in GB but constitute 11% of successful applicants and 12% of total funding.¹⁰⁶

99 Appendix 2, NISP Hansard

100 Appendix 4, QUB Written Submission

101 Appendix 2, AFBI Hansard

102 Appendix 4, UCD Institute of Physics in Ireland Written Submission

103 Appendix 2, NISP Written Submission

104 Appendix 4, Cirdan Imaging Ltd Written Submission

105 Appendix 4, UCD Institute of Physics in Ireland Written Submission

106 Appendix 3, Interview with Mr Iain Gray, CEO TSB

EU Framework Programme 7

120. AFBI were positive about the value of funding from EU Framework Programme 7 for early stage research. They state, however, that programmes under FP7 appear to be less well subscribed to by local businesses.¹⁰⁷ A number of other responses also cited problems for organisations in Northern Ireland. QUB stated that there is little dedicated or coordinated assistance available within Northern Ireland to support consortia building and navigating through the complexities of Framework applications.¹⁰⁸ They consider Invest NI's EU support service too small and suggest that there is little coordinated support across Northern Ireland. In common with many other respondents they compare provision in Northern Ireland to arrangements in the RoI, where, they state, there has been long-standing national level resource available to assist with Framework funding. In oral evidence to the Committee, QUB commented on the lack of infrastructure and expertise to support academics and business in drawing down EU funding. They stated that there is a lack of expertise embedded close to the research base and research institutes in Northern Ireland and believe that expertise that is closer to the research base can make a huge difference to the drawdown of EU funds.¹⁰⁹ In their oral evidence, DETI officials highlighted to the Committee that the UK has similar support mechanisms to the RoI so that to compare Northern Ireland as a region with the RoI as an EU Member State was not a fair comparison. However officials recognised the need to improve coordination across Government.¹¹⁰ Invest NI also acknowledge that, as a region, Northern Ireland currently underperforms in the uptake of FP7 funding. They attribute this, in part, to the low uptake by SMEs and to the limited number of large indigenous companies in Northern Ireland.¹¹¹ Information from DETI highlights the role played by Invest NI in running workshops across Northern Ireland on opportunities for FP7 funding and refers to its dedicated support team to help companies with the process.¹¹²
121. ADS asked their members for views on the appropriateness of FP7 funding.¹¹³ Many companies responded that the programme is too resource intensive. ADS report that only large companies tend to benefit from FP7 and that Northern Ireland is a region of small companies. Belfast City Council state that the complexity and difficulties inherent in accessing FP7 have created considerable barriers for Northern Ireland SMEs. The Council cites the substantial support structure in the RoI, as an example of how to facilitate business access to FP7 with support for bid writing and partner sourcing for example. They state that the lack of practical support in Northern Ireland has resulted in only a 20% success rate of applications.¹¹⁴ AFBI representatives commented on the complexity of the processes involved in applying for EU funding stating that in their experience the process can demotivate staff. They also commented on the support mechanisms in the RoI, stating that their scientific colleagues in the RoI have a much closer understanding of the systems in Europe because of their closeness to the departments and because of the departments' closeness to the EU systems. Representatives told the Committee,
- "In the Republic, they benefit from having a body of national contact points that are very closely integrated into Europe through the funding programmes and through the different thematic areas whereas here, we basically share with other regions in the UK, and that obviously dilutes the amount of contact that we have with them."*
122. They believe this needs to be worked on in Northern Ireland. However, AFBI representatives also commented on the success rate of the organisation in attracting EU funding, having

107 Appendix 4, AFBI Written Submission

108 Appendix 4, QUB Written Submission

109 Appendix 2, QUB Hansard

110 Appendix 2, DETI Hansard

111 Appendix 4, Invest NI Written Submission

112 Appendix 4, DETI Written Submission, No.3

113 Appendix 2, ADS Hansard

114 Appendix 4, Belfast City Council Written Submission

had 13 successful FP7 and INTERREG applications and 6 unsuccessful since 2008¹¹⁵ (representing a success rate for the organisation of over 68%). Invest NI outlined to the Committee, steps the organisation is taking to engage with the Department of Jobs, Enterprise and Innovation in the ROI, with DETI and with other Northern Ireland departments to look at how they can work together on opportunities from FP7. Invest NI representatives highlighted to the Committee the advantages of having another Member State so close and informed the Committee that they consider the strengths of the two jurisdictions to be closely aligned.¹¹⁶ InterTradelreland highlighted the work it is doing on FP7 including initiatives developed and consideration of additional new initiatives to stimulate participation in EU research programmes on a cross-border basis. These are outlined in the InterTradelreland written submission at Appendix 4.

123. The CBI believes too much time is wasted by companies having to find suitable partners to satisfy geographical and numerical requirements and that this reduces responsiveness and produces oversized and unwieldy consortia. The organisation states that funding to support Framework applications is only available to Invest NI clients or potential Invest NI clients. The CBI maintains that this results in a gap in funding support for those companies or organisations which are not Invest NI clients. They do, however, state that the promotion of the Framework Programme to businesses should continue to be targeted, thematic and co-ordinated with external partners and interested bodies.¹¹⁷

124. In its oral evidence to the Committee, the CBI provided a detailed description of the hurdles faced by SMEs in accessing FP7 funding.¹¹⁸ They believe that only a small percentage of SMEs are aware of what FP7 is and how they can become involved in it. The time scales involved in the Programme are considered a barrier for SMEs as it is at least four years from initial idea to possible commercial returns. The proposal document is a 120 page technical document for which SMEs would require considerable assistance to complete. A fee of around £35,000 was mentioned for assistance for completing the proposal. The average success rate is about 20% therefore considerable effort may result in no return. In addition, if the proposal is accepted there will be a large, in-kind contribution from the SME. This could be one full-time post at a fairly senior level in a SME. Coordination is also considered a challenge with several organisations across Europe having to be coordinated. In oral evidence, Invest NI representatives informed the Committee of the difficulties faced by SMEs in getting involved in FP7 due to the long lead-in times. They stated,

“You are asking SMEs to start committing to a project which is not even officially launched, because you need to get them involved to find the partners before the launch.”

125. Representatives briefly outlined the complexities involved for SMEs in becoming involved in FP7.¹¹⁹

126. The CBI also contend that, because at least three quarters of the resource will be going to academic institutions, there tends to be a drift towards the technical and academic side rather than the commercial side. They contend that, if care is not taken, this can result in a project that is technically good but commercially useless. The CBI suggests that there should be somebody in an organisation who is responsible for most of the administration relating to the funding application especially proposal writing. The CBI suggests that a company could partner with a technology developer or a university to write the proposal but they suggest that those partners may write the proposal with a focus on their own interests. They also believe companies need to be assisted in dealing with the EU Commission.

115 Appendix 2, AFBI Hansard

116 Appendix 2, Invest NI Hansard

117 Appendix 4, CBI Written Submission

118 Appendix 2, CBI Hansard

119 Appendix 2, Invest NI Hansard

127. InterTradelreland consider many of the issues SMEs have regarding bureaucracy associated with EU funding to be related to perception. They believe that the perception exists that processes are very complex, cumbersome and bureaucratic and that going through the processes is time consuming. Representatives did not contend that the process is not bureaucratic but outlined to the Committee that organisations can play a role in a project as a partner without having the same level of rigorous administrative burden as a project coordinator would have. They consider it important that these perceptions are broken down and that people are educated and encouraged to become involved in European projects.¹²⁰ Cirdan Imaging Ltd also considers the possibility of SMEs acting as suppliers or sub-contractors on EU funded programmes.¹²¹

Horizon 2020

128. Looking to the future, AFBI suggested to the Committee that when developing the research agenda for Northern Ireland, all departments must be mindful of the bigger European agenda and must make sure that the R&D that is being promoted internally fits with the EU research agenda. In this context, the CBI believes opportunities exist now for Northern Ireland to prepare for the advent of Horizon 2020. They state that consideration should be given to the appointment of Horizon 2020 thematic lead such as ICT and agri-food.¹²² InterTradelreland consider it an ideal time to analyse what can be done and to put in place relevant structures to grow participation in Horizon 2020. The organisation's research indicates that stakeholders see an opportunity for businesses and research institutes to form strong alliances to increase success in targeting EU funding.¹²³ They believe the demand for EU Framework funding for cross-border applications is increasing and will continue into Horizon 2020. InterTradelreland's research also demonstrates that such applications have a higher success rate.¹²⁴ In oral evidence, DETI officials informed the Committee that the building blocks are there to ensure that draw down from Horizon 2020 will be greater than is currently the case with FP7 and that work is being undertaken to establish thematic leads under priority areas.¹²⁵
129. The CEO of the Technology Strategy Board (TSB) informed the Chairperson of the need to do more to avail of the opportunities to engage in the European agenda and Horizon 2020.¹²⁶ Jim Nicholson, MEP¹²⁷ agrees that there is a need for greater emphasis on preparation for Horizon 2020 before its inception in 2014. He recommends that smaller companies should concentrate on Horizon 2020 rather than FP7 and that this should specifically include micro-businesses which do not have the resources to apply for funding. This view is supported Diane Dodds, MEP, who considers it important to place greater emphasis on micro-businesses perhaps even with a specific category allocated them.¹²⁸ Mr Nicholson believes there is still time for Northern Ireland to influence the thematic elements of Horizon 2020 to suit the needs of Northern Ireland Industry. However, he contends that Northern Ireland must get better connected in Europe and must develop the structures and knowledge to work with Horizon 2020 and transfer that knowledge back to the right people in Northern Ireland. He considers it important for Northern Ireland representatives to lobby much more in Europe. The EU Commission, Belfast representative suggests Northern Ireland is not in a position to influence the programme at this stage but should concentrate efforts on increasing awareness of Horizon 2020. He contends that emphasis should be on trying to achieve

120 Appendix 2, InterTradelreland Hansard

121 Appendix 3, Interview with Cirdan Imaging Ltd

122 Appendix 4, CBI Written Submission

123 Appendix 4, InterTradelreland Written Submission

124 Appendix 2, InterTradelreland Hansard

125 Appendix 2, DETI Hansard

126 Appendix 2, Interview with Mr Iain Gray, CEO TSB

127 Appendix 3, Interview with Mr Jim Nicholson, MEP

128 Appendix 3, Interview with Mrs Diane Dodds, MEP

research excellence instead of trying to draw down as much funds as possible. He informed the Chair that currently, Northern Ireland does not have many organisations capable of undertaking the Horizon 2020 level of research. He suggests starting with those companies which could provide services as a supplier or sub-contractor.¹²⁹

130. Invest NI representatives updated the Committee on the work that organisation is doing in Brussels in relation to the European Regions Research and Innovation Network (ERRIN) and the European Innovation Platforms (EIPs) in order to become more connected with Horizon 2020 and laying the foundations for its introduction in 2014.¹³⁰

INTERREG Funding

131. In relation to INTERREG funding, QUB informed the Committee that, although the University has an ambition to increase the level of EU funding, the management of those funds has a high overhead. They stated that INTERREG is a very costly scheme to administer and that they believe both universities are considering the amount of engagement they will have in the future because of the amount of bureaucracy that is involved.¹³¹

Other Support

132. The CBI informed the Committee that the Innova Programme is used by companies with experience in accessing funding because they have already established cross-border contacts. They suggested to the Committee that there is a need to make organisations aware of what is involved and whether it is right for them. They believe people can be afraid to get involved in the Programme when they first consider it and, with some assistance can come to realise that it is within their capability.¹³²
133. In oral evidence, InterTradelreland highlighted the benefits of its all-island Business Seed-corn competition where, each year, over 200 companies compete for funding. The Committee was informed that such companies would normally have difficulty in attracting funding but that they have found that companies which reach the finals may have attracted over €120m in funding.¹³³
134. There is a range of other programmes available to support R&D. There is broad support for these programmes from those organisations taking part. In its written submission, AFBI states that DARD's Research Challenge Fund is an important source of funding for research and development in the agri-food and rural sectors in Northern Ireland.¹³⁴ Asidua Ltd has taken part in Invest NI's Compete Programme. They state that both the Programme and the Client Executive support they have received has been excellent.¹³⁵ Invest NI's Proof of Concept Programme has provided an important bridge for AFBI between research outputs and commercialising that research through innovative processes and products. It has also assisted Automated Intelligence with early stage research work.¹³⁶ The University of Ulster informed the Committee that the Proof of Concept programme, helps de-risk projects and validates the scalability of the technology arising from research. They consider the scheme to have been very effective.¹³⁷ Belfast Metropolitan College believe great strides have been made in recent years with the introduction of both the Connected Fund, and the Higher Education Innovation Fund and this has led to industry-focussed applied research in areas such as renewables, composites and bio-business. They state that this applied research

129 Appendix 3, Interview with Maurice Maxwell, EU Commission Office, Belfast

130 Appendix 2, Invest NI Hansard

131 Appendix 2, QUB Hansard

132 Appendix 2, CBI Hansard

133 Appendix 2, InterTradelreland Hansard

134 Appendix 4, AFBI Written Submission

135 Appendix 4, Asidua Ltd Written Submission

136 Appendix 4, Automated Intelligence Ltd Written Submission

137 Appendix 2, UU Hansard

has led to increased collaboration between universities and FE Colleges and has a direct, immediate and measurable impact on companies, including SMEs.

Organisation Awareness, Understanding, Capacity & Capability

Organisation Awareness

135. A large number of respondents cited a lack of awareness and understanding of opportunities for research and development as a key barrier to organisations becoming involved. Many respondents, including Craigavon¹³⁸, Belfast¹³⁹ and Castlereagh¹⁴⁰ councils believe many companies, especially small businesses, are not aware of the supports available to them and therefore do not consider research and development as an option available to them. This view was supported by small businesses such as Pure Roast Coffee Ltd¹⁴¹ and Qwizdom UK Ltd¹⁴², both of which stated in their written submissions that lack of awareness about the sources of support available was one of the main barriers faced by organisations in accessing opportunities to be involved in R&D. ADS, many of whose members are small businesses, found that lack of confidence in local companies in investing in R&D stems from a lack of awareness of opportunities.¹⁴³ QUB maintain the major problem is often a lack of awareness and understanding of how each programme fits into a wider context and of a Northern Ireland strategy for optimising returns from regional, national and international programmes.¹⁴⁴

Organisation Knowledge and Understanding

136. A number of respondents raised the issue that, although organisations may be aware that opportunities exist for research and development they do not have an understanding of those opportunities and may often not realise that they may be eligible to avail of them. DARD believes that the understanding of what support is available and from whom is a barrier.¹⁴⁵ Newry & Mourne District Council and South West Regional College¹⁴⁶ both report a lack of knowledge and information available on existing programmes.¹⁴⁷ Banbridge District Council believes this extends, in most cases, to a lack of knowledge and understanding of the processes involved.¹⁴⁸ NISP supports this assessment. The organisation states that small companies do not know how to access the Knowledge/R&D networks. They believe there is a requirement for efficient support with the minimum overhead and bureaucracy.¹⁴⁹ Research undertaken by InterTradelreland also supports this. It was found that the role of intermediary bodies which can help connect businesses to the resources they need was poorly understood and poorly utilised within the system.¹⁵⁰
137. ADS informed the Committee that a lot of R&D happens within a company that is not viewed as R&D. They suggest many companies are undertaking R&D without realising it.¹⁵¹ South West Regional College consider the main barrier facing SMEs to be an absence of previous experience in undertaking research and development. They state that many businesses do

-
- 138 Appendix 4, Craigavon BC Written Submission
 139 Appendix 4, Belfast City Council Written Submission
 140 Appendix 4, Castlereagh BC Written Submission
 141 Appendix 4, Pure Roast Coffee Ltd Written Submission
 142 Appendix 4, Qwizdom UK Ltd Written Submission
 143 Appendix 2, ADS Hansard
 144 Appendix 4, QUB Written Submission
 145 Appendix 4, DARD Written Submission
 146 Appendix 4, SWRC Written Submission
 147 Appendix 4, Newry & Mourne DC Written Submission
 148 Appendix 4, Banbridge DC Written Submission
 149 Appendix 4, NISP Written Submission
 150 Appendix 2, InterTradelreland Hansard
 151 Appendix 2, ADS Hansard
-

not realise that their product development and product improvement is a form of research and development or that they can avail of funding assistance to help them capitalise on their innovative ideas. The College attributes this lack of understanding in part, to a lack of available information.¹⁵² The response from Manufacturing Northern Ireland supports this. They believe that many companies make a presumption that research and development is only applicable to new products and do not recognise that support is equally available for process development in their existing product range.¹⁵³ NILGA agree that small companies often do not feel that they qualify for any assistance or may consider that the process allowing them to become involved is too cumbersome. They state that most SMEs with the potential to innovate also lack the necessary contacts to create meaningful and efficient partnerships with bodies and institutions allowing them to create, what they refer to as, an “innovation chain”.¹⁵⁴ Manufacturing NI suggest there is a need to expand the understanding of R&D among SMEs and micro-businesses.¹⁵⁵ In this context, Diane Dodds, MEP highlighted the lack of involvement of Local Enterprise Agencies (LEAs) in the promotion of opportunities for R&D and in the development of ideas. She believes LEAs could play an important roles in this regard in the future.¹⁵⁶

Organisation Capacity and Capability

138. As well as issues relating to a lack of awareness and understanding of available opportunities, a number of respondents believe that many companies do not have the capacity or the capability to undertake research and development. Banbridge District Council consider it difficult for isolated small firms to generate, acquire and apply knowledge and technology in a planned and coherent manner. They state that this makes it difficult to plan and encourage their participation in essentially medium to long-term activities such as R&D.¹⁵⁷ Craigavon Borough Council suggest that many lack the scale and resources and need assistance from outside¹⁵⁸. South West Regional College believes the FE and HE sectors are well placed to provide such assistance.¹⁵⁹
139. Both Banbridge District Council¹⁶⁰ and DARD¹⁶¹ suggest businesses including many micro-businesses and SME's lack the absorptive capacity and knowledge to access the support available. Belfast City Council state that SMEs are more constrained by the availability of resources and the need to plan on a shorter term basis with an impetus on shorter payback periods, which is not always appropriate for R&D investments. The Council has undertaken a survey which has shown that SMEs are more likely than larger businesses to require support for innovation, product development and research & development.¹⁶² This is supported by other respondents. NISP state that small companies cannot usually afford the overhead to both navigate the opportunity and to make the speculative bid.¹⁶³ Automated Intelligence Ltd have found that, where a lack of capacity and capability exists within a company, access to appropriate skilled personnel can be difficult and costly.¹⁶⁴ ADS believes that SMEs can have very good ideas but, because they lack the capacity and capability to undertake appropriate

152	Appendix 4, SWRC Written Submission
153	Appendix 4, MNI Written Submission
154	Appendix 4, NILGA Written Submission
155	Appendix 4, MNI Written Submission
156	Appendix 3, Interview with Mrs Diane Dodds, MEP
157	Appendix 4, Banbridge DC Written Submission
158	Appendix 4, Craigavon BC Written Submission
159	Appendix 4, SWRC Written Submission
160	Appendix 4, Banbridge DC Written Submission
161	Appendix 4, DARD Written Submission
162	Appendix 4, Belfast City Council Written Submission
163	Appendix 4, NISP Written Submission
164	Appendix 4, Automated Intelligence Ltd Written Submission

R&D, the idea is set aside and not developed.¹⁶⁵ Castlereagh Borough Council consider key barriers to SME involvement in R&D to be time commitment necessary for businesses to avail of the support, limited human resources and, in many instances, no staff employed in a strategic development role for the business.¹⁶⁶ AFBI representatives reported, in their oral evidence, that as an organisation, they found the process arduous, even though they have a number of scientists with experience in applying for R&D projects. They noted that SMEs find it difficult to keep their heads above water. They commented that it must be impossible for them to take on the administrative burden of applying for R&D support. AFBI believes SMEs would need much more support to undertake R&D than organisations such as themselves.¹⁶⁷

140. NILGA points out the need to promote Innovation among SMEs, highlighting that SMES need to learn that: successful innovation requires a company-wide innovation culture which they must lead, and may involve working with external parties such as third level institutions and suppliers to access skills and other resources not available in-house.¹⁶⁸ This supports the contention of South West Regional College that the FE and HE sector is well placed to provide such assistance. However, NILGA also contests that the key to delivering this culture is to provide SMEs with the capacity and the capability to develop it.
141. QUB believes the key issues are demand-side oriented with too few active R&D companies in the region. They state that those sectors with R&D active companies are currently below critical mass. They also state that entrepreneurial ambition remains below the level of critical mass needed to drive a highly effective knowledge economy in technology intensive sectors. According to QUB, businesses are often not sufficiently engaged to identify knowledge and opportunities. They suggest that mechanisms should be established to better coordinate business engagement and create greater simplification and accessibility to the research base.¹⁶⁹ AFBI representatives supported this contention. In oral evidence they stated that the lack of critical mass of R&D active companies creates difficulties and is holding back productivity. They acknowledge the need to attract more R&D intensive companies.¹⁷⁰ DETI officials suggested to the Committee that this may be an accurate assessment. They stated that there is a systematic problem with the business base in Northern Ireland in that respect.¹⁷¹ Invest NI representatives also commented on systemic weaknesses in the business base, stating that these need to be addressed if the desired and necessary levels of economic growth are to be achieved. They cited R&D as a key driver for economic growth.¹⁷² InterTradelreland research suggests that business have issues in terms of internal capabilities to manage innovation. However, the organisation states that indications from its research are that a large majority of businesses consider themselves to be innovative.¹⁷³

Improving Awareness, Understanding and Capacity and Capability

142. Many organisations which commented on the lack of awareness and understanding of available opportunities brought forward suggestions for how these opportunities could be promoted in the future. Belfast Metropolitan College suggest that promotional campaigns highlighting relevant research opportunities should be targeted at all employers with regular feedback on the changing needs of local businesses through FE/HE business consultative forums.¹⁷⁴ Almac Ltd suggest that proactive promotion of funding opportunities to all types

165 Appendix 2, ADS Written Submission

166 Appendix 4, Castlereagh BC Written Submission

167 Appendix 2, AFBI Hansard

168 Appendix 4, NILGA Written Submission

169 Appendix 4, QUB Written Submission

170 Appendix 2, AFBI Hansard

171 Appendix 2, DETI Hansard

172 Appendix 2, Invest NI Hansard

173 Appendix 4, InterTradelreland Written Submission

174 Appendix 4, BMC Written Submission

- of organisations from academic to SME and large industry would be highly beneficial.¹⁷⁵ Belfast City Council believe that improvement of business awareness of opportunities could be achieved through a series of funding clinics, seminars and workshops and an enhanced engagement programme with businesses at all levels.¹⁷⁶ Many respondents report that there are specific difficulties faced by SMEs. Manufacturing Northern Ireland state that further work should be done with Councils and Local Enterprise Agencies to capture those companies which are not Invest NI clients but are looking for structures to support their research and development activity.¹⁷⁷
143. AFBI believe that organisations such as themselves and other public sector research establishments could, if supported, do more to increase awareness of resources, facilities and services available to the private sector and to increase awareness of the benefits associated with exploitation of Intellectual Property. AFBI also state that the research and knowledge capabilities available to the private sector in Northern Ireland could be better promoted by universities and public sector research establishments working together to jointly promote research and development opportunities through single points of contact.¹⁷⁸
144. The CBI suggest that marketing material and communication portals could be updated with local success stories to inform Northern Ireland stakeholders of those who are active in Europe and the type of projects that are being undertaken.¹⁷⁹ Manufacturing Northern Ireland mirror this in their suggestion that case studies should be developed which show how companies have made use of research and development in a difficult economic climate.¹⁸⁰
145. Belfast Metropolitan College calls for a review of how research and innovation is defined and interpreted by local businesses including the terminology used in literature targeting local businesses in relation to research opportunities.¹⁸¹ NILGA believe the capabilities of smaller firms with low technological capability must be improved. They believe a proactive approach is needed within such companies to broaden awareness, develop people, increase networking, improve management and develop learning processes.¹⁸²
146. Both Belfast City Council¹⁸³ and the CBI¹⁸⁴ believe there is considerable potential for more participation with, and learning from, good practices in other regions, notably the RoI, and their approach to encouraging investment in R&D and innovation. The consideration of the RoI as a model of good practice is also supported by UCD which states that the experience there 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.¹⁸⁵
147. In order to improve awareness and knowledge of R&D, Invest NI has put in place 16 Innovation Advisors of which three are involved in providing support to businesses starting out on R&D activity.¹⁸⁶ The organisation informed the Committee that it has built mutually beneficial relationships with regional, national and international stakeholders to help provide a joined up picture for businesses.

175 Appendix 4, Almac Ltd Written Submission

176 Appendix 4, Belfast City Council Written Submission

177 Appendix 4, NISP Written Submission

178 Appendix 4, AFBI Written Submission

179 Appendix 4, CBI Written Submission

180 Appendix 4, MNI Written Submission

181 Appendix 4, BMC Written Submission

182 Appendix 4, NILGA Written Submission

183 Appendix 4, Belfast City Council Written Submission

184 Appendix 4, CBI Written Submission

185 Appendix 4, UCD, Institute of Physics in Ireland Written Submission

186 Appendix 4, Invest NI Written Submission

148. InterTradelreland highlighted the support that some companies require to create the capability to leverage connections and collaborations. The organisation is piloting the Innovation Challenge Programme, to embed a capability in companies to create markets and launch new products and services at reduced time, money and risk. Representatives informed the Committee that improving connectivity within the system and developing the capability of companies to connect with the system can help increase participation in international R&D programmes.¹⁸⁷

Barriers to Resourcing Support for R&D

Structural Barriers

149. QUB commented positively on the support structures for programmes managed through Invest NI. They state that these programmes are adequately resourced with support for organisations wishing to engage and apply. According to QUB, standard materials, advice, application templates are accessible and dedicated staff are in place to support access to programmes. However, they go on to state that the current incentives and resources are not sufficient for universities and FE colleges to fully engage in knowledge transfer and exchange activities with locally based companies. The University believes such activities are critical to ensure that the regeneration of the local knowledge based economy can occur.¹⁸⁸ Issues were raised by a number of other respondents. Belfast City Council considers the current structure confusing.¹⁸⁹ AFBI believes the current EU support team in Invest NI works with limited resources when compared with other regions and similar bodies.¹⁹⁰ Dr Chris Lundy considers Northern Ireland slow to respond to the opportunities presented by developments in the Chinese economy. He considers the lack of strategy for dealing with and responding to Chinese R&D investment in Europe and its evolution is undesirable, and potentially harmful to the EU's own innovation system. He states that the Confucius Institute may provide opportunities to bring together academia and business to explore and develop R&D opportunities both for companies within Northern Ireland and for Chinese companies seeking R&D opportunities in Europe.¹⁹¹

Barriers to Accessing Funding

150. Access to finance was considered by a number of respondents to be a key barrier to organisations becoming involved in R&D. Banbridge District Council consider the limited financial resources and reducing sources of funding to be a barrier.¹⁹² DARD considered this and the lack of other specialist resources and time to conduct R&D to be barriers to organisations becoming involved.¹⁹³ Automated Intelligence believe the timing of support could be changed to benefit companies. They state that R&D activities require an up-front investment before they can commence. They believe this can be difficult for companies especially those in a start-up phase.¹⁹⁴
151. South West Regional College consider the lack of consistent research and development funding to be one of the main barriers faced by them in assisting companies accessing opportunities to be involved in research and development. They believe the low level of funding available to industrial organisations that only covers a small proportion of costs creates difficulties. They also cite difficulty in obtaining research funding for projects which

187 Appendix 2, InterTradelreland Hansard

188 Appendix 4, QUB Written Submission

189 Appendix 4, Belfast City Council Written Submission

190 Appendix 4, AFBI Written Submission

191 Appendix 4, Dr Chris Lundy Written Submission

192 Appendix 4, Banbridge DC Written Submission

193 Appendix 4, DARD Written Submission

194 Appendix 4, Automated Intelligence Ltd Written Submission

are not high profile or lengthy as a barrier.¹⁹⁵ Almac Ltd have a different view on this. They state that it is often the case that projects further advanced on the R&D pipeline are given a smaller percentage of costs compared to those at the early stages of research. They would like to see support available for longer duration projects.¹⁹⁶ This suggests a need to provide more flexibility in funding opportunities to suit the wide range of organisations that may apply.

Barriers to Business-Led R&D

152. Belfast City Council believes a disproportionate amount of funding for R&D in Northern Ireland is allocated to universities with little success achieved in commercialising the results of research.¹⁹⁷ AFBI believe there is not enough support available for the non-university public sector research base. They added that there is a need for more direct support for promoting and engaging in collaborative research and the commercialisation of its knowledge base.¹⁹⁸ Diane Dodds, MEP suggested that, although universities are benefiting from EU funding, commercialisation of research is where the economic benefits lie.¹⁹⁹ Almac Ltd agrees, stating that there is no support available for the commercialisation of R&D. In oral evidence, the company informed the Committee that it takes around two years to sell new technology to a pharmaceutical company and that support should be available for this.²⁰⁰ ADS found that many of the opportunities for R&D are not market-driven.²⁰¹ They informed the Committee that small companies need market-driven opportunities that will provide a return on investment fairly quickly. ADS explained to the Committee that, if a small company has invented something or developed a new process and it needs to commercialise it, it may need to grow its business or buy new equipment. This is not considered R&D, however, if the company cannot obtain support for this phase it can prevent the commercial development of the opportunity.²⁰² The University of Ulster agrees that there should be much more emphasis placed on the translation of research outputs into the economy.²⁰³

Barriers to SMEs

153. It seems that, at every hurdle, barriers are faced by SMEs in trying to engage in research and development. There is a lack of awareness among SMEs of opportunities, a lack of knowledge and understanding of the opportunities, a lack of capacity and capability to become involved in those opportunities and, according to some respondents, a lack of resources available to support SMEs that want to become involved in R&D. Belfast City Council believe the bulk of opportunities and attention are focused on larger businesses and inward investors. They consider this to be to the detriment of the majority of businesses in Northern Ireland.²⁰⁴ UCD state there is an acute shortage of funds accessible to smaller science-based businesses seeking investment. They believe these companies play a key role in the innovation economy bringing science knowledge and disruptive technologies to the market.²⁰⁵ NISP agree when they state that there is a lack of genuine Knowledge/R&D funding for innovative start-ups to help develop their products.²⁰⁶
154. Cirdan Imaging Ltd presents a range of resource issues which can inhibit SMEs from becoming involved in R&D. This includes lack of grant support for overheads, excessive and

195	Appendix 4, SWRC Written Submission
196	Appendix 4, Almac Ltd Written Submission
197	Appendix 4, Belfast City Council Written Submission
198	Appendix 4, AFBI Written Submission
199	Appendix 3, Interview with Mrs Diane Dodds, MEP
200	Appendix 2, Almac Ltd Hansard
201	Appendix 2, ADS Hansard
202	Appendix 2, ADS Hansard
203	Appendix 2, UU Hansard
204	Appendix 4, Belfast City Council Written Submission
205	Appendix 4, UCD Institute of Physics in Ireland Written Submission
206	Appendix 4, NISP Written Submission

unnecessary bureaucracy, complex support documentation and difficulties in attracting match funding.²⁰⁷ ADS believes SMEs need to have an easier way to access support for R&D in areas that will make a difference to their businesses.²⁰⁸

155. DETI considers it important to get more micro-businesses to be innovative through skills, leadership and management so that when companies recognise the opportunities coming their way in the future, innovative companies can be encouraged to take them. They do however believe that many micro-businesses must consider innovation and R&D a cost. Department officials informed the Committee that those businesses do not really recognise that, although R&D may initially be a cost, it brings long-term benefits.²⁰⁹

Barriers Associated with the Current Economic Climate

156. ADS believes that many SME's in Northern Ireland have a poor or cautious view of the market in the current climate and have little confidence in investing in R&D at present.²¹⁰ Manufacturing Northern Ireland believe that the current economic climate, coupled with the continuing lack of private sector finance, make growth through R&D more difficult.²¹¹ Diane Dodds, MEP agrees that there are issues for small businesses in obtaining capital to develop ideas at a time when financial lenders are less willing to lend.²¹²

Suggestions for Overcoming Barriers to R&D

157. There was a wide range of suggestions from respondents on the provision of resources to organisations to become involved in research and development, including
- Awarding grants to prepare grant claims and submissions.²¹³
 - Providing an effective grant assistance programme for micro-businesses.
 - Paying a proportion of grants up front to ease cash flow problems of businesses.
 - Increasing the level of financial support available to companies for R&D projects to at least 50%.²¹⁴
 - Supporting recruitment costs to help attract personnel with the right skills from inside and outside Northern Ireland.²¹⁵
 - Supporting small scale projects by several grant and academia partnerships and supporting large scale projects through more applied and tailored packages depending on the sector.²¹⁶
 - Improving efficiency through reduction in the amount of expenditure on consultancy activities and increased accountability within organisations funding/ delivering collaborative R&D.²¹⁷
 - Increasing the limit of existing innovation vouchers to further reduce the commercial risk to businesses.²¹⁸

207 Appendix 4, Cirdan Imaging Ltd Written Submission

208 Appendix 2, ADS Hansard

209 Appendix 2, DETI Hansard

210 Appendix 4, ADS Written Submission

211 Appendix 4, MNI Written Submission

212 Appendix 3, Interview with Mrs Diane Dodds, MEP

213 Appendix 4, Cirdan Imaging Ltd Written Submission

214 Appendix 4, Automated Intelligence Ltd Written Submission

215 Appendix 4, Automated Intelligence Ltd Written Submission

216 Appendix 4, Banbridge DC Written Submission

217 Appendix 4, QUB Written Submission

218 Appendix 4, Castlereagh BC Written Submission

- Making grants competitive to drive up quality by awarding only the best 40% to 50% of projects but providing them incentives such as greater than 60% grant support and support for overheads.²¹⁹
 - Providing enhanced all-Ireland support for European funding to leverage funding more effectively at a European level.²²⁰
 - Providing strong national R&D programmes to complement and thereby unlock EU funding.²²¹
 - Raising the level of investment into the Invest NI EU support team, including awareness raising, training, mentoring and funds to assist with project consortia building and bid writing.²²²
 - Topping up financial support on funding obtained from European funding. Alternatively, if an application is not successful, due to a limitation on numbers of projects funded rather than on the quality of the application, some form of funding could be provided from the Government to cover at least part of the application such that the programme can advance and be in a stronger position to apply for additional external funding in subsequent years.²²³
 - Mainstreaming the DEL Employer Support Programme - with block funding given to FE colleges to increase research lecturing time enabling a significant up-take in the time available to engage with employers.²²⁴
 - Providing long-term investment in start-ups through a large-scale, research-focused venture capital fund to assist young companies in Northern Ireland to innovate and expand and working to ease the regulatory burden on venture capitalists and angel investors.²²⁵
158. NISP suggest there is a fear factor and a lack of mentoring available to SMEs. They contend that when a grouping such as NISP is produced, meetings are held in a non-threatening environment and people get to know each other and start to link with experienced people who have knowledge that they do not possess. This leads to a more natural process of mentoring. They suggest that the answer may, in part, lie in a model similar to that already developing in NISP
159. Invest NI concede the need to overcome the barriers and increase the level of high quality innovation, research and development in Northern Ireland. Representatives informed the Committee that the organisation is committed to increasing the scale, quality and speed of R&D from the initial concept through to full commercial application. They informed the Committee that, because participation in FP7 was not happening at the expected level, a mentoring scheme has been introduced specifically to look at the needs of the research base.²²⁶ The organisation has also introduced a range of practical measures which are outlined later in this report.

219 Appendix 4, Cirdan Imaging Ltd Written Submission

220 Appendix 4, Almac Ltd Written Submission

221 Appendix 4, ADS Written Submission

222 Appendix 4, AFBI Written Submission

223 Appendix 4, Almac Ltd Written Submission

224 Appendix 4, BMC Written Submission

225 Appendix 4, UCD Institute of Physics in Ireland Written Submission

226 Appendix 2, Invest NI Hansard

Risk for Organisations Becoming Involved in R&D

Risk Awareness and Management

160. There will always be risk involved in participation in R&D projects and this cannot be eliminated. However, a number of respondents do believe more could be done to assist businesses to become aware of the risks and to manage them. DARD states that the perceived risk provides barriers to effective R&D, if any at all.²²⁷ Belfast City Council states that there is a perception that the existing support comes with a heavy price tag in terms of the potential risk to the applicants' businesses.²²⁸ NISP believes that companies are afraid to apply their limited resources to R&D when there is not enough certainty of success.²²⁹ Dr Chris Lundy concurs stating that there is unwillingness by companies to engage in R&D due to the prospect of failure and the impact that may have on confidence within the business.²³⁰ Almac Ltd states that the low level of assistance available is often not sufficient to offset the risk involved and, as a consequence, higher risk/higher return projects are de-prioritised.²³¹
161. Awareness and understanding of risk was also considered from a Government perspective. According to Almac, there needs to be a greater understanding of what Almac does. They informed the Committee that, without this, funding bodies can find it very difficult when they do their commercial assessment as they are not fully aware of the risks.²³²

Intellectual Property Risks

162. NISP²³³ Almac Ltd²³⁴ and Castlereagh Borough Council²³⁵ cite risks relating to a fear among business that they may lose intellectual property rights. Almac Ltd believe that this alone may be sufficient to deter potentially suitable SME partners from getting involved. Asidua Ltd, as a small business, confirmed this view. They indicated that the process of collaboration with larger companies is highly risky for companies such as themselves due to the fear that such collaboration may result in the loss of a product. They explained that the field in which they work does not allow for the provision of a patent early in the process, therefore risks are inevitable regarding IP rights.²³⁶ Manufacturing Northern Ireland supports this view and states that there is a natural reluctance for companies to share new ideas with other companies which may also be competitors in other markets.²³⁷ ADS informed the Committee that IP can often be sold on and that large numbers of job opportunities can be missed as a result.²³⁸ The CBI states that there is a big challenge regarding the review of IP agreements. They believe that most SMEs know almost nothing about IP agreements and that some assistance in this area would be very valuable.²³⁹
163. DETI considers it important for companies to collaborate on innovation and R&D in sectors in which they could potentially be competitors. They acknowledge that IP can become an issue. They refer to innovation centres being opened in Sweden, Finland and Israel within which such risks can be managed. Environments are provided to help overcome concerns and risks that

227 Appendix 4, DARD Written Submission
 228 Appendix 4, Belfast City Council Written Submission
 229 Appendix 4, NISP Written Submission
 230 Appendix 4, Dr Chris Lundy Written Submission
 231 Appendix 4, Almac Ltd Written Submission
 232 Appendix 2, Almac Ltd Hansard
 233 Appendix 4, NISP Written Submission
 234 Appendix 4, Almac Ltd Written Submission
 235 Appendix 4, Castlereagh BC Written Submission
 236 Appendix 3, Interview with Asidua Ltd
 237 Appendix 4, MNI Written Submission
 238 Appendix 2, ADS Hansard
 239 Appendix 2, CBI Hansard

companies have with each other when they see the potential for growth through exports.²⁴⁰ InterTradelreland considers collaboration to be key to R&D success. Representatives informed the Committee that the organisation's programmes are demonstrating the benefits of a collaborative approach.²⁴¹

Risk Culture

164. Dr Chris Lundy suggests that the governance culture and framework within which R&D is to be encouraged and sustained needs to be considered. He states that innovation, creativity and entrepreneurship must be further celebrated and encouraged, while failures must be seen as learning experiences.²⁴² Automated Intelligence Ltd supports this perspective. The organisation believes that people need to be driven to take risks and engage in R&D projects. They state that personal and wider benefit of R&D needs to be publicised and encouraged in Northern Ireland in order to create this cultural change.²⁴³ In oral evidence, representatives from NISP informed the Committee of the need for a greater acceptance in Government that business will involve risk as long as the appropriate steps are taken to mitigate risks. The NISP Chairperson said,

*"The Public Accounts Committee looms large in the minds of public servants and I think there has to be a change of attitude and an acceptance that risk is part of doing business."*²⁴⁴

165. AFBI informed the Committee in oral evidence that there is a need at all levels in the public sector, to embed R&D into daily work and to recognise that R&D and innovation are not additions to normal work. They stated that the bureaucracy in Northern Ireland is cautious and risk-averse and commented,

"We need to look at that culture and realise that, if we are to compete internationally, we... need to...take a more enlightened approach [to risk] and not allow our concern about the Public Accounts Committee and the Northern Ireland Audit Office's requirements to police public sector spending to stifle innovation and stop us taking any chances in investing and developing our economy."

166. DETI officials outlined to the Committee some of the steps being taken by the Department including, as recommended in the IREP report, looking at how projects are evaluated and assessed. They informed the Committee that changes have been made to Invest NI's appraisal mechanisms in order to better manage risk and to look at how the wider benefits from innovation and R&D projects can be captured and applied again. Officials highlighted the MATRIX recommendation that there should be a portfolio approach to risk. However, officials also stated that, a knowledge-based economy will bring more risk because of the requirement to invest in areas where the future revenue streams are uncertain.²⁴⁵

Bureaucracy Associated with Support for R&D

General Bureaucracy

167. A large number of respondents commented on what was perceived to be unnecessary bureaucracy associated with a wide range of support for R&D. Respondents were from the private, academic and public sectors. Issues related to all aspects of the process from application to appraisal to monitoring and reporting and related to time scales, administration

240 Appendix 2, DETI Hansard

241 Appendix 2, InterTradelreland Hansard

242 Appendix 4, Dr Chris Lundy Written Submission

243 Appendix 4, Automated Intelligence Ltd Written Submission

244 Appendix 2, NISP Hansard

245 Appendix 2, DETI Hansard

- processes, documentation, funding criteria and payment criteria. For example, one of Northern Ireland's most technically engaged SMEs, Cirdan Imaging Ltd states that there are problems regarding cash-flow with grants typically not being paid until 60 to 90 days after submission and 120 days after major expenditure. They believe this cripples micro-businesses. They state that the administration processes are excessively bureaucratic and are too time consuming and that the necessary support documentation required by Invest NI is difficult for micro-businesses to prepare.²⁴⁶
168. QUB believes that Northern Ireland is disadvantaged compared to other regions because, it believes, funding schemes are:
- “mired by prevarication, time-consuming appraisal processes and an over-emphasis upon process-driven audit. Such schemes should be grown exponentially but with much greater emphasis upon outcomes rather than process and with significantly reduced bureaucracy.”²⁴⁷*
169. South West Regional College considers the difficulty in meeting funding criteria; the level of documentation required and length of the approval processes as barriers.²⁴⁸ Craigavon Borough Council concurs stating that the process for achieving support and funding is slow, cumbersome and bureaucratic.²⁴⁹ This is also supported by Newry & Mourne District Council²⁵⁰ Asidua Ltd²⁵¹, Belfast Metropolitan College²⁵² and by the CBI, which states that a greater sense of urgency must be introduced in administrative processes to reflect the competitive pressures faced by businesses as they seek to take research through to commercialisation. The CBI believes bureaucracy must be cut substantially and trust must be increased. It believes this could be achieved through the introduction of a two-stage application process, development of more flexible trust-based contracts, the harmonisation of rules governing different instruments and acceptance of average labour rates and company auditing processes.²⁵³
170. The Chairperson visited two small businesses with technology backgrounds and considerable experience in the field of innovation, research and development, namely. Asidua Ltd and Cirdan Imaging Ltd. Notes on these visits are at Appendix 3. Both Asidua Ltd and Cirdan Imaging Ltd outlined a number of issues regarding the administrative burden for small businesses. The payment schedule is considered unreasonable with 90-100 days taken between money being spent and reimbursed. This creates considerable cash-flow problems for small companies. Currently, a business develops a significant business plan to support the application, there is then an appraisal followed, if successful, by a letter of support. Research work is then undertaken and the money is spent. Only then can a claim be made. Additional time is then spent auditing and checking. Cirdan Imaging Ltd suggested that, if funding could be delivered up-front this would assist cash-flow. Grants are designed to deliver 40% of direct costs but, due to application costs and time in the process the actual figure is closer to 30% of direct costs.
171. Both AFBI²⁵⁴ and ADS²⁵⁵ believe the EU funding in particular requires a lot of resource and that this limits the engagement from private sector in Framework Programme 7. The Committee recognises that the requirements of FP7 are EU requirements, however there may be scope for providing support to organisations to assist in managing those requirements.

246 Appendix 4, Cirdan Imaging Ltd Written Submission

247 Appendix 4, QUB Written Submission

248 Appendix 4, SWRC Written Submission

249 Appendix 4, Craigavon BC Written Submission

250 Appendix 4, Newry & Mourne DC Written Submission

251 Appendix 4, Asidua Ltd Written Submission

252 Appendix 4, BMC Written Submission

253 Appendix 4, CBI Written Submission

254 Appendix 4, AFBI Written Submission

255 Appendix 4, ADS Written Submission

172. As stated earlier, InterTradeIreland believe organisations can participate in projects as a partner without having the same level of rigorous administrative burden as a project coordinator would have.

Bureaucracy in Application Processes

173. The application process for support is considered overly bureaucratic and overly time consuming by a number of respondents including ADS which calls for it to be simplified and streamlined,²⁵⁶ and Belfast City Council which comments on what they see as negative perceptions surrounding the bureaucratic structures organisations need to navigate in order to avail of the support.²⁵⁷ Almac Ltd agreed with this stating that the EU funding element is both complex and time consuming and, considering the low likelihood of success, it is not worth completing the application. The company believes there is a need for a more relevant programme that can be applied more quickly.²⁵⁸ ADS has been able to avail of support from Government for setting up projects and writing R&D proposals. However, this is not a service of which respondents were universally aware, as a number of respondents have stated that such support would be welcome. ADS does however, state that the fact that external support is required, in itself, demonstrates that the process to access opportunities is too complex and time consuming.²⁵⁹ Automated Intelligence Ltd considers the process required to obtain grant support to be highly administrative. They state that it can divert the company from its normal day to day operations.²⁶⁰ Northern Regional College comment on the lack of flexibility relating to the strict qualifying times for entry to programmes and completion of projects. They believe this can act as a barrier for some companies.²⁶¹
174. Craigavon Borough Council suggests that the funding process should better match the capacity and needs of indigenous SMEs to ensure that the funding support available is fully utilised and the benefit to the local economy is maximised. They state that, if the process cannot be simplified, more hands on support and mentoring is required for companies going through the process.²⁶² QUB informed the Committee in oral evidence that, R&D engagement is generally fairly low in Northern Ireland, and is not helped by the bureaucracy of the schemes. They believe that, if R&D is to increase:

“Finding a balance of accountability is incredibly important and is inherent in the system. Government must balance a little autonomy and freedom with accountability in the system, in an area that is inherently flexible and unpredictable in its nature.”²⁶³

Time Constraints

175. As well as issues relating to the time-consuming nature of the process, a number of respondents raised issues relating to turnaround times from application to commencing work to obtaining funding. QUB believes the approval process takes too long. They state that too many approvals, often repeated several times, are carried out with little or no added value. They consider this too slow for most business outcomes.²⁶⁴ The CBI and Almac Ltd²⁶⁵ agree that the turnaround times represent a severe limitation and are ineffective for responding to market developments and the exploitation of short-term opportunities for innovation.²⁶⁶ The

256 Appendix 2, ADS Hansard
 257 Appendix 4, Belfast City Council Written Submission
 258 Appendix 2, Almac Ltd Hansard
 259 Appendix 4, ADS Written Submission
 260 Appendix 4, Automated Intelligence Ltd Written Submission
 261 Appendix 4, NRC Written Submission
 262 Appendix 4, Craigavon BC Written Submission
 263 Appendix 2, QUB Hansard
 264 Appendix 4, QUB Written Submission
 265 Appendix 4, Almac Ltd Written Submission
 266 Appendix 4, CBI Written Submission

CBI believes the time from application to grant support should be reduced to no longer than six months.²⁶⁷

176. ADS suggests the timeline for calls for R&D projects should be more market driven. They state that applications take more than a year to approve for projects of three to five years in duration. They state that this results in a minimum time of five to eight years to bring a product to market and in real terms the opportunity is likely to have been lost by then.²⁶⁸

Bureaucracy in Appraisal, Monitoring and Reporting Processes

177. QUB contend that the level of bureaucracy required dissuades potential applicants and the use of appraisal techniques should be more flexible. They consider the application of Green Book appraisals to some R&D project proposals to be inappropriate as it leads to highly speculative and largely meaningless assumptions on income streams. The process of monitoring, reporting and financing R&D activities is also considered overly bureaucratic by QUB. They state that audit demands are stifling and time consuming and can prevent talented people from driving innovation.²⁶⁹ Cirdan Imaging Ltd considers the costs of monitoring too high. They suggest that if monitoring costs more than 10% of the grant this should be looked at.²⁷⁰

Government Assistance to Access R&D Opportunities

Strategic Level Approach

178. At a strategic level, there were a number of calls for a more holistic approach to the way in which support for R&D is coordinated by Government. QUB believes that work to generate Foreign Direct Investment would benefit from a more coordinated and better planned approach. The University believes this should be founded upon clear knowledge of the strengths of the research base. They state that companies invest in R&D where genuine research strengths exist. QUB goes on to state that the current range of programmes to support R&D is sometimes disconnected, overly complex and can operate in isolation. They believe programmes could benefit from being considered holistically and comprehensively with a focus on greater simplification.²⁷¹ NISP suggest a more proactive approach with, what they call an open process like MATRIX. They believe certain sectors should be prioritised with some programmes of special interest and with a fast, transparent competition to help small firms through the process.²⁷²
179. In oral evidence, QUB informed the Committee that funding schemes seem to be put in place in isolation of each other and that they are not always cohesive and aligned. They state that they do not believe anybody has stepped back and considered elements of good practice across other economies. They suggest there is a need to look at R&D as a holistic area and develop a sustained long-term plan and a sustained long-term investment. They believe there has to be long-term ambition rather than, what they call, the current “short-term, three-year turnaround.”
180. In its written submission to the Inquiry, DETI outlined work being undertaken to encourage more companies to be innovative and to invest in R&D. These included an innovation strategy which is currently under development and actions to attract Foreign Direct Investment. The key actions are outlined in the Department’s written submission at Appendix 4. In giving oral evidence, DETI officials acknowledged that more needs to be achieved at a strategic

267 Appendix 4, CBI Written Submission

268 Appendix 4, ADS Written Submission

269 Appendix 4, QUB Written Submission

270 Appendix 3, Interview with Cirdan Imaging Ltd

271 Appendix 4, QUB Written Submission

272 Appendix 4, NISP Written submission

level. They informed the Committee that a steering group has been established by the Department to consider what aspects of the support mechanisms for R&D are not working as well as they should and agree on improvements required.²⁷³ In its briefing to the Committee on recommendations to encourage increased participation in Framework Programme 7, the Department confirmed the establishment of a Steering Group specifically to identify actions required to support increased participation in FP7²⁷⁴. The briefing also contains recommendations for the development of support mechanisms for Horizon 2020. The Department outlined the key areas for prioritisation in its written submission to the Inquiry. These are:

- Telecommunications & ICT
- Live & Health Sciences
- Agri-Food
- Advanced Materials
- Advanced Engineering²⁷⁵

181. In oral evidence, officials outlined how these priorities are included in the Programme for Government and how they arose from the Independent Review of Economic Policy (IREP) carried out in 2009 and from work conducted by MATRIX. Officials explained that other UK regions and other countries are carrying out similar prioritisation and investment exercises. They informed the Committee that companies which are active in those priority areas already account for more than three quarters of the Northern Ireland spend on R&D. The Department is now working to align these priority sectors with its economic and innovation strategies. Officials consider a key driver for future success in R&D to be the alignment of its marketing for Foreign Direct Investment to sectors where strengths already exist. They also believe the devolution of corporation tax varying powers would be an important policy lever in attracting large companies to establish in Northern Ireland.²⁷⁶

Structures for Delivering Government Assistance

182. There were calls for a more coordinated structure within Government to lead an overall strategy for R&D. AFBI suggest there is a structural problem in Northern Ireland that must be addressed.²⁷⁷ Dr Chis Lundy suggests that the roles of a number of organisations might be re-aligned to:

“provide an efficient, effective, responsive and innovative ‘one-stop-shop’ for R&D activity. The resultant unit would have direct links into not only business and our universities but other research institutions such as Loughry and Greenmount Colleges etc., and the Confucius Institute. It would be responsible for exploring new R&D opportunities and developing R&D investment strategy; exploring opportunities for securing international venture capital; co-ordinating the development of R&D clusters and rapidly assessing applications for R&D funding.”²⁷⁸

183. Almac Ltd supports this and states that an official group should be established and tasked with supporting all types of organisations. They believe such a group would benefit the whole of the Northern Ireland economy. They state,

273 Appendix 2, DETI Hansard

274 Appendix 4, DETI Written Submission No. 3

275 Appendix 4, DETI Written Submission No.1

276 Appendix 2, DETI Hansard

277 Appendix 2, AFBI Hansard

278 Appendix 4, Dr Chris Lundy Written Submission

“this group could be government or academic based and would participate in information dissemination as well as training of individuals on the completion of applications for the variety of R&D funding opportunities that are available internationally as well as locally.”²⁷⁹

184. The University of Ulster suggests that such a structure could bring together market intelligence about research opportunities and could provide practical assistance in enabling access to funding and remove many barriers that currently exist between applicants and funds.²⁸⁰ AFBI also suggested a one-stop-shop to which they, the universities, and SMEs who find it difficult to navigate the EU R&D process could obtain assistance. They suggest the organisation could also conduct market intelligence and find out what is available and guide organisations through the process. They suggested either Invest NI or NISP as a base for such a function.²⁸¹
185. UCD believes that, above this level, a necessary step 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, what they refer to as the ‘chief science champion.’²⁸²
186. The representative from the EU Commission in Belfast believes our universities should be at the forefront of making a concerted effort to take the lead in R&D and that NISP should also be part of this spearhead using their contacts and knowledge to identify opportunities and drive forward proposals. He also states that the agricultural and food sectors need to become more closely engaged in a more structured way.²⁸³ QUB concurs stating that improved linkages between universities, colleges and the business community can be a useful mechanism in facilitating early stage R&D. They believe this will be particularly beneficial for first time engagers.²⁸⁴ In their oral evidence to the Committee QUB representatives stated that there is a need to have dedicated expertise close to the research base and also people on the ground who understand the schemes and networks and who can help academics and businesses to navigate a range of complex funding areas. QUB representatives suggest this should form part of an integrated approach. They also informed the Committee that the need is not for an additional mechanism to drive R&D but for a change to the system with a more flexible structure. They informed the Committee that:
- “Sometimes, we get the impression that there is an excessive tendency to try to direct things, as though it were possible to steer things to particular places, when what Government should be doing is creating an enabling environment that allows creative opportunities to emerge.”*²⁸⁵
187. Representatives stated that there is too much risk-aversion with too many audits built into the system as a result and that the length of time required to make decisions can drive creativity out of the process. They believe that a more enabling environment, rather than a directive approach, may make a huge difference. The University of Ulster agreed with QUB that the main area for improvement is in the implementation of R&D.²⁸⁶
188. In oral evidence, DETI made reference to the Economic Strategy where the potential of having an Innovation Council is highlighted. They informed the Committee that such a council would be, not only Government led, but would include businesses and universities at a high level. They informed the Committee that this is the sort of action being taken elsewhere. Officials also referred to consideration by MATRIX of a “first stop shop” to help navigate through the

279 Appendix 4, Almac Ltd Written Submission

280 Appendix 2, UU Hansard

281 Appendix 2, AFBI Hansard

282 Appendix 4, UCD, Institute of Physics in Ireland

283 Appendix 4, EU Commission, Belfast Office Written Submission

284 Appendix 4, QUB Written Submission

285 Appendix 2, QUB Hansard

286 Appendix 2, UU Hansard

various support mechanisms for R&D. Department officials believe that what is needed is knowledge of how to navigate the various support programmes and advice and guidance available on those programmes. They believe such a structure would allow the system to work more efficiently. To achieve this, a management structure would have to be put in place to oversee and encompass the various sectors and the various ways of doing things. They told the Committee,

“The challenge that we are looking at in the next step of that is how we put in place a system of management that makes it seamless to tie those support programmes together and put in place a team or series of individuals who are capable of understanding the full plethora of what is available.”

189. They informed the Committee that this should include what business can contribute. They consider other issues to be important apart from funding, including advice, knowledge, mentoring, association with other businesses and working into supply chains.²⁸⁷
190. Invest NI agreed that there should be some organisation with overall responsibility for driving R&D. Representatives explained to the Committee that some central organisation should have an overview of what is happening in the R&D arena. However, they went on to state that to have this organisation within Invest NI would create difficulties because the organisation should have a cross-cutting remit. The Committee was told that the idea of an Innovation Council was under consideration. They suggested such a council should not be within Government but would be aligned to Government.²⁸⁸ It is believed that this positioning would enable an Innovation Council to have a cross-government remit and a much stronger influence on Government as it would not be perceived as coming from any particular perspective.

Specific Assistance to SMEs and Micro-Businesses

191. A number of respondents believe that support mechanisms for SMEs should be established or improved. Cirdan Imaging Ltd suggest more needs to be done to support indigenous SMEs to engage in R&D in order to retain jobs in the long-term. They feel there is too much pressure in Invest NI to work towards inward investment.²⁸⁹ In giving oral evidence to the Committee, the University of Ulster highlighted the difficulties for SMEs with many of the funding programmes on offer. They commented,

“We are a large university, and we have a very skilled team of research administrators, but those programmes are still difficult for us, never mind how difficult they must be for a start-up company or an SME.”
192. InterTradelreland consider the attention paid to smaller businesses in traditional economic sectors to be insufficient under the current support system. Research by the organisation indicates that there is a requirement of improved information and access to intermediaries with appropriate skills and experience to mentor would-be innovators.²⁹⁰ Belfast City Council suggest that new support mechanisms should be aimed predominantly at ensuring that SMEs and micro-businesses have the capacity and capability to engage in the R&D process. The Council believes that simplification of the existing support structures could lead to enhanced investment in R&D.²⁹¹ NILGA calls for more involvement from district councils in the support mechanisms they believe councils have the experience and understanding of local SME knowledge and needs to develop long-term economic investment and job creation. They state that councils are already encouraging SME innovation and R&D transition to export markets.²⁹² The CBI believes the best way to get SMEs involved is to exploit linkages with

287 Appendix 2, DETI Hansard

288 Appendix 2, Invest NI Hansard

289 Appendix 3, Interview with Cirdan Imaging Ltd

290 Appendix 4, InterTradelreland Written Submission

291 Appendix 4, Belfast City Council Written Submission

292 Appendix 4, NILGA Written Submission

larger companies and to third-party participation in projects easier.²⁹³ The EU Commission in Belfast suggests the appointment of an R&D champion.²⁹⁴ Belfast City Council suggests the identification and promotion of R&D role models, mentors and advisors within the SME sector.²⁹⁵

193. QUB believes that, aside from assistance from Government, there may be a role for trade associations to provide assistance to SMEs. They believe universities can assist if there are particular consistent needs but across the wide range of SME sectorial needs, trade associations may be better placed.²⁹⁶ This approach was also suggested by representatives from the Northern Ireland Science Park when they gave oral evidence to the Committee.²⁹⁷

Practical Assistance from Government

194. In addition to improvements in infrastructure, knowledge and networking to support and improve R&D, many respondents called for more practical assistance to help organisations to engage in R&D activity. Diane Dodds, MEP commented that companies know that there are funds available but they need to get practical assistance to get access to those funds.²⁹⁸ Suggestions for practical assistance included:

- More dedicated or coordinated assistance to support consortia building and navigate through the complexities of Framework applications.²⁹⁹
- Use mentoring schemes to strengthen the capacity of indigenous businesses and researchers to submit quality applications to FP7 and provide assistance throughout the lifecycle of a project.³⁰⁰
- Increase Government support for FE colleges to help SMEs to understand the process of new product and service development to identify market niches and unique selling points for their proposed new innovations.³⁰¹
- Increase local Government decision making and delivery powers in relation to R&D as local councils are best placed working on the ground with businesses and have the experience of implementing and delivering small and major programmes and projects.³⁰²
- The R&D funding providers must become involved in practical measures to entice SMEs to embrace innovation to increase the uptake of the existing support that is available.³⁰³
- Practical support for writing applications and for training, similar to what happens in the RoI rather than only advice as is currently the case in Northern Ireland.³⁰⁴
- Additional support for 'IP knowledge forums' to broker knowledge transfer/ exchange from within the academic research base to potential implementers (businesses and entrepreneurs) would facilitate better mutual understanding.³⁰⁵

293	Appendix 4, CBI Written Submission
294	Appendix 4, EU Commission, Belfast Office Written Submission
295	Appendix 4, Belfast City Council Written Submission
296	Appendix 2, QUB Hansard
297	Appendix 2, NISP Hansard
298	Appendix 3, Interview with Diane Dodds, MEP
299	Appendix 4, QUB Written Submission
300	Appendix 4, CBI Written Submission
301	Appendix 4, SWRC Written Submission
302	Appendix 4, Newry & Mourne DC Written Submission
303	Appendix 4, NILGA Written Submission
304	Appendix 3, Interview with Cirdan Imaging Ltd
305	Appendix 4, QUB Written Submission

- Provide more incentives for universities to collaborate with SME's, especially micro-businesses. Link HEIF funding to real results for SME's.³⁰⁶
 - Creation of a management tool that allows all stakeholders to view businesses requesting support and offer timely, co-ordinated strategic interventions.³⁰⁷
 - Provide better support for developing a business strategy and developing and submitting grants.³⁰⁸
 - Provide R&D support for the large companies and tailored support for small companies as SMEs can only thrive in the presence of successful large companies to pull through their products to market and large companies need strong, innovative supply chains to remain globally competitive.³⁰⁹
 - Increase the signposting (ie not just INI clients) of companies and individuals towards Knowledge/R&D support and investment/funding.³¹⁰
 - R&D intensity is located in too few companies within Northern Ireland and efforts to incentivise this in key market sectors should be encouraged.³¹¹
195. Invest NI outlined some of the practical measures it is taking to support organisations to become involved in R&D.³¹² These include:
- The appointment of Innovation Advisors to reach out to local businesses to raise awareness of the support available and to assist them to become involved in R&D including assistance through the application process.
 - Involvement in the Enterprise Europe Network; an EU programme providing international collaboration opportunities and information for any organisation but with a focus on SMEs.
 - The appointment of two Northern Ireland based Collaborative Executives to respond to queries from client companies, the wider business community, universities and other public bodies and to proactively target companies currently in receipt on Invest NI funding for Industrial R&D.
 - The introduction of a pilot mentoring scheme to provide funding to enable applicants to contract hands-on advice from FP7 experts.
 - Advice to businesses on applications to Technology Strategy Board programmes.
 - Attendance at networking events with the TSB, the UK Enterprise Europe Network and the UK FP7 National Contact Points.
 - Representation on the TSB Horizon 2020 Steering Group with a view to ensuring that the views of Northern Ireland stakeholders are considered in the development of the UKs proposals for the implementation of the Horizon 2020 programme.

Networking and Coordinated Knowledge Development in R&D

Networking Between Business, Government and Academia

196. There is general consensus among respondents that more networking is required and that all parties involved need to develop a much greater understanding of the needs of others. InterTradelreland sees R&D as part of a wider ecosystem which includes other firms,

306 Appendix 4, Cirdan Imaging Ltd Written Submission

307 Appendix 4, Castlereagh BC Written Submission

308 Appendix 4, Cirdan Imaging Ltd Written Submission

309 Appendix 4, ADS Written Submission

310 Appendix 4, NISP Written Submission

311 Appendix 4, QUB Written Submission

312 Appendix 4, Invest NI Written Submission

- customers, suppliers and other supporting stakeholders including Government which provide companies with resources such as finance, technological expertise, market access support, intellectual property advice and other R&D support.³¹³ Belfast Metropolitan College calls for the establishment of stakeholder forums to enable government to work closely with FE and HE sectors;³¹⁴ Banbridge District Council believes it would help the process if the Local Enterprise Agencies were to focus on establishing appropriate implementation networks as a mechanism for getting firms engaged.³¹⁵ Jim Nicholson, MEP considers it essential for Government to work more with the universities as they have lot of experience in working with Europe.³¹⁶ DETI officials informed the Committee that the Department is currently looking at how greater collaboration can be achieved between universities, business and Government.³¹⁷
197. Almac Ltd provided an excellent example of collaborative working during their oral evidence session to the Committee.³¹⁸ They informed the Committee that the company is working with QUB to meet the needs of both the business and the University. They are collaborating on an initiative to try to improve research from the laboratory through to the clinic. They believe that academia can educate people in Almac. They want to generate the next generation of entrepreneurs at QUB who will develop their own companies.
198. Almac maintains that it is an important linkage but that many businesses have difficulties dealing with academia. They went to QUB with a very firm proposal that was industry led with clear deliverables. It took them about a year working with QUB to facilitate a structure that they needed. Almac states that business must be able to 'speak the right language' when working with academic groups in order to achieve acceptance. They state that too hard-nosed commercial approach will result in academics retreating into an 'ivory tower of academia'. The same may apply from a university perspective in that universities must be able to speak the language of business.
199. The Company contends that if proper research is undertaken with a proper commercial end point, it will get commercial returns and benefit patients but will also be the research that gets into the good academic publications. Almac believes that QUB also understands this to be the case. According to Almac, US companies are far ahead of Europe on this. They are engaged with academia and they have academic people who are commercially minded and who undertake research with an eye to the market. This view is supported by the CEO of TSB who contends that UK universities in general need to do better out of large EU R&D programmes. There may be an opportunity for a R&D focused organisation in Northern Ireland to drive a similar approach here and get ahead of what is happening in Europe. This may be an advantage of having only two universities as it means there are only two groups of academics to convince in order to develop the appropriate culture.
200. Commenting on the relationship that exists between QUB and Almac, Invest NI representatives acknowledged the benefits of such a relationship. They agreed that there was much to be learned from such relationships and that they were working on other such partnerships including the Northern Ireland Advanced Composites & Engineering (NIACE) Centre.³¹⁹
201. In the experience of the Northern Ireland Science Park, relationships with the universities are reported as being very good. They also informed the Committee that DETI is always available to provide advice and support when required. However, they believe Government could make much more use of the expertise that exists in the universities. As outlined by Almac regarding

313 Appendix 4, InterTradeIreland Written Submission

314 Appendix 4, BMC Written Submission

315 Appendix 4, Banbridge DC Written Submission

316 Appendix 3, Interview with Mr Jim Nicholson, MEP

317 Appendix 2, DETI Hansard

318 Appendix 2, Almac Ltd Hansard

319 Appendix 2, Invest NI Hansard

the relationship between business and academia, NISP also contends that the USA is far ahead in terms of the relationships between Government and business. They believe that existing structures such as MATRIX and the Science Park itself are beneficial but do not extend far enough into the operational day-to-day level. They believe there could be great value in such an engagement.³²⁰

202. Belfast Metropolitan College provided a practical example of how the College has networked through its Club Met Knowledge Network to establish a renewable energy steering group and subsequently develop appropriate courses in the renewable energy sector.³²¹ Belfast City Council highlighted the potential importance of Belfast Metropolitan College's E3 Campus in offering a connection between business and the College by providing an Incubation Centre.³²²
203. Practical suggestions came from a number of respondents for how knowledge development in R&D can be coordinated across organisations. UCD recommends that there should be enhanced support for collaboration and people-exchange between universities and industry. They believe NISP provides many good examples of the value of such interactions and state that QUB is the UK leader in the KTP scheme.³²³

Business to Business Networking

204. NILGA suggest that expertise in innovation needs to be cultivated to highlight the need to provide skills training in innovation process management. They also suggest that a portal should be developed to facilitate sharing of best practice linking marketing and innovation. They believe this would allow firms to network and learn from each other and to learn through case studies"³²⁴ Banbridge District Council state that, in the RoI, the larger R&D performing firms have organised themselves into the Industry Research and Development Group (IRDG) which is affiliated to the Irish Business and Employers Federation. The Group acts as a discussion forum and lobby for the interests of R&D performing organisations. The Council believes that there is an opportunity for Northern Ireland organisations to do something similar.³²⁵

Networking Within Academia

205. In oral evidence, South East Regional College informed the Committee that a number of examples exist of FE colleges working together and that all the FE colleges are keen to progress further on collaboration in R&D.³²⁶ Mr Jim Nicholson, MEP believes that such collaborative working by FE colleges should be encouraged to increase applications for EU funding.³²⁷ South West Regional College also calls for greater collaboration from businesses, academia and government agencies to support and exploit opportunities for R&D.³²⁸ The CBI believes that much depends on the level of interest there is within individual departments in the local universities, in collaborating with industry. They state that some departments are very involved while others are interested only in writing academic papers.³²⁹

Networking Outside Northern Ireland

206. NILGA states that regional, cross border and European networks should be facilitated and that the perceived or actual difficulties associated with the building of these should be

320 Appendix 2, NISP Hansard
 321 Appendix 2, BMC Hansard
 322 Appendix 3,
 323 Appendix 4, UCD, Institute of Physics in Ireland
 324 Appendix 4, NILGA Written Submission
 325 Appendix 4, Banbridge DC Written Submission
 326 Appendix 2, SERC Hansard
 327 Appendix 3, Interview with Mr Jim Nicholson, MEP
 328 Appendix 4, SWRC Written Submission
 329 Appendix 2, CBI Hansard

addressed in the next round of European funding to ensure maximum transfer of knowledge and innovation leading to creating of wealth and quality employment.³³⁰ Invest NI outlined steps the organisation is taking to improve networking at EU level with the appointment of an Invest NI representative in Brussels to support Northern Ireland R&D stakeholders and influence EU R&D policies by developing relations with the key individuals in the EU institutions.³³¹ Asidua Ltd suggest that clusters of companies should be identified for collaboration on cross border basis.³³²

207. Many respondents have made comparisons with support provided in the RoI in areas such as EU funding, venture capital funding and the support mechanisms that have been put in place by Government. Jim Nicholson, MEP states that lessons should be learned from the RoI and that meetings should be considered with counterparts in Dublin to learn from their success.³³³ The comparison with the RoI is acknowledged by the Department. Officials recognise the challenge and state that the RoI economy is different with more academic institutions, more value-added companies and a key policy lever in low corporation tax. The Department considers it an unfair comparison due to the nature of the Northern Ireland business base and the low number of universities.³³⁴

Framework Programme Evaluators

208. The CBI suggested that Northern Ireland must increase the number of evaluators in the evaluation process for Framework funding. They consider the benefits from being an evaluator to include the ability to fully understand how the evaluation and assessment process works and the insight gained to the types and level of applications which are being submitted.³³⁵ In oral evidence to the Committee they stated that the evaluators make the decision as to which projects will be successful and that these evaluators, when they come back to a region, are in a position to provide feedback on projects that were not successful. They suggest there is a need to encourage more academics and people from industry, with existing success in specific areas, to become evaluators to help increase success rates.³³⁶ This view was supported by Jim Nicholson, MEP. He suggests that more should be done at a local level to encourage greater involvement of evaluators.³³⁷

Improving Government Knowledge of R&D

209. Suggestions were made for how Government knowledge of R&D could be improved and shared. QUB believes specific, dedicated, skilled resources should be allocated to understand R&D intensive and innovative economies such as Finland, Sweden and Israel. The information and understanding gained could subsequently inform public policy within Northern Ireland. They believe focus on implementation and long-term patience is critical to success and call for the development of a ten-year strategy which focuses firstly upon drafting a new policy with clear ownership and buy-in from stakeholders across Northern Ireland and across Government departments. They state that allocation of resources to support the strategy should be aligned carefully and that the strategy must be implemented through clear implementation plan and clear accountability structures.³³⁸

330 Appendix 4, NILGA Written Submission

331 Appendix 4, Invest NI Written Submission

332 Appendix 4, Asidua Ltd Written Submission

333 Appendix 3, Interview with Jim Nicholson, MEP

334 Appendix 2, DETI Hansard

335 Appendix 4, CBI Written Submission

336 Appendix 2, CBI Hansard

337 Appendix 3, Interview with Mr Jim Nicholson, MEP

338 Appendix 4, QUB Written Submission

210. Both AFBI³³⁹ and DARD³⁴⁰ advocate increased joint working between departments to develop strategies in key sectors. DARD considers one of the most important outcomes to be an increase in business to business and business to researcher collaboration so that organisations can pool resources and skills for their mutual benefit. The University of Ulster commented on the lack of available high level scientific advice in the form of a scientific advisor to the Assembly and Executive. The University believes this is something that should be provided for.³⁴¹ DARD believes it is important to ensure a joined up approach across Government departments to develop a science and innovation strategy led by a Chief Scientist.³⁴² Invest NI considers the value of a Chief Scientific Officer as,

“somebody who can lobby strongly on behalf of the research that needs to be done to maximise the strengths of the Northern Ireland research base, of which there are many. Such an Officer could also identify where we should prioritise our research activities...”³⁴³

211. DETI acknowledges the need for Government to improve its knowledge and understanding of R&D. Officials informed the Committee that the UK may not be a good comparator. Their evidence demonstrates the UK spend on R&D, relative to its economic output is much less than countries such as Sweden, Finland and Israel.³⁴⁴
212. The EU Commission Belfast representative highlighted the positive action taken by the Executive with the establishment of the Executive Office in Brussels and by Invest NI putting a representative in Brussels. He considers it essential to have an in-depth understanding of what is happening in the EU and that needs to be matched with knowledge in Northern Ireland. He believes there is a need to build on the knowledge in DETI, Invest NI and the universities and determine how Northern Ireland's strengths fit into Horizon 2020.³⁴⁵

Competence Centres

213. QUB welcomes the recent initiative from Invest NI to fund industry-led Competence Centres in key sectors. They believe more of these centres should be funded and state that, with a clearer, more focused strategy, more could be achieved through Competence Centre models.³⁴⁶ AFBI also believes that Competence Centres provide an important vehicle for engaging the private sector in research and development. They state that the centres proposed by Invest NI will provide local companies with an opportunity to steer and direct programmes of research in the local research base.³⁴⁷
214. AFBI have been working with Invest NI on the establishment of Competence Centres for the agri-food sector and the renewable energy sector. In oral evidence, representatives informed the Committee that the centres would be industry led. They outlined the basic model as Invest NI providing substantial funding over a period of up to five years for the centres to carry out early-stage R&D. Companies will get together, work together and identify the R&D that they want to carry out. Representatives informed the Committee that they consider Competence Centres to be good forums and structures for bringing the industry together and listening to it, and getting it to take the lead to drive forward early stage R&D.³⁴⁸

339 Appendix 4, AFBI Written Submission

340 Appendix 4, DARD Written Submission

341 Appendix 2, UU Hansard

342 Appendix 4, DARD Written Submission

343 Appendix 2, Invest NI Hansard

344 Appendix 2, DETI Hansard

345 Appendix 3, Interview with Mr Maurice Maxwell, EU Commission Office Belfast

346 Appendix 4, QUB Written Submission

347 Appendix 4, AFBI Written Submission

348 Appendix 2, AFBI Hansard

Conclusions & Recommendations

The Current Position

215. Throughout the course of the Inquiry, in written and oral evidence and in meetings with stakeholders, evidence was provided of the excellent work being done by staff in Invest NI in providing advice and assistance to organisations involved in R&D at all levels. The work of organisations such as InterTradelreland, the Northern Ireland Science Park, the Northern Ireland Advanced Composites and Engineering Centre, MATRIX and the Agri-food and Biosciences Institute have been rightly held up as examples of the progress being made in developing Northern Ireland's ability to undertake and succeed in R&D at the highest level.
216. The Committee has heard of the excellent work being undertaken by many progressive Northern Ireland companies of all sizes, the two universities, many FE colleges and local councils, to drive the innovation and R&D agenda and help Northern Ireland to succeed in this increasingly complex and demanding field. The Committee has also heard evidence from key stakeholders in business, academia and government to the effect that the programmes that are in place to drive R&D, including those from Europe, UK, cross-border and Northern Ireland level, are largely appropriate to the needs of business and academia.
217. Evidence gathered by the Committee clearly demonstrates the increasingly important role that R&D is playing and will continue to play as an important economic driver. As stated in the report of the Independent Review of Economic Policy, EU legislation will result in reduced levels of support for Selective Financial Assistance to businesses and, eventually, to Selective Financial Assistance coming to an end in 2013 as a means of attracting and retaining Foreign Direct Investment. The opportunity exists to make more of the support programmes for R&D to help drive the economy and develop the high value, high paid jobs needed to rebalance and rebuild the economy. Combined with increased levels of R&D, the proposed devolution of corporation tax powers, enabling the Executive to set the rate of corporation tax, will assist Northern Ireland to compete with those regions with well-established good practice in R&D.
218. In November 2011, the Committee considered the final progress report on DETI's Regional Innovation Strategic Action Plan. The Chair wrote to congratulate the Minister on the achievement of the objectives in the plan. It was also suggested that, when the new Innovation R&D and Creativity Action Plan is issued, it would be appropriate to include objectives which demonstrate clear outcomes and benefits including objectives with annual targets, directly related to increasing the number of companies, the number of locally owned companies, the number of SMEs investing in R&D and objectives for increasing the overall spend on R&D in Northern Ireland.
219. In November 2011, the Department of Finance & Personnel issued a press release detailing the level of R&D activity in Northern Ireland. Results included the highest ever R&D expenditure in Northern Ireland in 2010 with an increase in 8%.³⁴⁹ While there is much to be positive about, there is still a lot of potential for increasing the level of R&D within Northern Ireland. The Treasury consultation on rebalancing the Northern Ireland economy noted the particularly low level of business expenditure on R&D. It further noted that R&D and innovation are particularly low when compared to successful small economies in Europe several of which are in more peripheral locations than Northern Ireland. Over the past five years business expenditure on R&D in Northern Ireland has averaged 0.69% of Gross Value Added (GVA) compared to 1.23% for the UK as a whole. Business expenditure on R&D in Northern Ireland is heavily focused on a small number of companies, with just 10 companies accounting for around 57% of all business R&D investment in 2009.³⁵⁰

349 Statistical Press Release, NI R&D 2010 Headline Results; DFP, 9th November 2011

350 Rebalancing the Northern Ireland Economy; HM Treasury Consultation, March 2011

220. The evidence gathered by the Committee demonstrates that, although much excellent progress has been made in developing capacity and capability in Northern Ireland to undertake high quality, high value innovation and R&D, there are still many significant barriers to organisations of all sizes becoming involved and taking advantage of the many opportunities that exist locally, at UK level, at EU level and internationally. These barriers include issues regarding awareness and understanding of the available opportunities, barriers to accessing funding and barriers to navigating and coping with the complexities of the programmes and the administrative processes associated with them. There are barriers which relate specifically to SMEs and, in some cases, barriers which specifically impact on the capacity and capability of micro-businesses to engage in the process. Many organisations have perceptions regarding the risks involved in becoming involved in innovation and R&D programmes and are unsure how to manage these risks or if they can be managed.
221. Many of these barriers will require changes in Government policies and procedures, if they are to be overcome. The current structures in place to support R&D are not as well connected as they should be and this is leading to considerable problems, not only with communication and information sharing but also in developing a strategic approach to innovation and R&D at a regional level. Structural changes will be required to the way in which innovation and R&D is managed at a strategic level in Northern Ireland. This will also require changes to the systems and processes that are in place to support innovation and R&D. An overall strategic vision is required, supported by policies and strategies within a structure designed specifically to meet the long-term challenges and maximise the potential of Northern Ireland to avail of the existing and future opportunities for innovation and R&D to help grow the economy.

Vision for Innovation and R&D

222. Although there is considerable good work being undertaken to support and undertake R&D at all levels across business and academia, the Committee did not find evidence of an overall integrated and holistic approach to R&D. The need for an integrated and holistic approach was a call from many respondents to the inquiry.
223. Such an approach should be all inclusive. It should include specific systems and processes, designed to meet the needs of large businesses, SMEs and micro-businesses. It should take account of the contribution that can be made by Government departments and district councils. It should encompass the work of Invest NI, InterTradeIreland and the universities. It should provide a strategy for involvement of FE colleges, research institutions and Local Enterprise Agencies.
224. The integrated and holistic approach to R&D must be outward looking and based on information gathered on what works well in other regions, EU Member States and internationally. It must consider existing support programmes provided through organisations such as the Technology Strategy Board and through the EU institutions. The approach must also look inward at the past and future potential contribution of Government at all levels including district councils, universities and FE colleges, business support organisations such as the CBI and FSB and trade bodies. It must identify and recognise the contribution that can be made across all sectors at all levels.
225. The infrastructure that is currently in place to support R&D has largely evolved from established support mechanisms as the role of R&D has rapidly developed over the past number of years. Considering the expected future impact of R&D as a key economic driver, **a clear vision for innovation and R&D must be developed and implemented, including policies, strategies, structures, systems and processes which are custom-designed specifically to meet the long-term challenge of maximising the potential for Northern Ireland businesses and academia at all levels to take advantage of the existing and future opportunities for innovation, research and development (Recommendation 1).**

Structures to Support Innovation and R&D

226. As stated above, there is much good work being undertaken to support and undertake R&D. The absence of an overall vision and integrated and coordinated approach is resulting in substantial barriers to the development of the R&D capability of Northern Ireland as a region. This gap impacts at every level across Government, business and academia. Government departments such as DETI, DARD, DHSSPS could be better connected. There is no evidence of a strategic level approach to involving local councils in the R&D agenda. There is evidence that the level of involvement in R&D at university level is dependent upon the level of interest and motivation within individual departments. There is little coordination or shared learning across the FE sector. Evidence suggests that, with some notable exceptions, businesses and business support organisations are largely not involved in developing the R&D agenda.
227. In order to develop and implement a vision and strategy for R&D there should be involvement of all sectors at all levels. The so-called 'triple helix' approach of involving Government, business and academia must include representation from district councils, business representatives from large businesses, SMEs and micro-businesses as well as input from the FE sector.
228. There have been a number of calls for a high-level steering group to oversee and set the strategic direction for R&D. The Committee considers this an essential element in establishing and implementing a vision and integrated approach to R&D. **A high-level steering group should be established comprising Government, business and academia to advise on policy and oversee the integration and coordination of all R&D activity across all three sectors at all levels (Recommendation 2).** The steering group should be involved in setting the vision for innovation and R&D. It may be considered appropriate to establish a new group to undertake this role. Alternatively, it may be considered suitable avail of existing knowledge and experience and to widen the remit and membership of the existing Framework Programme 7 Steering Group as its membership currently represents many of the key strategic level stakeholders.
229. Although the current programmes for supporting R&D are mostly considered appropriate, there are many and varied barriers to organisations becoming involved in R&D activities. The wide range of opportunities available and the complexities involved in the application process along with monitoring and reporting requirements make it extremely difficult for many organisations of all sizes to navigate the processes. Many companies do not know what opportunities may be open to them or where to go to find out about opportunities; some do not know that the work they are doing may be eligible for support; and many do not realise that the work they are doing actually constitutes R&D. A number of respondents cited the lack of opportunities for business-led research as a barrier as well as a lack of support for the commercialisation of R&D. There is strong evidence that small companies are not becoming involved in R&D because they do not have the capacity to devote the appropriate resource to the administrative burden required by the processes. Companies informed the Committee of barriers such as concerns with cash-flow, match funding requirements, intellectual property rights and internal knowledge and skills.
230. There is evidence of much confusion regarding the current support structures and what level and nature of support there is available to navigate the requirements of funding programmes. The Committee does not consider this to be problem that can be resolved solely by improving the information and communication mechanisms associated with R&D. Some respondents have suggested the formation of an Innovation Centre; a single organisation with responsibility for driving R&D in Northern Ireland. The Committee believes that, for Northern Ireland to achieve its potential as a region and maximise the potential of innovation and R&D to driving the economy in the long-term, **a completely new structure is required in the form of a single unit to integrate and coordinate all innovation and R&D activity. It should have four key responsibilities:**
- i . **Improving Government knowledge and information on innovation and R&D by gathering knowledge and information through, research, networking and**

collaboration to identify and learn from good practices; and to identify the contribution that can be made at all levels by Government, business and academia.

- ii. **Developing programmes, systems and processes to meet the needs of business and academia by providing programmes of assistance for innovation and R&D; providing support to understand and navigate programmes; and providing support for administering programmes from application to evaluation.**
 - iii. **Implementing support for innovation and R&D through promotion of opportunities, educating and mentoring, practical support through projects, awareness programmes for support available and for specific programmes (such as Horizon 2020 and the Small Business Research Initiative).**
 - iv. **Developing and supporting a culture of innovation and R&D across Government, business and academia at all levels in Northern Ireland (Recommendation 3).**
231. It has been suggested by some that such an organisation should be a stand-alone entity. Others have suggested that it should be constituted as part of an existing organisation such as Invest NI or the Northern Ireland Science Park. The Committee believes that more work is required to determine how this unit should be constituted however its work should be overseen by the Steering Group for Innovation and R&D. It is considered a critical element in establishing Northern Ireland's long-term future regarding R&D; it is therefore essential that the structure is the most appropriate to the needs of Government, business and academia.
232. The recommendations above are the key strategic level recommendations from the inquiry. The remaining recommendations consider how the four key responsibilities outlined in Recommendation 3 above can be implemented in practice. Although recommendations 4 to 9 fit into the proposed structures above, it is not considered necessary to wait until the recommended structures are in place before planning to implement these recommendations. If Northern Ireland is to be considered a serious participant in innovation and R&D in the future, it is important that plans are put in place to implement the recommendations below with a view to integrating work into the new structures as they are established.

Improving Government Knowledge and Information

233. The need to collect and use information and knowledge of current good practices on R&D was raised by a number of respondents. Respondents referred to countries such as Sweden, Finland, Israel and the Republic of Ireland among others. The Committee agrees that there needs to be learning from the experience of countries which lead the world in innovation and R&D. However, consideration should be given to the most appropriate countries to benchmark against. The Global Innovation Index 2011 ranks countries across the world in relation to the enabling environment provided for innovation and on their innovation outputs.³⁵¹ Table 1 lists the top ten countries overall, the top ten in terms of innovation inputs and the top ten in terms of innovation outputs. The Outputs pillar includes statistics on trademark registrations, information on the use of ICT in business and a sub-pillar on creative goods and services. This pillar may therefore represent an indicator of performance on the commercialisation of research.
234. There are no specific statistics available for Northern Ireland however, evidence from the Inquiry demonstrates that improvements are needed here in to areas covered under the pillars of the Innovation Input Sub-Index pillar. This includes the political, regulatory and business environments, education, third level education, research and development, infrastructure and market sophistication. Much can therefore be learned from countries which rank high on this pillar. However, in the long-term, it is essential that innovation and R&D results in commercial returns to grow and develop the economy. It is therefore important that

351 Global Innovation Index – Accelerating Growth and Development; Dutta, S. (Editor); INSEAD, 2011

there is learning from the good practices of those countries which rank high on the Innovation Output Sub-Index pillar. For this to be achieved. Table 1 suggests appropriate countries may include Switzerland, Sweden, Finland and Denmark as they rank high on both the Input and Output pillars.

Table 1: Leading Countries for Innovation

Rank	Global Innovation Index	Innovation Input Sub-Index	Innovation Output Sub-Index
1	Switzerland	Singapore	Sweden
2	Sweden	Hong Kong/China	Switzerland
3	Singapore	Switzerland	Netherlands
4	Hong Kong/China	Ireland	Germany
5	Finland	Sweden	USA
6	Denmark	Finland	Finland
7	USA	Denmark	Denmark
8	Canada	Canada	Israel
9	Netherlands	Luxembourg	United Kingdom
10	United Kingdom	United Kingdom	Canada

Source: *Global Innovation Index – Accelerating Growth and Development*; Dutta, S. (Editor); INSEAD, 2011

235. From the evidence gathered, it is obvious that Northern Ireland must become much more connected in Europe. It is also crucial that the required knowledge and understanding is developed to work with EU programmes for R&D including Framework Programme 7 and Horizon 2020. The Committee supports the recommendations from the Framework Programme Steering Group and believes that, if fully implemented, will begin to address many of the concerns respondents had regarding the ability of Northern Ireland to engage with Europe and compete for EU funding for R&D. However, it is important that FP7 and Horizon 2020 are not considered in isolation. They must be integrated into the overall vision and strategy for innovation and R&D for Northern Ireland.
236. Other sources of support for R&D coming from outside Northern Ireland also need to be developed. This includes areas such as venture capital and the Small Business Research Initiative. The fact that Northern Ireland companies perform well in the SBRI in GB but do not have the opportunity to avail of the initiative inside Northern Ireland demonstrates a serious gap in the infrastructure here for supporting R&D.
237. As well as looking outwardly, it is important to look inwardly to understand the capabilities, the weaknesses and the potential that exist inside Northern Ireland. There must be a comprehensive knowledge and understanding of what Government, business and academia can contribute to increasing the level and quality of innovation and R&D. Government must know where the key barriers are to organisations becoming involved in programmes, whether this relates to tax credits, Knowledge Transfer Partnerships or taking the lead in strategic programmes under Horizon 2020. The potential of all public and business support organisations to contribute to improving the level and quality of innovation and R&D must be explored. This includes FE colleges, Local Enterprise Agencies, local councils and trade bodies. There must be learning from successes such as the NIACE Centre, NISP, AFBI's high success rate with EU funding applications and the collaborative efforts of Almac Ltd and QUB. This learning must be applied to help grow innovation and R&D in all sectors in Northern Ireland.

238. Learning from good practices in other countries, developing the ability for Northern Ireland to engage in Europe and understanding the capabilities, the gaps and the potential that exist inside Northern Ireland are the three critical elements to provide the knowledge and understanding required to assist in developing the appropriate infrastructure for innovation and R&D. Therefore, **a mechanism should be put in place and resource allocated to undertake the following functions:**
- i. **To identify and learn from good practices in innovation and R&D in other countries and regions.**
 - ii. **To engage regularly with other sources of support such as EU institutions, venture capital firms and the Technology Strategy Board to gain a comprehensive understanding of and influence the initiatives and support programmes that are available for R&D.**
 - iii. **To gain a comprehensive understanding of the strengths, weaknesses, and potential that exists in Government, business and academia in Northern Ireland to contribute to innovation and R&D.**
 - iv. **To use the knowledge and understanding gained to inform the development of appropriate systems and processes, to support and improve the capacity and capability of organisations at all levels to participate in innovation and R&D (Recommendation 4).**

Improving Programmes, Systems and Processes

239. Respondents had concerns regarding programmes for R&D, the systems and processes for supporting organisations during programmes and the systems and processes associated with programmes. Work to become better informed through consideration of good practices in other regions, improved engagement with sources of support for R&D and improved understanding of the existing potential within Northern Ireland will provide the knowledge and understanding to develop and improve programmes, systems and processes. Programmes must be reviewed to ensure they are as 'business-friendly' as possible.
240. Concerns were expressed that programmes do not always meet the needs of business with the timing and duration of support not being flexible enough to meet business needs and not enough opportunities being provided for business-led R&D. Some respondents raised concerns that Invest NI does not provide support to a wide enough range of organisations, for example – not providing support for FP7 applications to non-client organisations and non-registered companies not being eligible to avail of innovation vouchers. Respondents raised concerns in relation to funding, with suggestions for increased levels of funding, up-front funding to assist with cash-flow problems, support for overhead costs and grant support to prepare complex applications. There were also suggestions for programmes to provide incentives for universities to collaborate with SMEs and micro-businesses and for robust Northern Ireland programmes to complement and link into EU programmes. The Committee understands and supports efforts by Invest NI to increase the capability of organisations to participate in R&D through its Innovation Escalator approach. This work should be built on and expanded. **Government, business and academia should work together to review and, where necessary, improve programmes developed within Northern Ireland and influence programmes being developed elsewhere, so as to balance the needs of business and academia with those of the Executive (Recommendation 5).**
241. Organisations of all types and sizes from business and academia expressed concerns about the complexities involved in navigating the systems and processes required by the range of R&D opportunities at all levels. There was general consensus that much more could be done to assist organisations through these processes and to thereby encourage more organisations of all sizes and all levels of experience to become involved. Suggestions

for support included ideas for coordinating business engagement, consortia building, 'IP knowledge forums'; and people exchange between universities and industry to increase awareness and mutual understanding. There were suggestions for practical support for capacity building, training, promoting and raising awareness of R&D and for development of ideas and products. The need for mentoring was raised by a number of organisations with one suggestion for the provision of opportunities for businesses to meet with experienced people in non-threatening environments to develop mentoring opportunities without the fear of loss of intellectual property. There were calls for assistance to manage the requirements of complex funding processes as well as calls for the improvement and simplification of processes for SMEs to become involved in R&D. The concerns raised are both real and significant. They act as substantial barriers to organisations becoming involved in innovation and R&D. It is in the interests of Government, business and academia to work to overcome these barriers and provide appropriate support mechanisms for organisations of all types and sizes to become involved in both the currently available and future R&D programmes.

Government, business and academia should work together to review and improve existing support processes and, where appropriate, develop new practical measures of support for all innovation and R&D programmes (Recommendation 6).

242. The level of bureaucracy associated with the administrative processes for R&D support was considered excessive and unnecessary by many respondents. This applied to EU funded programmes but also applied to some programmes administered by Invest NI and InterTradeIreland. There are issues associated with the application process as well as processes for approving, monitoring and evaluating funding programmes. Specific problems related to the complexities of the processes and documentation, the time involved, repetition within the process, the number of audits in the system and the long delay in payment of grants leading to cash-flow problems for businesses. **Government, business and academia should work together to review and, where necessary, improve the administrative processes for R&D programmes developed within Northern Ireland so as to balance the needs and capabilities of business and academia with the needs of the Executive (Recommendation 7).**

Implementing Support

243. There is considerable evidence that the infrastructure is not yet in place to provide the level of support required by business and academia. Systems and processes will be required to promote opportunities for R&D and to encourage potential applicants, to educate and mentor business and academia and to provide practical support for organisations to navigate the various programmes and the administrative process involved. Much can be learned from initiatives such as the cross border initiative between Newry & Mourne District Council and Louth Local Authorities along with initiatives like Castlereagh Borough Council's Evolution Project. Learning can be used to help develop similar initiatives and to ensure continuity of approach. Awareness programmes will be required for schemes such as Horizon 2020, the Small Business Research Initiative, and others. Support staff will be required on the ground to help businesses, universities and FE colleges to navigate the complexities of the various schemes including providing support for applicants through the process and supporting successful applicants through programmes. **A long-term strategy and implementation plan should be developed with appropriate resources provided for promotion of opportunities for R&D, educating and mentoring, practical support through projects and awareness programmes for support available for specific schemes (Recommendation 8).**

Developing and Implementing a Culture of Innovation and R&D

244. The experience of the Committee in undertaking this Inquiry has been that there is a very varied level of awareness of innovation and R&D across Government, business and academia. Many businesses of all sizes are fully engaged in R&D but, equally, many more businesses of

all sizes are not engaged. Some do not know how to engage, some do not have the capacity or capability to engage and some see the barriers as being too great for them to overcome. There is no consistent approach across the further and higher education sector with only patchy evidence of collaboration and knowledge sharing among FE colleges and evidence of an inconsistent approach at university level with some departments better engaged than others. There is strong evidence that the public sector is trying, within the knowledge, skills, structures and resources available however, there is little evidence of a coordinated approach among Government departments and bodies, among local councils or between the various levels of Government. **A clear and consistent message and approach must be continuously promoted by Government, business and academia across Northern Ireland to the effect that innovation, and R&D are key drivers for economic growth and will be supported at all levels (Recommendation 9).**

Additional Short-Term Measures to Improve Uptake of R&D

245. Throughout the course of the inquiry there were a number of issues raised which the Committee believes can and should be addressed in isolation. These are largely 'quick fixes' which can be implemented without undue delay. By addressing these issues the message will be sent out that Northern Ireland is serious about addressing the barriers to organisations becoming involved in innovation and R&D.
246. There were many calls from respondents at all levels for mentoring programmes to support organisations through the application process and throughout programmes. Invest NI has initiated a pilot mentoring scheme. The Framework Programme 7 Steering Group has recommended that, subject to positive evaluation, the scheme be expanded to include all NI research institutions with the possibility of involvement of FE colleges. However, the need for mentoring has been established for programmes other than FP7 and would be particularly welcomed by SMEs and micro-businesses to assist in identifying the type of support best suited to individual companies and to support companies through the process. **Invest NI should explore ways to open up innovation and R&D mentoring schemes to all businesses which need it. This should include consideration of the contribution that could be made by third parties such as local councils, FE colleges and Local Enterprise Agencies (Recommendation 10).**
247. Many of the problems raised by respondents related to financing innovation and R&D activities. There were calls for additional support programmes for projects and for increased levels of support. These are matters which can only be considered in the longer term. There is, however, one issue that can be addressed in the short-term. That is the matter of the 60 to 90 day period it takes to pay a grant following the submission of costs. The Committee recognises the high levels of expenditure that businesses undergo to become involved in R&D and the impact this high expenditure can have on cash-flow, especially for SMEs and micro-businesses but also for larger businesses. Government also recognises this as a problem and, in recognition, has cut the target period for payment of invoices by Government departments from 30 days to 10 days. In the same spirit, **the target time period for payment of grants, following receipt of an accurate record of expenditure should be reduced immediately to 30 days with consideration given to how this can be reduced further in the future (Recommendation 11).**
248. The Committee was impressed with the high level of success of Northern Ireland companies tendering under the Small Business Research Initiative. The Committee was however disappointed to learn that opportunities do not exist for these progressive companies and others to tender under the SBRI for contracts within Northern Ireland. This constitutes a significant gap in both the innovation and R&D infrastructure here and in the procedures for procurement. **The Department of Finance & Personnel must take steps to introduce and promote the Small Business Research Initiative across Government departments, agencies and NDPBs (Recommendation 12).**

249. The number of respondents highlighting the high level of demand for venture capital in Northern Ireland and the low level of availability was a matter of concern for the Committee. Given the importance of venture capital to small, early-stage, high-technology, knowledge-based companies, there seems to be little resolve to deal with the issue as a priority. DETI recognises that venture capital is critical and has informed the Committee that it is committed to growing a flourishing venture capital environment. **The Department of Enterprise, Trade & Investment must work with others including the universities, NISP, AFB and venture capital companies to develop a strategy and plan increase the level of venture capital available in Northern Ireland (Recommendation 13).**
250. Framework Programme 7 closes at the end of 2013 and will be replaced by Horizon 2020. Some respondents have indicated the need to take advantage, at the earliest stage, of the opportunities available in the new Framework. This should involve a process of matching Northern Ireland's research base to the funding priorities of Horizon 2020. Focus should be on the knowledge and experience achieved and business networks created through EU participation. Therefore, **preparation for Horizon 2020 should commence immediately, including an assessment of what Northern Ireland can offer, in business and academia, in relation to the funding opportunities available through Horizon 2020 (Recommendation 14).**
251. A number of respondents, including Invest NI have suggested that there would be benefits in appointing a Chief Scientific Officer to advise on policy and to lobby on behalf of the Northern Ireland research base and maximise its strengths. There have been calls for a high level science steering committee to lead a science strategy for Northern Ireland. **The Executive should explore the benefits of establishing high level structures for science including the appointment of a Northern Ireland Chief Scientific Officer and a science steering committee (Recommendation 15).**



Northern Ireland
Assembly

Appendix 1

Minutes of Proceedings Relating to the Report

Thursday, 20 October 2011

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Phil Flanagan
Mr Stephen Moutray
Mr Mike Nesbitt
Ms Sue Ramsey

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Sohui Yim (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Dr Alasdair McDonnell
Mr David McIlveen
Mr Robin Newton

10.42am The meeting began in public session.

7. Inquiry into Research and Development

Members discussed the draft terms of reference for the Inquiry and a briefing note from the Clerk.

Agreed: To consider the proposal again at next week's meeting and to agree dates for the inquiry.

[EXTRACT]

Thursday, 27 October 2011

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Phil Flanagan
Mr Stephen Moutray
Mr Robin Newton

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Sohui Yim (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Paul Frew
Mr Mike Nesbitt
Ms Sue Ramsey

10.05am The meeting began in public session.

5. Research and Development: Assembly Research

10.14am The Assembly Research Officer joined the meeting.

Members received an oral briefing from Assembly Research. Key issues discussed included EU Innovation Policy, Research and Development and Framework Programme 7 (FP7).

10.36am Stephen Moutray left the meeting.

10.40am The Assembly Research Officer left the meeting.

Agreed: Rapporteur to consider the appropriate Assembly committees and universities in GB and the RoI to invite to give written evidence to the Inquiry.

Agreed: To write to Invest NI and InterTradeIreland to ask them to provide information on appropriate businesses (those that have successfully availed of opportunities for R&D and innovation) to invite to give evidence to the Inquiry.

Agreed: To make any necessary amendments to the Inquiry Proposal, as and when it is appropriate.

Agreed: To forward the Assembly Research papers to the Department.

Agreed: To contact MEPs to ask their views on Horizon 2020.

Members noted a report from Assembly Research on the Role of a Rapporteur for Committee Inquiries.

[EXTRACT]

Thursday, 19 January 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Phil Flanagan
Mr Stephen Moutray
Mr Mike Nesbitt
Mr Robin Newton

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Sohui Yim (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Paul Frew
Dr Alasdair McDonnell
Ms Sue Ramsey

10.35am The meeting began in public session.

9. Inquiry into Research and Development

10.53am The meeting moved into closed session.

Members discussed the Inquiry in Research and Development.

Agreed: To ask the Department for details of the organisations which account for R&D activity in Northern Ireland and invite them to provide written evidence to the Inquiry.

Agreed: To contact the Sector Skills Council for Science, Engineering and Manufacturing Technologies SEMTA and ask them to provide evidence to the Inquiry.

Agreed: To contact the businesses already invited to provide evidence by telephone to encourage them to avail of the opportunity to provide written evidence to the Inquiry.

Agreed: To ask the Federation of Small Business and Enterprise NI to ask their members to provide evidence to the Inquiry.

Agreed: To request details of the companies referred to by the local Councils in their submissions and ask them to provide evidence.

Agreed: To contact South Eastern Regional College (SERC) and the University of Ulster to encourage them to give evidence to the Inquiry.

Agreed: To ask the following organisations to provide oral evidence to the Committee:

- Aerospace Defence Security
- Almac
- Confederation of British Industry
- South East Regional College
- Belfast Metropolitan College

- Queen's University Belfast
- University of Ulster
- Northern Ireland Science Park
- InterTradelreland
- Invest NI
- DETI

Agreed: To schedule the Department to provide separate oral briefings on 29 March for both the draft action plan for R&D, Innovation and Creativity and the Inquiry.

Agreed: To provide InterTradelreland, Invest NI and DETI with details of emerging issues before they give evidence.

Agreed: Rapporteur to undertake interviews with the following organisations and to report back to the Committee:

- Asidua Ltd
- Cirdan Imaging Ltd
- EU Commission in Belfast
- Belfast City Council
- Agri Food and Biosciences Institute (AFBI)
- Centre for Competitiveness

Agreed: To schedule further evidence sessions when remaining organisations provide written evidence to the Inquiry.

[EXTRACT]

Thursday, 2 February 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Phil Flanagan
Mr Paul Frew
Ms Jennifer McCann
Mr Stephen Moutray

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Sohui Yim (Assistant Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Daithi McKay (Deputy Chairperson)
Mr Robin Newton
Mr Mike Nesbitt

10.35am The meeting began in public session.

6. Assembly Research: Inquiry into Research and Development

Members received a research briefing from Assembly Research regarding papers for the Committee's Inquiry into Research and Development.

12.14pm Paul Frew returned to the meeting.

12.20pm Steven Agnew left the meeting.

Agreed: Content for Assembly Research to include more information pertaining to a research and development case study from an aeronautical company Holland.

[EXTRACT]

Thursday, 16 February 2012

Almac Group, 20 Seagoe Industrial Estate, Craigavon

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Gordon Dunne
Mr Phil Flanagan
Mr Stephen Moutray
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Ms Paula Best (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Steven Agnew
Mr Paul Frew
Ms Jennifer McCann
Dr Alasdair McDonnell
Mr Robin Newton

10.45am The meeting began in public session.

5. Inquiry into Research and Development: Almac

10.46am Officials joined the meeting.

Members received an oral briefing from Colin Hayburn, Executive Director, Professor Richard Kennedy, VP Experimental Medicine and Professor Tim Harrison, VP Discovery Chemistry, Aine Rafferty, Alan Armstrong CEO, John Irvine, Executive Director, Almac

Key issues discussed included an overview of the structures and work of Almac, the impact of the current European R&D funding and the new Horizon 2020, the need for partnerships between business and academia and the role of government and the legislature.

12.17pm Officials left the meeting.

[EXTRACT]

Thursday, 23 February 2012

South Eastern Regional College, 81 Victoria Avenue, Newtownards

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Phil Flanagan
Mr Paul Frew
Ms Jennifer McCann
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Dr. Alasdair McDonnell
Mr. Robin Newton

10.36am The meeting began in public session.

6. Inquiry into Research and Development: Confederation of British Industry (CBI)

12.00pm Officials joined the meeting.

Members received an oral briefing from Kirsty McManus, Assistant Regional Director, CBI, Dr Paul Beaney, Technical Director, Cherry Pipes Ltd and Stephen Sloan, Project Manager, Momentum.

Key issues discussed included CBI's response to the Inquiry into Research and Development, the Administrative burden in the application process, collaboration and networking on R&D projects, the low numbers of Northern Ireland Evaluators for R&D project applications and SME involvement in R&D.

12.15pm Stephen Agnew left the meeting.

Agreed: CBI to provide an analysis of Framework Assessors and a national report on Medium sized businesses.

Agreed: for officials to answer any further questions in writing that the Committee may have regarding this issue.

Members noted a record of an interview with the Chair and Jim Nicholson MEP regarding the Inquiry into Research and Development.

Agreed: to receive oral evidence from the Agri-Food and Bioscience Institute (AFBI) for the Inquiry on 22 March.

[EXTRACT]

Thursday, 1 March 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Phil Flanagan
Mr Paul Frew
Mr Paul Givan
Mr Stephen Moutray
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Leanne Johnston (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Daithí McKay (Deputy Chairperson)
Ms Jennifer McCann
Dr. Alasdair McDonnell

10.40am The meeting began in closed session.

1. Inquiry into Research and Development

Members discussed the emerging findings to date from the Inquiry.

10.45am The meeting moved into open session.

5. Inquiry into Research and Development: Belfast Metropolitan College

Agreed: Members agreed to forward a Committee paper on the emerging findings of the Inquiry to date to the Department for consideration, prior to DETI, Invest NI and InterTradeIreland giving oral evidence on the Inquiry.

Members noted a briefing paper from the Department on the working group on Framework 7 and Horizon 2020.

10.48am Officials joined the meeting.

Members received an oral briefing from Damian Duffy, Director, Business Generation and Learner Services and Justin Edwards, Assistant Chief Executive.

Key issues discussed included the benefits of Knowledge Transfer Programmes, applied research and collaboration between business and academia on innovation, research and development.

11.15am Stephen Moutray left the meeting.

11.21am Paul Givan left the meeting.

Agreed: officials to provide examples of success stories as a result of working with organisations in the Republic of Ireland.

8. Inquiry into Research and Development: Aerospace Defence Security

11.46am Officials joined the meeting.

Members received an oral briefing from David Raymond, Chairman of BASE Aerospace and ADS NI Deputy Chairman, Ronnie Harrison, Technical Director, Thales Belfast and Dr Leslie Orr, Manager, ADS Northern Ireland.

Key issues discussed included access to research and development and the need for market driven research and development to assist small and medium sized enterprises to avail of opportunities for research and development

[EXTRACT]

Thursday, 8 March 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Gordon Dunne
Mr Phil Flanagan
Mr Paul Frew
Mr Paul Givan
Ms Jennifer McCann
Mr Stephen Moutray
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Paula Best (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Steven Agnew
Dr. Alasdair McDonnell

10.35am The meeting began in public session.

5. Inquiry into Research and Development: Queens University Belfast

10.45am Officials joined the meeting.

Members received an oral briefing from Scott Rutherford, Director of Research and Enterprise and Professor Tony Gallagher, Pro-Vice Chancellor, Queens University Belfast.

Key issues discussed included infrastructure and expertise requirements for research & development, changes to procedures for Knowledge Transfer Programmes and promotion and support requirements from government for research and development.

11.10am Paul Givan joined the meeting.

11.20am Phil Flanagan left the meeting.

11.26am Officials left the meeting.

11.26am Stephen Moutray left the meeting.

6. Inquiry into Research and Development: University of Ulster

11.27am Officials joined the meeting.

Members received an oral briefing from Tim Brundle, Director of Innovation and Tony Bjourson, Director of the Bio-Medical Sciences Institute.

Key issues discussed included implementation requirements for research and development, bureaucracy at all levels in the process, government structures to support research and development and the need for more opportunities for venture capital.

11.46am Paul Frew left the meeting.

12.00pm Daithí McKay joined the meeting.

12.00pm Paul Givan left the meeting.

12.14pm Officials left the meeting.

Agreed: In the absence of Mr Robin Newton, the Chair will act as Inquiry Rapporteur.

[EXTRACT]

Thursday, 15 March 2012

Northern Ireland Science Park, The Innovation Centre, Belfast

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Gordon Dunne
Mr Phil Flanagan
Mr Paul Frew
Ms Jennifer McCann
Mr Stephen Moutray
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Steven Agnew
Mr Paul Givan
Dr. Alasdair McDonnell

10.40am The meeting began in public session.

5. Inquiry into Research and Development: Northern Ireland Science Park

10.44am Officials joined the meeting.

Members received an oral briefing from Dr Norman Apsley, Chief Executive Officer, NISP, Alan Watts, Director, Halo Business Angel Network and Frank Hewitt, Chairman, NISP.

Key issues discussed included the NISP Connect and Business Angel projects, opportunities for venture capital and relationships between NI and RoI and EU funding.

10.55am Gordon Dunne joined the meeting.

11.24am Stephen Moutray joined the meeting.

11.57am Paul Frew left the meeting.

12.07pm Officials left the meeting.

[EXTRACT]

Thursday, 22 March 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Gordon Dunne
Mr Paul Frew
Ms Jennifer McCann
Mr Stephen Moutray
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Steven Agnew
Mr Phil Flanagan
Mr Paul Givan

10.11am The meeting began in public session.

2. Inquiry into Research and Development: Agri-Food and Biosciences Institute

10.12am Officials joined the meeting.

Members received an oral briefing from Professor Seamus Kennedy, Chief Executive Officer, Dr Mike Camlin, Deputy Chief Executive Officer, Professor John Davis, Director of Economics and Joel Ferguson, Acting Head of Corporate Services, AFBI.

Key issues discussed included the role and work of AFBI, current structures for supporting research and development and centres of competence for research and development..

10.34am Daithí McKay joined the meeting.

10.39am Paul Frew joined the meeting.

10.50am Gordon Dunne joined the meeting.

11.02am Stephen Moutray left the meeting.

11.21am Officials left the meeting.

3. Inquiry into Research and Development: DETI

11.26am Officials joined the meeting.

Members received an oral briefing from Graeme Hutchinson, Head of Policy Division, Ciaran McGarrity, Principal, Innovation Policy Unit and Bernard McKeown, Principal, Foresight and Horizon Scanning Unit, DETI.

Key issues discussed included structural and cultural systemic problems relating to research and development, how larger organisations can support SMEs and the need for government to be less risk averse.

Members noted the lateness of papers from the Department and expressed concern at how this was occurring more frequently.

Agreed: for Officials to report this back to the Department and for Committee staff to monitor the situation.

Paul Frew declared an interest as a former member of the Public Accounts Committee.

12.10pm Paul Frew left the meeting.

Agreed: to provide results of mapping exercises on Research and Development undertaken by the Department.

12.37pm Officials left the meeting.

[EXTRACT]

Thursday, 29 March 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Paul Frew
Mr Paul Givan
Ms Jennifer McCann
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Phil Flanagan
Mr Daithí McKay (Deputy Chairperson)
Mr Stephen Moutray

10.34am The meeting began in closed session.

6. Inquiry into Research and Development: Invest NI

10.50am Officials joined the meeting.

Members received an oral briefing from Carol Keery, Director, Innovation, Research and Technology and Dr Joanne Coyle, Collaborative R&D Support Service, Invest NI.

Key issues discussed included the role of Invest NI and its comprehensive support to businesses including promoting and enhancing R&D, mobilising SME and firms to collaborate in R&D and the role of Innovation Advisers.

11.20am Paul Givan joined the meeting.

11.43am Paul Frew left the meeting.

11.43am Paul Givan left the meeting.

11.45am Sandra Overend left the meeting.

Agreed: for officials to respond in writing to any further questions the Committee may have.

11.52am Officials left the meeting.

7. Inquiry into Research and Development: InterTradelreland

11.54am Officials joined the meeting.

Members received an oral briefing from Liam Nellis, Chief Executive, Aidan Gough, Strategy Policy Director, Dr Bernie MaGahon, Science, Technology & Innovation Manager and Dr Simon Grattan, EU Programme Co-ordinator, InterTradelreland.

Key issues discussed included the role of InterTradelreland in connecting businesses North and South for collaborative work, setting targets for Horizon 2020 and the innovation challenge programme.

12.07pm Paul Frew returned to the meeting.

12.15pm Sandra Overend returned to the meeting.

12.27pm Paul Frew left the meeting.

Agreed: for officials to respond in writing to any further questions the Committee may have.

12.39pm Officials left the meeting.

Agreed: to forward the additional questions on the Inquiry to the Department for a response by 18th April.

[EXTRACT]

Thursday, 19 April 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Paul Frew
Ms Jennifer McCann
Mr Stephen Moutray

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Phil Flanagan
Ms Sandra Overend

11.36am The meeting moved into closed session.

14. Closed Session: Inquiry into Research & Development

Members discussed a draft report of the Inquiry into Research & Development.

Agreed: For the Chair and Deputy Chair to meet with MATRIX representatives

Agreed: For the Chair and Deputy Chair to meet with Mr Iain Gray, Chief Executive of the Technology Strategy Board.

[EXTRACT]

Thursday, 3 May 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Steven Agnew
Mr Phil Flanagan
Mr Paul Frew
Mr Paul Givan
Ms Jennifer McCann
Mr Patsy McGlone
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Gordon Dunne
Mr Stephen Moutray

10.40am The meeting began in closed session.

1. Closed Session: Inquiry into Research & Development

Members considered the draft Inquiry report and noted a record of the informal meetings held by the Inquiry Rapporteur.

Agreed: to provide any comments on the draft report to the Clerk or to the Chairperson.

Agreed: to consider the final report at the meeting of 31 May.

Agreed: to schedule the debate in plenary during the week commencing 11 June.

10.53am Paul Frew joined the meeting.

[EXTRACT]

Thursday, 17 May 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Daithí McKay (Deputy Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Phil Flanagan
Ms Jennifer McCann
Mr Patsy McGlone
Mr Stephen Moutray
Ms Sandra Overend

In Attendance: Ms Cathie White (Assembly Clerk)
Ms Kate McCullough (Assistant Assembly Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr Paul Frew
Mr Paul Givan

10.09am The meeting began in closed session.

1. Closed Session: Inquiry into Research & Development

Members considered the draft Inquiry report

Agreed: to include a reference in the inquiry report to the Memorandum of Understanding (MoU) between Newry and Mourne District Council and Castlereagh Borough Council's Evolution Project.

Agreed: to table the draft motion for plenary debate on 11 June in the Business Office.

10.14am Daithí McKay joined the meeting.

10.15am The meeting moved into open session.

[EXTRACT]

Thursday, 24 May 2012

Room 30, Parliament Buildings

Present: Mr Alban Maginness (Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Mr Phil Flanagan
Ms Jennifer McCann
Mr Patsy McGlone
Mr Stephen Moutray
Mr Robin Newton
Ms Sandra Overend

In Attendance: Mr Jim McManus (Assembly Clerk)
Ms Kate McCullough (Assistant Clerk)
Mr David McKee (Clerical Supervisor)
Ms Michelle McDowell (Clerical Officer)

Apologies: Mr. Paul Frew

10.05am The meeting began in closed session.

1. Inquiry into Research & Development

Members considered the draft Inquiry report

Agreed: to arrange a press pre-briefing for the morning of Monday 11 June prior to the debate on the Inquiry to invite press representatives and key stakeholders.

10.07am Sandra Overend joined the meeting.

2. Apologies

Apologies are detailed above.

3. Research and Development Inquiry: Final Report

Members considered the final report of the Research and Development Inquiry

Agreed: That the list of Abbreviations and Table of Contents stands part of the report

Agreed: That the Executive Summary at paragraphs 1–33 stands part of the report

10.15 am Jennifer McCann joined the meeting.

Agreed: That that the Summary of Recommendations at paragraphs 1-15 stands part of the report

Agreed: That the Introduction at paragraphs 16-27 stands part of the report

Agreed: That the Key Issues and Findings at paragraphs 28-214 stands part of the report

Agreed: That the Conclusions and Recommendations at paragraphs 215-252 stands part of the report.

Agreed: That the extract of the Minutes of Proceedings at Appendix 1 stands part of the report

Agreed: That the Minutes of Evidence (Hansards) at Appendix 2 stands part of the report

Agreed: That the Rapporteurs Meetings at Appendix 3 stands part of the report

- Agreed:* That the Written Submissions at Appendix 4 stands part of the report
- Agreed:* That the Assembly Research Papers at Appendix 5 stands part of the report
- Agreed:* For the Chairperson to approve an extract from today's minutes which reflect the read-through of the Report. These are needed for inclusion at Appendix 1, minutes of proceedings.
- Agreed:* The appendices 2 to 5 of the report will be included in the CD ROM in the public version of the report.
- Agreed:* To order 50 reports with a CD ROM and 15 full reports for printing.
- Agreed:* To write to the following Committees - Agriculture and Rural Development, Employment and Learning, Finance and Personnel and the First and Deputy First Minister - to inform them that some of the recommendations in the report concern their departments.

[EXTRACT]



Northern Ireland
Assembly

Appendix 2

Minutes of Evidence

16 February 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Daithí McKay (Deputy Chairperson)
 Mr Gordon Dunne
 Mr Phil Flanagan
 Mr Stephen Moutray
 Mrs Sandra Overend

Witnesses:

Mr Alan Armstrong *Almac Group*
 Professor Tim Harrison
 Mr Colin Hayburn
 Mr John Irvine
 Professor Richard Kennedy
 Miss Aine Rafferty

1. **The Chairperson:** I remind colleagues that the purpose of the research and development inquiry is to identify barriers to innovation, research and development and to make recommendations on how those barriers can be overcome. Briefing the Committee today are Mr Colin Hayburn, executive director of Almac Group; Professor Richard Kennedy, vice-president of experimental medicine; Professor Tim Harrison, vice-president of discovery chemistry, and Miss Aine Rafferty. We are very grateful to you for allowing us to visit your headquarters to get a sense of what you do as a business and for your input into the entire area of research and development, which we see as crucial to transforming business in Northern Ireland. We believe that you are a good example of how we can build business and create high-value jobs that will bridge the productivity gap between here and Britain. It is very important to create a step change in our economy. One way to do that is through the development of research and the creation of innovative business here in Northern Ireland. We are absolutely delighted to be here. We look forward to your comments.

2. **Mr Colin Hayburn (Almac Group):** Thank you, Alban. The Committee is very welcome at Almac. It is great to see you all here. We have a brief presentation. We hope that it gives you a flavour of what we are trying to do. I know that a paper was submitted to the Committee. Our presentation will try to cover in a more specific and detailed manner some of the points in that paper. We are very informal bunch so please interrupt me or speak up. We will try to answer any questions as we go through the presentation. I will make some brief introductory comments. Then, these very clever professors will explain the complicated stuff. Some of this stuff is top secret. *[Laughter.]*

3. We were not quite sure whether any of you knew much about Almac. Our global headquarters are here in Craigavon. Principally, we operate a range of services to the pharmaceutical industry. That starts off with biomarker identification. A biomarker might be something in your blood or a solid tumour, which might indicate a particular prevalence, or response to therapy, or recurrence of disease. We take that right through to making an active pharmaceutical ingredient (API), which is the main subject matter of a drug. We make those for third parties. The pharmaceutical company would ask us to try to formulate it into a tablet or some sort of medicine. It is highly complex work. We package that medicine and prepare it to go into a clinical trial. Nowadays, if you want a drug to be approved, it involves a heavily regulated clinical process. It is a global process. You have to show that the drug works, is efficacious and is commercially relevant. Our clinical trials operations are involved in doing that. That is very much done on a global basis.

4. At present, we are in our 32-acre Craigavon campus. There are six main trading divisions, which cover the main

- services to the pharmaceutical industry, right through from biomarker identification, API manufacture, formulation and development, and the management of clinical trials. Our R&D arm is slightly different to that. It is trying to develop technology that will allow us to stand alone and trade with the pharmaceutical industry, rather than as a service provider partner. My colleagues will give a bit more detail on that.
5. We have also recently launched a new North American headquarters in Souderton, Pennsylvania. Slightly under 50% of our global revenue comes from America. If you want to be a player and a main entity in the pharmaceutical industry, it is essential that you have a presence in America. We opened that very impressive facility in 2011. It is a 40-acre site in Pennsylvania, which we hope will eventually replicate most of the services that we carry out here. It will not take any jobs away from here. It will make us a global player. If we are not a global player, we cannot compete.
 6. In the past five years, we have had very strong growth in revenue and employment. We are very proud of our group turnover figures, which, in this day and age and competitive environment, are very impressive. It took a lot of money and investment to achieve those figures. It involved a lot of effort and challenge. We are in a global economy. In the past few years, low-cost and developing economies, such as India, China and the Far East have really challenged us on cost. Therefore, we have to be more innovative. We have to be very smart. We have to be smart from a governmental perspective too, because the companies that we compete against have no regulatory barriers. We have regulatory barriers here, which have to be complied with. Therefore, although we face strong competition, we have had strong growth nonetheless. It takes a lot of effort to keep it up.
 7. Our employment numbers are around 2,000 people on site here in Craigavon and around 1,000 people in North America. In the past few months,
- we carried out a bit of research. We found that 80% of the people who are based in Craigavon are from Northern Ireland. The other 20% per cent are from overseas. The guys might share with you that, in order to get high-quality research and development staff, we have to have a global reach. There is a high cost to that. I am not sure what our recruitment costs are in a year to find a high-class scientist. However, to find quality candidates costs hundreds of thousands of pounds. These two boys do not come cheap. You are lucky to get them today for half an hour. *[Laughter.]*
8. I will now hand over to Tim and Richard. As I said, I hope that in the paper we submitted we addressed, in a practical and specific manner, some of the main points. Please feel free to engage with Tim and Richard as they go through the presentation and to talk through any points that you might want to raise.
 9. **Professor Tim Harrison (Almac Group):** Thank you Colin, and thank you for the invitation to speak to you today. As Colin said, we work in a quite complex and high-tech industry. It is a high-risk and high-reward industry. However, it is also hugely worthwhile, because, ultimately, we are trying to produce drugs to improve people's quality of life. We are conscious that not everyone will be familiar with the details. Therefore, as Colin said, we will try to give to give you a context of the actual types of research that we do and identify some of the issues. We will also provide some real case studies and summary points that will hopefully lead to further discussion.
 10. As I said, drug discovery and development is a complex and long-term process. To give you a quick overview of that process, it starts with discovery and then moves to a pre-clinical stage in which we work with animals, before moving to people. The first medical studies will be at the phase 1 level with healthy human volunteers. We then move to the first patient studies in phase 2, with expanded patient studies in phase 3. If we are very fortunate, drugs will be approved at the end of that process. Almac does not do the

- whole process, but you can see from the slide that 12 to 14 years would not be uncommon. On the latest estimates, the whole process costs around \$1 billion.
11. I will now talk about one of the R&D divisions of Almac — Almac Discovery — which looks to develop new drugs. Richard will then tell you about our other main research division, Almac Diagnostics. In Almac Discovery, we look to develop new projects at the very beginning of the process. We look to identify new targets, and a current focus is on cancer. We bring those projects in, add value to them in a number of ways and license them out to bigger players who can afford to take them through the later stages of development. That is the business model: we get new projects, add value to them, and out-license them. We do deals to bring revenue into the company. Typically, there will be an upfront payment, milestones to success and, ultimately, royalties on sales. I will give you an example of what those numbers could look like later in the presentation.
 12. The key point that I want to make is that we are selling oncology drug discovery programmes — not completed products. That is slightly different to some of the engineering-type R&D that you may be familiar with. Drug discovery requires a long-term investment, but the rewards can be very high when you get it right. Therefore, as we move further on in the process — if we can get to that point — revenues are really significant. Again, I will give you an example of that later.
 13. Almac Discovery was a new venture for the Almac group. It is a drug discovery company. It is not a service company and we do not do research for anyone else. As I have described, it has a biotech-type business model. We got initial funding from Invest Northern Ireland (INI) and the McClay Trust to secure the company and established it in January 2008. Since then, we have created 31 new jobs at the Craigavon site. We took great care in recruiting an experienced management team from all over the world, and, as Colin alluded to, that was not the easiest thing to do.
 - Getting those guys to move to Northern Ireland was not easy, but we waited and got the right team, and it is now in place. We also importantly established a strong network of technical and commercial outsourced contacts. We are very well linked into not only the UK and Europe but to America and the rest of the world.
 14. As I will show you in a minute, we have established a number of innovative drug discovery programmes in the area of cancer with a potentially high value, and I will give you an indication of what those values could be. Our vision — it is grand, but I hope it is achievable — is to build a sustainable drug discovery R&D company in Northern Ireland. If can we achieve that, it could have real game-changing consequences for the economy.
 15. The next slide shows our current portfolio. I will not dwell on it, but it shows the different phases of clinical development, beginning with the early pre-clinical and phase 1 stages. You will see that we have a product that has been through phase 1 and we partnered on that with a company for further development. The slide also shows our other two lead products. I will talk about one of those in a moment as a case study, and we hope that to be in the clinic this year. The other lead product is just behind that in the production process, and we also have a range of early-stage programmes. We also have another collaboration with a university in Sweden on column therapy, which is also in the clinic. Those projects represent possible partnering points according to the scenario that I showed you: we take it to a certain point and then partner it. Hopefully, you will see that we are not too far away from achieving potential value inflection points with some of those products.
 16. I will show you an example of one of our programmes, which is the second one that will hopefully go into clinic. This is clinical cancer research. I picked this one because there was a bit of press around it last year. You may have seen some of that. A press release went

- out on the back of a paper published in the American Association for Cancer Research journal. The work was also presented at the American Association for Cancer Research meeting in the States in April. We have other publications to follow up, and this really made a splash last year. It was featured on local and national television and in the national press.
17. **What was so interesting? It was a drug candidate to treat cancer:** a so-called anti-angiogenic. Very briefly, if a tumour is going to develop, it needs blood vessels and nutrients to grow. Simplistically, if you can cut off that supply of nutrients, you can starve a tumour. I will show you some real data that we have to show that. The market leader in the anti-angiogenic area is a drug called Avastin, which you may have heard of. In 2010, the sales were worth around \$7 billion; that figure represents one year's sales. Here is the first indication that, when you get it right, the kind of revenue you can bring in.
 18. This drug was discovered at Queen's University and was licensed to Almac Discovery. It was a big protein, and we cut it down and found the active bit. It works through a different mechanism to Avastin. People get resistant to Avastin quite quickly, so we hope that this will be a differentiator. The sort of deal we did with Queen's included financing research staff there. The drug stops tumour growth in a range of pre-clinical models, and we plan to start clinical trials this year. As I said, if we can show good clinical data, we think there is the potential for a pretty big partnering deal after that.
 19. I will show you this data slide, because I believe a picture is worth 1,000 words. This is a mouse model implanted with a tumor. These animals are dosed with vehicle and the tumour grows; you can see the size. This is two dosing schedules for our drug, either daily or three times a week, and you can see that not only does the tumour stop growing, but you start to see some regression. This is a simple animal model, and the hope now is that, when you take this drug into humans, you will see the same effect. We believe that this has application across a range of solid tumours because of the mechanism, so it is really quite an exciting drug.
 20. What may something like this be worth? I am not going to walk you through the details. We got an independent company to build us a model for this and the projected revenue is shown on the slide. Peak sales are around \$2.4 billion. The sort of deal that we might do on something like this would be worth, upfront, around \$15 million, milestones with a total of \$115 million, and then the 12% royalty on that would be something like as shown, so, it would be \$300 million a year. Clearly, there is a long way to go with that drug; it has to go through those stages. However, if we are successful, this is the sort of revenue that can start to feed back into Northern Ireland on a long-term basis.
 21. **Mr Hayburn:** Current INI funding will cover you for those three years, but just those three years. We are not making money until the time that I am pointing out. I will summarise this while that slide is up; there is a complete gap in funding from 2013 to 2020. We will touch on that later, but it is a very significant point. R&D funding is only a small part of our overall needs.
 22. **Professor Harrison:** The other important point is that, the further you go along this axis before partnering, the bigger the deal will look.
 23. Of course, there are potential risks. This is a risky business. This drug could show toxicity in the clinic; we may take it into humans and discover that it does not show efficacy, although it is showing efficacy in pre-clinical models; and we may not be able to find a commercial partner at this stage. If we are forced, because of funding to partner this early, we may not be able to find a partner. There are significant risks, but there is clearly also significant reward.
 24. That is really just a flavour of Almac Discovery. Hopefully, it sets the context

- for the discussion at the end. We have summarised some matters and there are a few real case examples of some of the issues with R&D. I am going to hand over to Richard now to talk about Almac Diagnostics, which is the other major R&D division within Almac.
25. **The Chairperson:** Thank you very much.
26. **Professor Richard Kennedy (Almac Group):** Thank you for the opportunity to give evidence on our research today. I have a few comments especially on this first slide. I sit across a number of camps. I sit on a research group at Queen's University that I will talk about a little bit later; I am the vice president and medical director of Almac Diagnostics; and I also practice as a medical oncology consultant in Belfast City Hospital. There is rationale for doing all three, because it covers what is required to get something moved from basic science into the clinic. That is why I sit on that interface.
27. Almac Diagnostics, briefly, is a personalised medicine company. What we are trying to do is to develop tests in order to tell us the best treatment to deliver to patients. With increasing costs of drugs and therapies, we need to be able to target treatment better so that the right patients are benefiting. Unfortunately, at the moment, when I give chemotherapy in the clinic, probably only about 20% to 30% of people benefit from it; the rest are just getting the toxic effects, so we can do a lot better.
28. As part of the Almac Group, diagnostics has its own lab, which has all the quality systems to be able to deliver diagnostic tests internationally. It is one of the very few labs in Europe that can deliver tests to the US. The slide shows the research pipeline that I am responsible for. It is broken into two main groups: predictive and prognostic tests. Predictive tests predict the response to specific therapies, and prognostic tests predict the outcome for a patient following standard treatment such as surgery, so there is a slight difference between the two. I will not go into too much detail
- on that today, but they are two different programmes.
29. Today, I will focus on the test for stage II colon cancer. There has been quite a lot about this in the press and the media recently, so you may have heard a bit about it already. The issue is that, in patients who present with stage II colon cancer, the disease is confined to the bowel, which is a good thing. However, in that group of patients, about 20% will develop recurrence within five years, and that will, ultimately, lead to their death. We know that, if we offer chemotherapy to those patients, we can prevent recurrence of the disease. The problem is that we do not know who those 20% are. The options, then, are to treat everybody with chemotherapy, accepting that 80% of them will not benefit; or not to treat anybody, accepting that 20% will die from colon cancer. That is not a good situation to be in. Therefore, we have developed a test to try to sort that situation out.
30. Using technology developed by Almac, we have developed a test that can analyse the tissue from patients with colon cancer and predict the risk of recurrence within five years to help clinicians to make decisions on treatment. This was not straightforward. To do it, we had to collect a lot of tumour samples from a lot of different centres. There were about 16 or 17 centres involved. To give you an idea of the stretch that we had to make to get the samples, the slide shows the number of centres all over the world. The reason for doing that is that we did not want to develop a test just for Northern Ireland; we wanted to develop a test that would work throughout the world. To do that, we needed to collect patient material from throughout the world. A lot of work was needed to achieve that, but it was worthwhile.
31. The end result was that we developed a test that quite nicely separates patients between those who develop recurrence, and those who do not. The slide shows survival over time. It shows people who are predicted to have the worst outcomes, and you can see that they do badly.

32. This study was published by the American Society of Clinical Oncology. Its 'Journal of Clinical Oncology' is one of the premier journals on cancer medicine in the world. Our work got a splash in the journal, as well as an editorial. That was good advertising for Almac's capabilities.
33. The test has been licensed for a validation study in the US with a diagnostics company, and deal terms have been reached that I will talk about in a moment. The slide is just to give you an idea that developing one of these tests is not an entirely straightforward process. We started the process at the start of 2007. We are now in 2012, and we still probably have a year to go with the validation studies. It is a long process, which goes back to Colin's point: our funding covered about two years of it.
34. **Mr Hayburn:** We do not start making money at this point. The commercial return kicks in only five years from that point. The current structures in INI for funding, and even framework programme 7 (FP7), are a more traditional model. They do not suit this type of world-class research. The guys are maybe underselling themselves: there are countries around the world that are trying to do this, and we have been first in some cases. Those bigger companies have bigger support structures — they are massive billion-dollar companies. We do not have that. We have to work within tighter confines. The funding for two or three years really is vital for us.
35. **Professor R Kennedy:** I will not go through this in great detail. The slide shows a simplification of the process. The next slide shows the current deal terms and the projected returns on the test. That is just for the US markets — there is potential to take it into European markets as well. At 2016-17, you are looking at about \$20 million coming back. That is the bottom line at that stage, coming back to Northern Ireland. That is an overview of the diagnostics.
36. While you are here, I thought that it was worth touching on the topic of this next slide. I think that it may be a good model for the way forward for some more basic research as well. Some of you may be aware of this, but Almac and Queen's University are collaborating on an initiative to try to improve research from the lab through to the clinic. That it funded by the McClay Foundation and Invest Northern Ireland. The idea is to facilitate the transition of innovation from academia to industry. Typically, what happens is that the academic will work up to a point, publish the data and that is it finished. Nobody is picking that up and taking it into the clinic, and there are numerous reasons for that. It may be that the research is not compatible with product development: it may have been done with the wrong technologies and in the wrong way; or it may be that industry and academia are just not talking properly.
37. To try to reduce those roadblocks, we are reflecting Allen McClay's vision, which is to streamline it. We are a small country. We have two universities, and one nearby that does this kind of work. Its work is highly compatible with the research that we are trying to bring into the market, so we are trying to streamline that process.
38. The other point is that it works both ways. Academia can educate the people in Almac research as well, to ensure that they do not end up in a bubble where they get disconnected from what is going on at the cutting edge of science, and they can share technologies. It is more than Almac. We are hoping to generate the next generation of entrepreneurs in Queen's University. Those are people who now have an idea of what industry is about and how to get products into the market. Hopefully, they will develop their own companies and have their own ideas. We are trying to encourage that way of thinking.
39. We are also building sustainable relationships. Those people will train up through the university, and they may go to other countries and become the CEOs of major pharmaceutical companies, for

- all we know. However, they know about Almac, our capabilities and what we can do, and, hopefully, that will create a sustainable business model.
40. Within the programme, we are developing a test for predicting the risk of dying from prostate cancer, which has been very successful. Queen's University has had a large input, and it looks like we will develop a test of worth. We are developing new drugs and lead compounds that fit into Tim Harrison's programme. We have a medicinal chemistry programme in Queen's University that is linked into this, which is helping to develop drugs. Hopefully, Almac will be able to pick up on the product-development pipeline and market. We are also developing new technologies for biomarkers and drug discovery in Queen's University.
41. That is what I wanted to cover today. I have partly addressed the questions that were originally put to us in the context of what was presented. Some of the discussion points may need to be addressed. Colin said that we are presenting pipelines, which can run seven or eight years. Typically, our funding is for two or three years. We are left with a deficit to try to fund — to try to get products to market. That is holding things back. Some of our programmes are very good but we cannot take them forward as we do not have the finance.
42. As regards the framework, when an application is put in, it can be two years before you get any funding. By that time, everything has moved on in basic research. What you put in is no longer relevant. That is an issue for us. The end part of the pipelines is the clinical trials in patients. Nobody is going to invest in a product that does not work when it goes into the patient. That is the most expensive part of research, and there is no funding mechanism for it at present.
43. When we launch into one of these research projects, we are often asked about the guarantee of financial return, and that frustrates us a little.
- You cannot give a guarantee; it is research. We do our best to try to de-risk it as best we can, but there has to be an acceptance that some of the programmes will fail. We are always asked how many jobs it will create. Some may create jobs if we bring in a technology where we are developing a biomarker. Some will be more around revenue creation, which comes back in.
44. We find the EU funding element very complex and time consuming. We do not get much support. To give you an idea, we looked at putting in a framework programme 7, and it was going to take a full-time equivalent six months just to do the paperwork. That is fine if you have a fairly good guarantee that you will get funded, but it is actually a fairly low guarantee.
45. The other issue is that those are, typically, academia or small to medium-sized enterprise led. We get only a proportion of the funding for the work that we do. Therefore, it has to be very much in line with our research programme. That puts us in a situation where you are putting an academic group in the lead of one of your lead programme in your commercial enterprise. There is a lot of risk attached to that, and we have had experiences where the academic group will just head off in a different direction. Sometimes, it is quite difficult to control.
46. **Mr Hayburn:** Richard, you might mention the oncology aspect of the calling of FP7.
47. **Professor R Kennedy:** It is worth mentioning that the current framework programme 7 does not have a relevant oncology calling for us. We cannot apply at the moment, and none of our programmes apply to the current framework programme 7.
48. **Mr Hayburn:** The new one, as you mentioned this morning, Alban, can apply. If we were looking for specific topics for action, one would be support from INI locally to help us to create an infrastructure internally with Almac, including staffing and resource. We have spoken to INI and its FP7 contact in

- Brussels. That is all very good, but there is no support there for that. It would take a heavy investment from Almac to even avail ourselves of that, and it would be time consuming. Europe-wide, it is highly competitive to try to get the funding.
49. **Professor Harrison:** If you think that you have made a new discovery, time is everything. If you want to avail yourself of European funding, you have to ask, first, if there is a relevant European call that you can put into — often there is not — and then, even if there is, you wait a couple of years and you have lost the edge. There needs to be something more relevant that can be applied more quickly.
50. **The Chairperson:** At the moment, oncology is not part of framework 7.
51. **Professor Harrison:** Not for this year's call. There are very minor, specific things, but it was excluded from this year's call.
52. **Professor R Kennedy:** We also feel that there is an important element in education. As Colin has already alluded to, we need a particular type of training for that kind of work. It is important that that is being supported and that we are getting the right people coming through the universities. Tim, you have been involved in a committee on that, so maybe you want to comment on it.
53. **Professor Harrison:** It is really about developing the skills. I was involved in the original science, technology, engineering and mathematics (STEM) review and now I am involved in the STEM implementation group with Joanne Stuart. I chaired a workshop yesterday that was organised by the Department for Employment and Learning (DEL), which was great. It had all of the stakeholders from colleges, sector skills councils and the Department. It was fantastic. There is a fair amount of work in doing that, but business is committed to doing it. There are certain recommendations from the STEM review that actually require a limited amount of funding to really make a difference on things like scholarships, but now there is no funding at all. It is about working with Governments to try to make sure that, when we go through those processes, we actually do deliver something at the end of them. It took a long time for the STEM report to be published, and obviously the economy has moved on. We understand that, but, if it is important — I think everyone from Northern Ireland believes that the STEM subjects are important; they are right up there in the Programme for Government — we have to make sure that we work with the Government and that we can follow through on some of our commitments, otherwise it is going to be difficult to keep engaging with business. Business is very committed. It was a brilliant workshop. There was a real buzz around the place yesterday.
54. **Professor R Kennedy:** Point 2 demonstrates that those programmes are long-term things. They are not simple two-year or three-year projects, so it requires more of a long-term outlook. As the Assembly changes, those things are continuing, and I know that the views may change each time. It is about having some kind of continuity on it. Thank you for your attention.
55. **The Chairperson:** Thank you very much, Professor Kennedy. We will leave that slide up, because it is very helpful in focusing the discussion. I am going to start off the questions. Prior to the meeting, we structured a number of questions simply to try to focus on the issues that we are looking at in the inquiry. It might not flow directly from what you have just said, but, for the sake of our inquiry, we want to pursue that structure. Of course, you can bring anything in that you want, if you think it will be an appropriate response.
56. I was very interested in the interface between academic research, and business research and development. In your original submission you stated that there was a tension between the two: that academic research was not always directed towards business, and, indeed, that some of it was not contributing towards business development. I think

- that is, in essence, what you were saying. In that written submission you drew out that particular tension. Would you like to comment on that? How can we get academic research, business research and business application? How can we co-ordinate that so that we can maximise research?
57. **Mr Hayburn:** The QUB/Almac initiative is maybe the first step.
58. **The Chairperson:** That is very interesting. If you want to enlarge on that, that would be helpful.
59. **Mr Hayburn:** Richard has been put in the unique position of bridging industry and academia. That had to be very much an industry-led initiative. Sometimes, when you go into university settings, they are very political. There are various disciplines, and we need a crossover of various departments. We had to go into Queen's and put forward a very firm proposal that was industry led, with clear deliverables. That did cross over some departments, but it had to be industry led. We approached Queen's and talked for about 12 months to facilitate the structure that we wanted; not necessarily the structure that Queen's wanted. That was led by Tim and Richard, who are both experienced in working with academics, but who also know that there have to be deliverables from an industry perspective. From a strategic perspective, it took a bit of work to do that.
60. Richard, you may want to talk specifically about how that operates.
61. **Professor R Kennedy:** That is an important point. I can talk about the academic side. Most of my career has actually been in academia, so I can comment on that.
62. The first thing to say is that, in our current academic set-up, investigators are rated on what is called research excellence framework (REF) return. They are rated on their publication record. That is not unique to Queen's University; that is within the UK. Universities do not rate the commercialisation of research. It is a nice thing to have, but it is not one of the things that researchers are rated on. So, you get what you pay for, effectively, or you get what you expect. Interestingly, even within the programme, the pressure from the university was still to have so many high impact publications within a certain time. That is its interest.
63. **The Chairperson:** And that gives the university international standing and status.
64. **Professor R Kennedy:** Absolutely. It is an academic institution, so it needs academic standing. The commercialisation of that research takes somewhat of a secondary position to that. We have tried to show that you can do both. My argument is that, if you do proper research with a proper commercial end point, it will get into the clinic and will, therefore, benefit patients, but also, it should be the research that gets into the good publications. Therefore, you can marry the two, but it takes a little bit more creativity. In my experience, the university understands that now. A good example is maybe the paper I showed on the stage II colon cancer project. That has a clear deliverable for patients, a clear benefit and a clear product, and is probably one of the highest impact papers that has come out of the Department at Queen's in the past four or five years.
65. **Mr Hayburn:** There is a link there. That paper could be used as a marketing tool to commercialise the test. If a paper in an internationally renowned journal is picked up by the pharmaceutical companies, they would then contact us to speak to them about the test. That is an important linkage. However, not everybody can deal with those academic groups. We have had to invest in people like Richard and Tim, who can go in and — it is fair to say — speak the right language with the academic groups to achieve acceptance. We find that if too hard-nosed a commercial approach is taken with academic groups, they retreat into almost an ivory tower of academia.

66. **Professor Harrison:** It does not automatically mean more work for the academics. As Richard said, if experiments are done in a certain way, they do not have to be repeated, so it could actually mean less work. It is about working together with them to show them that that is the way forward and can accelerate commercialisation. You still get all the benefits for the academic group, but are now in position whereby, at point x, you can commercialise straight away.
67. One way in which we have done that, which is probably different to most programmes, is through Richard, who is seconded down there as team leader with a couple of his people. I am taking one of my key team leaders out of my drug discovery group for two years and seconding them to Queen's University. We are in the process of hiring three postdoctoral fellows to work under him. He will be in the academic lab bringing all his industrial experience. We have bought equipment that is industry standard and fit for purpose. Those postdocs are going to get fantastic training; everybody in that lab is going to get fantastic training. We think that we can start to expand that. People see, for example, that we probably produce purified compounds more efficiently because we have good automation. Once people in academia see that, they will say that they want to be part of that.
68. You have to be in there; you have to work together with the academics.
69. **The Chairperson:** Would that have happened if you did not have the McClay Foundation? This is an innovation in the way that universities do things.
70. **Mr Hayburn:** It is. However, it is the way that industry does things, and it represents an investment on our part. The people who the chaps talked about will not bring in any money for us for two or three years, but they occupy costly oppositions. It is a long-term investment on our part, and there is risk involved in that investment. As the guys have said, this is biological research. There are no gimmes with it and it could go wrong quickly.
71. We need funding support. The McClay Foundation has been set up to do things like that, and that is good. However, government should also be involved. Incidentally, INI has supported that venture and the Almac Group has also invested heavily, with almost £1 million. That is sunk money and a long-term investment. Those are early phase projects. We hope to get certain candidates for prostate cancer into Almac Discovery, and we will then enter into that five to seven-year commercialisation period. However, it may be 10 years before we get anything out of that. It will be high-quality stuff, but it will take a lot of investment.
72. **Professor R Kennedy:** We have been working in Queen's since May of last year, and it is fair to say that our colleagues from Queen's have been very supportive. They have actively supported the programme and see the purpose behind it. There has been very good interaction, and they are beginning to understand the benefits.
73. **The Chairperson:** Obviously, you hope that that will work well for Almac. Do you see that as a model that other firms could use in this area and in other areas of research?
74. **Professor Harrison:** That model is being used. Bombardier has set up a new research area at Queen's Island. That is on the Bombardier site, but it is a university building. That is a very innovative approach and they have set up labs there, so that people from Bombardier can effectively be seconded into academic labs. I absolutely think that that model can be applied in other areas, and it is.
75. It is expensive and only the big companies can even start to think about doing it. Almac has all sorts of demands on capital investment, and it is about balancing the investment against the research and development, and the risk. You have seen the kind of rewards that you can get, but you have to be

- conscious that there is a very big group. There are lots of other requirements, and trying to get that balance right is important. To my mind, because this has such potential for Northern Ireland, that risk should be shared, as it is being shared — at least initially — by government. However, these are long-term projects. If we want to develop the sector, there needs to be a partnership.
76. **The Chairperson:** What proportion of that funding comes for Invest Northern Ireland for that?
77. **Mr Hayburn:** About £1.5 million. A lot of work went into getting that, Alban. This ticks all the right boxes from a theoretical perspective, but not a lot of jobs are created by it. As I said, the revenue expectation is perhaps five to 10 years down the line, and there may be no revenue expectation. It does not fit INI's classic model, but it is the future.
78. The US companies are way ahead of us on this. They are engaged with academia and they have academic guys who are commercially minded and who want to create something with an eye to the market. We find that European academia is less market focused. They are more classic academics, and changing that will take some time. However, we have made a start.
79. **Professor Harrison:** One other potential advantage is that, with Richard working in academia, he can apply for external research grants and bring in funding from outside of Northern Ireland. That was another big plus and we are in the process of applying for that funding now. We can utilise his position as a academic to bring in revenue in the form of research grants.
80. **Mr Dunne:** Thank you very much to everyone at Almac. We have been very impressed by what we have seen so far and by your commitment and dedication to your work. It is obvious that you feel some frustration at the delays in processing funding applications. Can you give us some more information and evidence in relation to how those delays restrict your development work? What can we and others do to try to help you through that?
81. **Mr Hayburn:** There are two aspects to that. There is local Invest NI funding and FP7 funding. FP7 is a highly complex matter, as we shared earlier. We have not really fully engaged in that, but we would appreciate support, even financial support, to be able to do so. That is a secondary issue, and we will address it internally in Almac in the next 12 months.
82. On the issue of INI funding, we have worked very hard with INI. Almac is a very big group, and INI gives us a lot of capital support and a little bit of R&D support. However, sometimes it treats that as one basket of overall funds to Almac. In respect of capital return, the business plans for our more services-based businesses are more straightforward as there is a basic return on revenue. So if, for argument's sake, you build a bigger facility, your output and revenue ought to grow in relative size to that facility. This is different, however. We have found from engaging and even trying to understand the longer-term commercial models for validation and commercialisation that they do not fit the classic three-year model. There has to be persuasion. We are trying to get three-year funding even though we know that the revenue might not come in. There is a box with a revenue slot, and it is not realistic to expect a revenue return in three years. There needs to be a five to six-year programme. We have raised that point with INI. You are completing your own Budget exercise at the moment, and you know INI well enough to know that is very difficult for it to give you budgets for five years. However, we need that surety.
83. R&D programmes are heavily people-based, so we have to give the guys job security for five years. INI does not have a structure to work with something like that, so when we engage in an application process, there are issues about return, job numbers and average salary. The average salary in Almac is between £26,000 and £28,000, which, as you know, is a lot higher than

- the national Northern Ireland average. Our average R&D salary, to get good-quality people, is between £38,000 and £40,000. We had to recruit Richard from Harvard in the US and encourage him to come back. He is very happy about that as you can see. We had to recruit Tim from industry. A lot of investment goes in to getting such staff. So the average cost of R&D staff salaries is high, and the INI models do not naturally fit that.
84. **Mr Dunne:** Do you think that it could do more to adjust those models to fit that? Do you think that we should be encouraging it to do that?
85. **Mr Hayburn:** You could certainly have a go at it. We talk to INI and work hard to engage with it. We feel that when we present something like this to INI, it goes away thinking, "That is great".
86. **Mr Dunne:** Do you feel that it is very much geared towards manufacturing?
87. **Mr Hayburn:** Certainly. Manufacturing is, historically, more traditional. We have asked it to do something different here. We suggested that it look at the example of San Diego in America, where the whole industry was transformed by taking a very active, aggressive governmental approach to funding in the pharmaceutical industry. That transformed San Diego in 30 years from a being a fishing base to a high-tech, high-class, world-class pharma-research base. We have talked to INI, and it has to come back to talk to you guys. There are budget constraints. From talking to INI over the past two or three years, we know that its chief concerns are budget constraints.
88. We have a very exciting programme. We are collaborating with a Swedish company, Immune Therapy Holdings (ITH), on column therapy. We have not shared that work. We have had a lot of interest from pharma companies. INI gave us a letter of approval for that. However, before we submitted the application, we had a meeting with INI and it told us, "Do not bother; we have no money". That is not a criticism of INI. I have always found that INI tries to work within very tight confines. Sometimes, it does not work, which is frustrating, and that adds to the laborious process. I think that that is fair to say.
89. We would like to get a new model for R&D programmes, even a five-year programme, which took into account a different format for the application form, with stretched-out revenues and support. INI will say that clinical trials are not supported from a European perspective, and that is true to an extent. We could push that a lot harder than we are pushing it. Those European rules are guidelines, so we could push a lot harder. There is no support for the commercialisation of R&D, and you would realise that if you asked a business development (BD) guy to out and sell R&D technology. It takes us around two years to try to sell a new technology to a pharmaceutical company. You will have an initial meeting and then you will have to go through various approval boards.
90. Pharmaceutical companies are worse than government; they really are. There are layers upon layers upon layers of approval required. It may take two years to get a meeting with the right people and then another year to try to work out a deal. They are very laborious and dinosaurian in how they approach things.
91. **Mr Dunne:** Why is that? Is it because of regulation?
92. **Mr Hayburn:** It is just the nature of the pharma industry, Gordon.
93. **Mr Dunne:** Heavily regulated.
94. **Mr Hayburn:** They will approach anything new like this sceptically. They are licensing more now. However, if, for example, we wanted to recruit two really world-class, clever scientific BD people to go round the world selling it, we would have no support for that.
95. **Mr Dunne:** Do you get inquiries from pharmaceutical manufacturers for R&D work?
96. **Mr Hayburn:** Gordon, most of our work is R&D work for the pharma industry.

- However, this is different. This is stuff that we are doing ourselves. You make a good point. The R&D work that we do in sciences and pharma, which is highly complex, is not treated as R&D by INI. It is treated as a service business, and it is all about revenues.
97. I would like to focus on our sciences business. Our sciences business involves highly complex science. It is not always easy to get it right. It is highly complex science to make API and develop new ways of making API. If we do not get that right, a pharma company will sometimes say, "We are not paying you for that." You have to take that risk. Our revenues and profits from sciences may be relatively low. When we put in a business plan to INI, we are told that revenue and profit have to be growing. However, that approach does not suit that type of work in our group. Other companies in our group are more profitable. Sciences will never be very profitable, but it is a vital part of the group. It is the clever stuff, but it is treated under very harsh economic conditions.
98. Pharmaceutical companies might say, "We are not paying you for that. Your quality yield was supposed to be 95, and it is 90. We are not paying you." We have to absorb that. And to take it as a cost, or maybe our earnings before interest, taxes, depreciation and amortisation (EBITDA) projection for that quarter will not be as big as it should be. If you try to sell it to INI, it will be sympathetic and nod at you, and then someone will come down and say, "You need to fill that in. Your revenue and EBITDA have to grow. We have to show that to tick a box." It does not always work.
99. **Professor Harrison:** That leads on to a general point about risk. It is not just about funding bodies' approach to risk; it is a wider issue in Northern Ireland. We make funding applications, but people do not understand fully what we are trying to do. As Colin said, you put in a business plan, but it does not take account of the risk. Therefore, the funding bodies find it very difficult when they do their commercial assessment.
- The economists get involved and it cannot be done. It can be modelled, but not many people are familiar with doing it. It is a real struggle.
100. It would be interesting to develop something on risk attitude in Northern Ireland. If we are to become innovative, we will have to understand more about risk. It is a world problem. I do not think that anybody really understands risk apart from those who are involved in it. It is very interesting. More and more people are talking about risk. Your Committee may want to look at the approach to risk at INI and government level. We have to accept risk. It is about understanding risk and then placing bets so that risk is minimised. You cannot get rid of it. It is almost as though people want an R&D project that must succeed. However, it is then not an R&D project.
101. **The Chairperson:** We are coming into the whole area of risk now.
102. **Mr Moutray:** Absolutely. As a local representative, I am delighted to be here. I am delighted that my colleagues have had the opportunity to come and see this gem in Craigavon.
103. **The Chairperson:** He got us special permission. *[Laughter.]*
104. **Mr Moutray:** Do you find that higher-risk, higher-return projects generally have a more positive impact on the economy than lower-risk projects?
105. **Mr Hayburn:** It is hard to know what that means, Stephen. If they work, of course they will. However, we have to consider the failure rate? For example, in the world pharmaceutical industry, 95% of all pharmaceutical oncology products fail at phase 3 clinical trials because they are not efficacious. As Tim alluded to, at a phase 3 clinical trial, it costs about \$1 billion to take a drug to market. We are hopefully taking a smarter, biomarker, biological-based approach about what drugs the body will respond to.
106. You may be asking whether we, as a country, should invest in higher-risk, high-quality, world-class, skilled jobs as opposed to low-level service jobs that

- come in and give people jobs. There is no security in that for me, but there is security in this. If we get this to work, if the intellectual property (IP) and API are protected and patents are protected and you build a reputational brand, you have got a world-class business. There is no protection for the lower-level services such as the call centres, as we have seen on the TV this week. We need to build that IP creation and that higher value, higher risk element in our services business, or we are exposed. India or China could come in and put a bid in for some of that API manufacture for four times less than we can offer. We have to build up a reputation so that people know if they go to us, they will get quality, assurance, deliverability and long-term sustainability. All that costs money. It might not always work from a profitability perspective in the short term, but for the longer-term strategy, it is the right thing to do; there is no doubt about it.
107. **Mr Moutray:** We have talked quite a lot about financial assistance this morning; does a company such as Almac need any other form of assistance, or is it entirely financial?
108. **Mr Hayburn:** What do you mean?
109. **Mr Moutray:** Is there any other type of assistance that you would need from government, or is it simply finance that is required by a company such as Almac?
110. **Mr Hayburn:** Finance is a big part of it, to be honest. A lot of things come down to finance eventually. We can look at resourcing other things but ultimately, who pays for it? We have had recent issues about planning, as you will know because they have been well publicised. In the past 18 months, a planning application was a major distraction for senior management and a major risk to our business. We lobbied hard to try and get the planning laws changed and get support from government in that, and it was a bit sensitive. I hope it is going in the right direction, but issues to create a proper, more corporate-friendly environment in legislation take a wee
- bit of courage. It takes a bit of forward thinking and listening to and working with businesses. Legislative assistance in things like that are very helpful. Alan and John are other board members at the back; can you think of any other assistance?
111. **Mr John Irvine (Almac Group):** Anything that helps on the planning side of things would be welcome. We have had huge problems there. Purely from a business perspective, those were problems that we should not have had to face, to be honest. Some of the other problems we have are energy costs here in the Province compared with our unit costs in Pennsylvania, for example. Our energy costs here are something in the order of two to three times more than what it is costing us in Pennsylvania. It is very difficult to compete globally when you have that burden to carry. I am sure you have heard people say that some of the employment legislation is extremely bureaucratic and is not always particularly employer friendly in our experience. Generally, a much greater focus on trying to identify what businesses need and the provision of support in the areas that you are directed to would certainly help.
112. **The Chairperson:** Just for the record, could you give your name and position, please?
113. **Mr Irvine:** Sorry; I am John Irvine, the executive director of Almac.
114. **Mr Hayburn:** That boy in the corner is Alan Armstrong, CEO. He might say something in a minute.
115. **The Chairperson:** You are very welcome, Mr Armstrong.
116. **Mr Flanagan:** I am delighted to be here to hear about the work that Almac is carrying out. It is very exciting and interesting to receive such an update on the work that you are doing. There is massive potential in it, so good luck for everything in the future.
117. I have a number of questions, the first of which is very short. What is your annual budget expenditure on R&D?

118. **Mr Hayburn:** It varies, Phil, given the demands. We try to keep that expenditure down to a percentage of our profit. We have to do that or else it gets out of hand. We try and keep that down to around 20% to 25% of our EBITDA. We are a small company. These things that we are trying to do, they are very ambitious targets. The other companies that are involved in this research are multi-billion-dollar companies. We are trying to work on a shoestring compared with those guys. We have to control our funding; we cannot throw money at this. We have to try to throw intelligence at it, as you can see from these two intelligent chaps here. That is what we have to do; we cannot throw money at it. We try and keep it at a ratio, Phil, so we can keep it under control.
119. **Mr Flanagan:** Have you a ballpark figure?
120. **Mr Hayburn:** It generally varies from year to year, Phil, because it is chiefly people. I have figures here, but I think that we are spending somewhere in the region of maybe £8 million to £10 million a year.
121. **Mr Flanagan:** The reason I ask is that the latest figures show that the 10 biggest spenders on R&D here account for 60% of the total budget. If we really are going to achieve the targets that have been set, we need to see greater involvement from small and medium-sized enterprises (SMEs), as well as from larger businesses like your own. We have discussed the risks that a company such as yours takes, which is, obviously, a calculated risk to some extent. For an SME that is going to get involved in R&D, would the risks be much greater for that smaller business than for a company, other than your own, apart from the obvious differences between limited and unlimited liability?
122. **Professor Harrison:** It depends on the project. It has to. It depends on the company. It depends on the business plan. It is difficult to generalise. What stage is the project at? What needs to be done? That is what determines risk; it is the business plan of the company.
123. **Mr Hayburn:** That is not an easy one to answer. In our industry, as I hope that we have laid out, it is a very long time from discovering something to patenting it. In the past two or three years, our patent costs alone have been well over £1 million. You have to patent or you have nothing to sell. Smaller companies have fewer overheads, but it all depends on how smart the idea is and what type of industry they are in. However, there is no easy way round our industry. I know that you guys have a strategy to get SMEs involved in R&D. We have mentioned that to INI and think that that is a good thing. There is no doubt that that is a good thing. However, the danger is that you dissipate the budget and there is no real achievement. We, then, ask for money for ambitious targets and far-reaching projects, and the money is not there. I know that it is a difficult job for you to try to balance that.
124. **Professor R Kennedy:** If I can comment on the SMEs. Part of it depends on the business model, which is why I have seen people setting up spin-out companies. There are two models: one is setting up a business to become a sustainable business that grows; the other is to sell the business as quickly as possible to a big company. The second model is very high risk, because it is all or nothing.
125. **Professor Harrison:** That is an important point. What we are trying to create in drug discovery is not the usual model. The usual model is what Richard has just said: you take a product like this, develop a company and sell it. We are not trying to do that. We are trying to do something sustainable for Northern Ireland. That has challenges, because that timeline really comes into play. Usually, you make a product, within three years you sell it and are done, and you start another company. We are not trying to do that. It is an interesting model, what we are trying to do here.
126. **Mr Hayburn:** Another good point is that, because of the way Almac is structured, we invest all our profits back into the business. Almac is owned now by the McClay Foundation. Nobody is

- in here to get rich quick. In a classic entrepreneurial R&D company, the focus is to get up to a certain stage, get rich and get out. In the LM21 project, the inventors at Queen's were approached by AstraZeneca and by us to take the compound. They chose us, because we decided that we would keep working with them over a period of time and for five years would let them be involved in the product. AstraZeneca offered them more money, but said that they should give the compound to them and just walk away. The inventors decided to stay with us. I think that Almac is unique in that way, Phil. In our first INI letter of offer for drug discovery, we guaranteed that we would put all the profits back into the business and not have any other use for those profits, which was unique for INI. Part of the reason for offering that was to try to do something different.
127. **Mr Flanagan:** Going back to the participation of SMEs in R&D, do you think that there is anything that the academic side of things or the industry itself can do to encourage or improve that participation?
128. **Mr Hayburn:** We have done a bit of outreach.
129. **Professor R Kennedy:** We are working with another company, PathXL, which is an SME spin-out from Queen's. We have grant applications with them, combining our approaches. We do work with other SMEs on various projects, where they fit, but they need to have something complementary to what we do.
130. **Mr Flanagan:** You have also referenced the cost and length of time it takes to apply for grants under the European funding frameworks, and you referred to the potential for a grant to cover the costs of having a full-time equivalent for six months. Is such a scheme being run anywhere else in Europe, and do you have a rough figure for the percentage of applications that are successful?
131. **Mr Hayburn:** I am not sure about that; I do not know. However, there is nothing to stop us from doing it. We could lead the way on that one.
132. **Mr Flanagan:** Would you be happy to do that?
133. **Mr Hayburn:** Yes.
134. **Professor Harrison:** A really interesting review of framework programme 7 came out at the end of last year and is on your website. It is probably in there, I suspect.
135. **Mr Flanagan:** Aidan has given us another couple of books that look like that. Aidan and Fergal have not been too shy about giving us books about research and development.
136. **Professor Harrison:** Last night, I was reading about Singapore's five-year investment strategy, 2011-15. It might be worth having a look at that. It is quite an interesting approach. If anyone would like it, I have a summary here. It is very R&D driven; how you get SMEs and how you link it all up.
137. **The Chairperson:** It would be very helpful if we could have that.
138. **Professor Harrison:** I will pass it to you at the end. If you need details of the website, I will provide you with them.
139. **Mr Hayburn:** A Chinese company is currently interested in one of these compounds. We have been engaged in a few interactions with Chinese companies in the past few years, particularly last year. Chinese companies come with a 25% stake by the Chinese Government. State aid rules limiting the amount of state aid given to private and public companies do not apply to them. The Chinese companies are funded by the state, with no rules or regulations, and they are competing against us, backed by the Chinese Government and their 25% stake. Europe has to wake up a bit. China will not always play by the rules. It will be smart. That is who we are competing against.
140. **Professor Harrison:** I will give you a headline figure. From 2011 to 2015, their budget is \$16.1 billion for R&D, which is up by 20%. I think that the population of Singapore is approximately 5 million. Then, there is a whole host of

- things that go with it. It is really serious stuff. I think that you need a seeding incentive to get the SMEs going. They have a budget for seeding. They call it investing ahead of industry, and elements go towards that. I suspect that rather than reinventing the wheel, there are things that we can learn from economies such as that. Then, of course, there are Finland and Sweden, which are interesting models to look at. There is another case study on your website on EU innovation policy best practice, which looks at Finland, Sweden and Germany. It is very useful for us to look at. There are some good reports there.
141. **Mr Flanagan:** Finally, Chairman, I would like to tease out the co-operation that exists between the company's operations here and in America. Are they working on similar projects, or are they operating in isolation from each other? What barriers or opportunities does that present, apart from having a foothold in the North American market? Perhaps you would give us an overview of the differences that a company involved in this sector faces in America compared with a company here as regards bureaucracy, financial support from government, and things like that?
142. **Mr Hayburn:** Our business is global, so there is high integration between the companies. We may have a contract to offer global services to a pharmaceutical company, so that would be managed between both sites as one project. That has to be the way it is. For us to compete, we have to be seen as a global company.
143. One thing that we did not mention today but will be a costly focus for us in the next two or three years will be to try to establish something in Asia. We have something in the west, something here, and we will need something in Asia. There will be a heavy degree of internal investment and internal management time involved in making sure that we are seen as a global company
144. We have the same management structure in the US and at our Craigavon site. We are over there on a steady
- basis. Continental is staying alive because of Almac at the minute, because we are back and forth every week. It is a global industry.
145. What was your second question, Phil?
146. **Mr Flanagan:** It was on the differences in government support and bureaucracy between here and America.
147. **Mr Hayburn:** We get a high degree of support for our Souderton headquarters. There is a high degree of interaction. It is slightly different. It is bureaucratic, but perhaps a wee bit more business focused in the States. We have no R&D function in the US at the moment, so we have not availed ourselves of any R&D activity there. We may look at that in the future, but at the moment our R&D hub is here. It is harder to spread your R&D hub between two centres.
148. From a commercial perspective, support for Souderton was reasonably good. Some very good local government and federal schemes were offered.
149. **Mr Irvine:** If I can just pitch in on that as well, the Souderton project was the largest capital project that we have undertaken within Almac. It represents an investment of \$120 million. A lot of interest was shown by the Commonwealth of Pennsylvania, right up to the Governor, who was Ed Rendell at the time. He went out of his way to meet with us, first in London. We had a number of meetings at the Governor's office in Philadelphia. There were roads issues and utilities issues that had to be dealt with in addition to the financial support we got. We were very impressed with the whole business approach to things and the fact that the Governor of Pennsylvania himself got involved personally to make sure that what needed to be done was done and sorted out. It is just different from here, in our experience.
150. **Mr Flanagan:** So, he did not just turn up just to cut the ribbon. *[Laughter.]*
151. **Mr Hayburn:** The Governor has an action team there, and the woman who ran that team, Gail Kronig, gave me, John

- and others her personal mobile number. She said that we were to call her if we had any hassles. It was all above board. You could call Gail to say that you were having a bit of issue with this local township or funding, and she would be straight there. The government is more directly accountable and less layered. The guys will get involved straight away.
152. **Mr McKay:** Thank you very much for your presentation. It has been an interesting debate. Risk, and research and development are the two issues that stand out for me. We are very risk-averse as a local economy. We are risk-averse as people, and we should be trying to break through that tradition. Investing in pharmaceuticals is viewed as a high-level risk, and you need to ensure that politicians and stakeholders have an idea of what the returns are going to be. I think we still need to work on that.
153. The point about Singapore was interesting; Committee members met representatives from Singapore towards the end of last year. They are very focused on pharmaceuticals and have a very business-oriented approach to the economy in general there. We have a lot to learn from them and there are certainly comparables in the size of the country. You mentioned India and China, and going beyond the regulatory barriers that we face here in R&D, what can we do as politicians to address those? Corporation tax is perhaps the obvious one. Are the BRIC countries being viewed as our greatest threat?
154. **Mr Hayburn:** It comes and goes, Daithí. Yes, from the standpoint of being able to produce services at a lower cost, it does. They have some way to go in being able to be trusted from a quality perspective. India and China have not yet developed their own pharmaceutical companies, but that will come. China will produce a pharmaceutical company within the next few years that will be a major, global company. I am more interested in your comment there about there being no regulation. Particularly in China, governmental support for those companies would be very strong.
- It would be unregulated. You would not be having a meeting like this; one guy would come in and help fund the company and take a stake in it.
155. You mentioned work we needed to do in risk analysis and maybe the education process. How could we take that forward? You mentioned that there was some work we had to do, perhaps on understanding what the risk elements are.
156. **Mr McKay:** The history of the economy here is different from other parts of these islands, for obvious reasons. Traditionally, we have a higher percentage of people involved in the public sector, so to introduce the degree of risk taking, like I always say, nothing ventured, nothing gained. Even at the level of small and medium-sized enterprises, we cannot get them to break out of that shell into the global companies as we see in other countries. It is about creating that culture. Invest NI and smaller groups in local council areas have a big responsibility in trying to develop that entrepreneurial spirit and to provide that support. If support is given at that level, it places an onus on those who receive it to reinvest, as they will owe something to where they come from. It is about doing that at a government and a community level.
157. **Mr Hayburn:** That is a good point, as is your point about education. INI's very fixed revenue and job growth three-year plans do not fit our R&D business model. It has a very controlled risk model and you have to show that you will grow your job numbers and revenue in order to tick a box. Ours is a longer term goal, and it requires others to enter in to an education process and a risk-taking and strategic process. That is good, but it will take some time for government to do that and that is not good for us. We have a highly competitive two-year window for some of these projects and need to act quickly. We are more than happy to engage and share more and to see whether there are other models that we can look at.
158. **Mr McKay:** You said that that sustainability needs to be built into

- the education system right up to the colleges and universities. I always remember an example that came from Wrightbus, which is based in my constituency. Willy Wright always said that he had all these guys coming to the company from the universities, who did not have a clue in practical terms when they hit the factory floor.
159. **Mr Hayburn:** That is right; I can hear Willy saying that.
160. **Mr McKay:** Do certain parts of the curriculum need to be changed or steered in a different direction?
161. **Professor Harrison:** Tuition fees are going up in Britain. They are not necessarily going up here, but who knows what will happen in the future. As that happens, it will make people think more about whether they need to go to university. Everyone is saying that fees going up is a bad thing, but there is a flip side to that in that not everyone should go to university.
162. At the meeting yesterday, DEL placed a huge emphasis on apprenticeships. Catherine Bell is very keen on apprenticeships and the Department is doing a great job in that area. One of the things that we, as an industry, have to do is to stress the importance of vocational training, and some of those mechanisms are happening through government. Those who want go to university should go. However, others may say that they do not want to spend £30,000 going to university and may want to do an apprenticeship instead. I think that will naturally happen and it is starting to happen.
163. **Professor R Kennedy:** Traditionally, universities courses have been very academically driven. It is almost as if the courses are set up for students to have academic careers, yet, obviously, most people will not do that. The US universities that I worked in offered modules in entrepreneurship, setting up companies, project management and all of the things that really matter if you go into industry. That has not been the tradition here. Perhaps government can
- look at that again and understand what we are teaching people in universities and whether we are educating them in the right way. We need academics and we have that, but we should also set up tracks for those who want to go into industry. When I interview for jobs in Almac, I notice that those who come from outside of Northern Ireland seem to have been better trained for industry than local people. Local people are equally clever if not cleverer, but they have a much more academic view.
164. **Professor Harrison:** That is a big focus of the STEM business subgroup, and we spend a lot of our time dealing with that. One of the big issues that we have in Northern Ireland, because 95% of businesses are very small, is in engagement. If we could find a way to engage more effectively with the whole of the business community in Northern Ireland, it would be great. We tend to engage with the bigger companies because we know where they are and we know where to go, whereas we do not engage with the thousands of small businesses that may only have 10 or 15 people and may be family run. It would be fantastic if government could help us to engage with other businesses. As I said, that is a major challenge and we are trying to address that with DEL and through that subgroup.
165. As to how we change people's perception of risk, my own view is that you show them success stories and role models. That is why funding some of the big companies to make that work will, ultimately, pay dividends. There is no better way to do it than by showing them what others have done, and they will want to do it themselves.
166. **Mr McKay:** You referred to the fact that Invest NI funds projects for the first few years, and that that funding then, effectively, disappears off the edge of a cliff. You also said that 95% of the projects fail at phase 3. What should Invest NI do? Should it cover the funding for the middle part, or would it make more sense for it to fund the latter stages? As you approach the latter stages of those projects, do the failure

- rates decline? Would that be more of an incentive?
167. **Mr Hayburn:** We know that there is a big failure rate and a high cost for those trials, Daithí. However, we suggest that there should some support, maybe with a policy of capping. We will do a phase 1 trial and a phase 2 trial, and the costs are a lot lower. There is phase 1 support, but there is not phase 2 support. With phase 2 support, you are starting to look a wee bit at efficacy and dosing. They should be able to look at giving us phase 2 support; they really should.
168. Phase 3 has massive costs — hundreds of millions. Those are global trials. It would be reasonable to fund phase 2 trials with a capped level and a control to ensure that you are not giving a company numerous trials. There is something there that should be looked at that is more focused. The 95% failure rate in those global pharmaceutical companies is why they are changing to a more biological-type focus, and that is what we are doing here.
169. **Professor R Kennedy:** The failure rate is quite a bit less with those biological-focused projects.
170. **Mr Hayburn:** It is 95% for the global industry, but it is a lot less for the biologically focused ones. That is what we are trying to do at the moment.
171. **Professor Harrison:** Colin has just made the point that I was going to make. Those are historical rates. Stephen asked about how you can de-risk things and how much risk you should take. What we are saying is that the business models are not quite right here. Our business model reflects an inherent de-risking by going down the route of personalised medicine. If Richard can select patients who will respond to the drug, you do not need thousands of patients; you might need 100 patients or even fewer.
172. The inherent business model that we are working towards is about how you make this better. It is not how we do more of the same. There is no point in doing that, and no one should ever fund that. It is not about that. This whole company is built around personalised medicine. If we get that right, all those ratios and success rates will change. Northern Ireland, as a country, will have to buy drugs, which are very expensive. It has to change. If we can get this right, there will be knock-on effects all over the show.
173. Every week, there is a debate from the National Institute for Health and Clinical Excellence (NICE) about whether we should approve this drug or that drug. Actually, if you really look into the way that drugs have been developed in the past, it is not surprising that they are expensive. Just give them to the patients who will benefit and they will become cost effective. That is what this whole business is about.
174. **Mrs Overend:** Thank you very much for having us here today. I have really enjoyed it. I am always very proud of our home industries. The late Allen McClay lived near my home, so we in mid Ulster can claim a little part of that. Your reference to San Diego was very interesting. I was on the Committee for Employment and Learning right up until last week. We were looking at how the mindset has changed there to reinvigorate San Diego. That needs to be done here in Northern Ireland; at least that is the way I see it.
175. It seems that Invest Northern Ireland needs flexibility to invest in companies such as yours. They are quite structured and need to be able to look at companies and see the potential, whether it is large companies such as yours or small industries. Is that your take on it? How do you think Invest Northern Ireland should look at that? Your briefing paper mentioned the establishment of an official group tasked with supporting all organisations to help improve R&D. Will you tell us more about where you see that coming from?
176. **Mr Hayburn:** I do not know who wrote that last part. *[Laughter.]*

177. You are absolutely right about the first part, Sandra. It is about flexibility in R&D. The way that we specifically focused on our two projects to date shows you the length of time that it takes for an R&D project here. That is totally different if you go to Bombardier or somewhere else. The R&D structure in INI for companies in Northern Ireland does not work for us. The big businesses are availing themselves of it, but they have a totally different model. Flexibility would be highly advantageous for us.
178. The groups are good, but we will not have groups that have the same issues as us. They could certainly be groups that set up in generally the same way as we approach things, such as the educative process and FP7, and that would be very useful. However, you have to come out of those groups and look again at your specific business. Our approach would be very different to that of those other industries. So I am not a great fan of groups, because, sometimes, you just spend a lot of time talking. Very specific flexibility within INI would be really useful.
179. **Mrs Overend:** In the submission, there is a reference to Northern Ireland needing its own national contact point. Are you aware of any such provision in Invest Northern Ireland?
180. **Mr Hayburn:** Invest NI has a woman who is very good and very helpful for FP7. However, you could learn the same stuff from the internet. It comes back again to the idea that you have to get stuck into it yourself; you have to go out there and submit an application. The help is there, but it is not specific enough. Bombardier shared with us what it did, which is something that we need to do. In Bombardier's first foray into FP7, it submitted four applications and failed them all. It resubmitted, having engaged with and invested in people internally to go out and find out about it. Of its next five submissions, four were successful. We will have to do the same. We held off slightly, until the oncology call was relevant, and I hope that it is relevant in the 2020 Horizon initiative. However, getting support even to do that would be useful for us.
181. I am not quite sure what the role of a central NI contact would be. If you spoke to INI today, it would say that it has that.
182. **Professor R Kennedy:** One big advantage we potentially have is that, within the EU grants, typically it will be for two member states. So, we can use collaborations with the South of Ireland. That could be encouraged as well. There are companies in the South of Ireland of comparable size. The problem is that, at the moment, setting those things up is quite laborious.
183. **Professor Harrison:** For example, the Marie Curie grant would fit into that, but that is under the FP7 people category. There are issues there. You could get the grant, but would have to send your people off for two years. That is all about knowledge transfer, which is brilliant, if you have the resources to do it. However, you can then hire new people only on the basis of how much transfer you do. You end up losing your own skilled researchers for two years and bringing in someone to train up for two years. That is great, but you still have to run a business. You cannot easily avail yourself of that grant, unless you have people you can spare to do it. It could work, but, in practice, it is quite difficult.
184. **Mrs Overend:** I am sure that, in the current economic climate, it is more difficult. I hear about Invest Northern Ireland giving money back to the Government. What if that additional flexibility had been there?
185. **Mr Hayburn:** That is true. When we hear that, we find it strange.
186. **Professor Harrison:** Is it true? *[Laughter.]*
187. **Mr Hayburn:** We do find it strange.
188. **Mr Flanagan:** Just a quick question, Chairman, before you move on. I am interested in what role you envisage venture capitalists playing in the future development of R&D here? Is there a role for them?

189. **Mr Hayburn:** There might be, but not with us.
190. **Mr Flanagan:** Not with you, but in the sector as a whole?
191. **Mr Hayburn:** Those guys come in for a very fixed term for a very fixed return. It sometimes works. The venture capitalist model is the classic model in the US. They go in for a very fixed term, put their own boards in, make money and get out again. However, if you want to grow a proper economy in Northern Ireland, for me, that is not the right way to go. Even in some UK companies, it has not worked. Venture capitalist houses have been into this space. They go in, and, if the return is not there in three years, they go. The venture capitalist model is not good for growing indigenous talent, because board members would probably be brought in from other countries to manage it, and manage it in a way that is focused not on the growth of a good indigenous business, but on getting money and getting out again. I do not see it, but I do not know what anybody else thinks.
192. **Professor Harrison:** If you look at the way that small biotechs are being funded in the current climate, you will see that that is not necessarily through venture capitalists. It is through corporate venture funds. If you want to find a way to do this, I suggest that you talk, as a Government, to some of those corporate venture funds. For example, Novartis and GSK, the big pharma companies, are now putting up \$0.5 billion — big, big venture funds. Those are the guys who are investing. You are still getting venture capitalists, but I think that the ratio has changed. For pharmaceutical R&D, it is the corporate venture funds that you should definitely consider talking to.
193. **The Chairperson:** I had a couple of points that I wanted you to reflect on. Your written submission referred to the benefits of having:

“Enhanced all-Ireland support for European funding”.
194. Will you elaborate on that?
195. **Professor R Kennedy:** At the moment, the SMEs, the companies in the South of Ireland and Almac work independently. I know that InterTradelreland is trying to do something about this, but it is very difficult to set up those connections. We do not move in the same circles a lot of the time and we will not be in the same conferences, so the question is how we get those introductions. We are not even certain what research a lot of these companies are doing because it is not in the public domain. There needs to be some sort of mechanism or an independent broker who can look at what they are doing and say that it is very compatible with what Almac is doing and introduce us. It is as simple as that.
196. **Professor Harrison:** There is a potential mechanism there. There is a trade body called BioBusiness based in Belfast. It has recently become an all-Ireland body and has lots of networks into Northern Ireland. It recently co-opted two board members from the Republic of Ireland, and one of the ambitions is to develop that. For example, you could take that kind of network and it could be a mechanism for doing this.
197. **The Chairperson:** Professor Kennedy, you have made the point that we have a ready-made situation here with two jurisdictions, we can have these partnerships and we should take advantage of that. Do you think that the situation is not being maximised?
198. **Professor R Kennedy:** At the moment, I do not think that it is.
199. **The Chairperson:** So we need something to bring companies together and get this co-operation going, thereby usefully exploiting the funding that is available in Europe.
200. **Professor R Kennedy:** It needs to be done in an intelligent way. To go back to Colin's point, we have had these meetings where lots of companies will come together, but you do not necessarily have the right people in the room or people who are able to divulge

- information, because some of this research is quite sensitive.
201. **The Chairperson:** You do not want to reveal what you are doing.
202. **Professor R Kennedy:** You need to have the right people talking at the right level.
203. **The Chairperson:** If framework programme 7 did not exist, would it make any difference to you?
204. **Mr Hayburn:** At the minute, no.
205. **The Chairperson:** Is that simply because framework 7 does not cover oncology?
206. **Mr Hayburn:** We are collaborative members in a number of FP7 applications through customers and partners, but, I would say that the oncology calling is not relevant at the moment. We have not yet invested time to focus on it because of the distraction and the time involved. We have to do that and we are planning to do that in preparation for the next calling round. There is money there and we have to try to get it, and we may need assistance to do that. It has no bearing on us at the moment but we want to get involved in the future.
207. **The Chairperson:** Will there be a significant drive from your company to get involved in Horizon 2020 to get funding?
208. **Mr Hayburn:** Yes.
209. **The Chairperson:** What assistance would you require from the Northern Ireland Administration to do that?
210. **Mr Hayburn:** Off the top of my head, because of the investment in time and money to get involved in that, grant support for somebody to be involved in that full time would be good.
211. **Professor R Kennedy:** Because of the nature of these frameworks, that person would not just be supporting Almac; they would be supporting that framework. The point is not just to seek Almac funding; it could be across more than one company and possibly include an academic institute as well.
212. **Mr Hayburn:** Start with Almac. *[Laughter.]*
213. **Professor R Kennedy:** I am saying that there is more than one benefit.
214. **Mr Hayburn:** Even that alone is a starting point. We can work on something more around that, but that would be useful for us.
215. **Professor Harrison:** As of April 2011, 110 projects in Northern Ireland had received EU funding totalling €30 million. The amount of funding per company is not that high. Some companies get more but others do not get very much. You must also have the right projects. If you are going to invest that much effort in trying to get one of those programmes, the salaries that you have to put in could be close to what you actually get and there is no guarantee —
216. **The Chairperson:** It is hardly worth it.
217. **Professor Harrison:** Yes, so you have to come up with the right proposals. Those projects are very big and necessarily require more investment. I thought that was quite a startling figure.
218. **The Chairperson:** It is a very low drawdown.
219. **Professor Harrison:** It is.
220. **Mr Hayburn:** We are probably not availing ourselves of that funding as we should in Northern Ireland. We attended a few FP7 meetings in the past year with local companies and only a few companies have become involved strategically in that programme. As a country, we have been a bit lax in getting involved in that. We have to look at it.
221. **The Chairperson:** Do you think that we have to up our game generally?
222. **Mr Hayburn:** I think so. Almac certainly does, and it is representative of the market.
223. **The Chairperson:** Does industry and business generally in Northern Ireland have to do the same?
224. **Mr Hayburn:** Yes, I think so.

225. **The Chairperson:** Does government have to be a bit more proactive in encouraging firms?
226. **Mr Hayburn:** Yes, I think so.
227. **The Chairperson:** I think that is everything that we wanted to bring to your attention. Thank you very much; that was very interesting and very useful. No other colleagues have questions. Once again, thank you very much for the invitation to come here; it has been of great benefit to us. We wish you good luck.

23 February 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Daithí McKay (Deputy Chairperson)
 Mr Steven Agnew
 Mr Gordon Dunne
 Mr Phil Flanagan
 Mr Paul Frew
 Ms Jennifer McCann
 Mrs Sandra Overend

Witnesses:

Dr Paul Beaney	<i>Cherry Pipes Ltd</i>
Ms Kirsty McManus	<i>Confederation of British Industry</i>
Mr Stephen Sloan	<i>Momentum</i>

228. **The Chairperson:** Briefing the Committee are Ms Kirsty McManus, Mr Stephen Sloan and Dr Paul Beaney. You are all very welcome. Dr Beaney is technical director of Cherry Pipes Ltd. Mr Stephen Sloan is project manager of Momentum. Ms Kirsty McManus is the assistant regional director of the Confederation of British Industry (CBI). We look forward to hearing what you have to say. I thank you for the paper that you provided to the Committee. It was very worthwhile. Thank you very much indeed for that.
229. **Ms Kirsty McManus (Confederation of British Industry):** Thank you for the opportunity to present today. Stephen and Paul will give first-hand experiences of the challenges for businesses engaged not only in the framework programme but more widely in the Innova and Fusion programmes and R&D tax credit.
230. If I may, I will start by providing the Committee with some context to our written submission. In response to the political and economic pressures regarding participation in the framework programme, a steering group was drawn together. It is chaired by the Department of Enterprise, Trade and

Investment (DETI). The group includes representation from the Department of the Environment (DOE), the Department of Agriculture and Rural Development (DARD), the Department for Employment and Learning (DEL), Queen's University, the University of Ulster, Invest NI, InterTradeIreland, the Science Park and the CBI. The steering group's focus was to look at Northern Ireland's framework programme participation to explore how the region can adapt and position itself to improve its current drawdown from framework programme 7 and, more importantly, how to best position itself for Horizon 2020.

231. The steering group needed to have an appreciation of the current perception of framework funding among the business community and to assess support mechanisms that are currently in place. A sample that offered a variety of large businesses and small and medium-sized enterprises (SMEs) — some with and some without previous experience of framework funding — were invited to attend an open and interactive workshop to glean first-hand evidence from industry on framework funding. The workshops were held over two days and hosted by an independent facilitator in order to offer an unbiased account of the voice of industry. The workshops enabled us to gather information on the key issues and barriers for SMEs in Northern Ireland to engage in the framework programme and, more importantly, potential components to resolve those issues and ways to increase the funding that Northern Ireland obtains from Europe.
232. Our written submission formulated the feedback from those industry consultations. More importantly, both Stephen and Paul participated in those workshops. They are here today to provide first-hand industry experience. I will hand over to Stephen, who will discuss his experiences of framework funding.

233. **Mr Stephen Sloan (Momentum):** I will give you a bit of context. My role is to look at collaborations, partnerships and expertise sharing between companies in both the North and the South and in GB. We became aware of framework programme 7 in 2009, and we started to look at it. People told us how difficult it was. The way that we decided to address it was to get involved in one of the projects. To summarise framework programme 7: you need partners from three European states, and you need to have research technology developers (RTD), which are normally third-level institutions but can be large corporates if more than 10% or 15% of their business is focused on R&D.
234. The first project that we got involved with was an SME associations call. We looked at its duration. You had three months to get an application in when the call opened. The process then was that you waited for a further three months for it to be assessed and to be told whether it was successful. You would then go into another two or three months of negotiation, and the project would start approximately nine to 12 months after you had initially engaged. When we went to talk to some of the member companies — the SME information and communication technology (ICT) member companies — we learned that the time frame, even for application, was far too long for them. The projects normally ran for two years, so if they had an issue that was very relevant to them at the beginning, it would be three years down the line before they could get an answer to it. As ICT is quite a fast-moving industry, you would find that it was almost obsolete at that point. Those were the main issues that we came across.
235. We addressed some of the members and asked them how they would engage. It became clear that we are more of a micro-SME region when compared with other regions in Europe. The definition of an SME in Europe is a business that has fewer than 250 employees and a turnover of under €50 million a year. So, the real issue was that, with the size of companies we have, we do not have the capacity to do a lot of R&D.
236. The process that we are investigating with members is whether we can take their requirements, do the heavy lifting for them, help with the application, help to work it through, find and identify partners, sign the partners up and keep them dipping into the process. That would mean that they can make sure that the outcome will still meet their requirements and ensure that, at the end, although the funding varies quite a bit, they will get something out of the project that they will then be subsidised through the programme to implement or test. Those are the kinds of things that we are currently looking at.
237. We are currently involved in a project that has been running for over a year and is expected to run for another year. One of the issues is signing up partners; you have to go down the route of engagement. The project was a recent one that we submitted in conjunction with Invest NI and with Queen's University in our region. It also involves the South West Regional Assembly in Cork and an IT association down there, as well as the same grouping of organisations in France and Cyprus. Therefore, it involves a lot of networking and discussion. If you are looking for SMEs to be involved, you find that they do not have the time for that. Their agenda is to generate their revenues. That is all they are interested in. If you can bring them something that is going to be of benefit, they will bite your arm off for it. However, they cannot waste their time; they do not have the capacity.
238. That is a synopsis of my experience. I will hand over to Paul, who has operated an SME inside one such project.
239. **The Chairperson:** That was a very useful insight into the practical aspects of the process. Thank you.
240. **Dr Paul Beaney (Cherry Pipes Ltd):** I am the technical manager at Cherry Plastics Group. We are plastics recyclers and processors, so our company goes right from the collection of waste, through

- all the various separation processes, and then processes the recycled plastic into pipes. We are a recycling company and a manufacturing company, so we cover both sides. We carry out a lot of research internally, and most of that research is focused on overcoming the different technical hurdles that we come across in recycling.
241. We have carried out a range of projects from framework programme 7, knowledge transfer partnership (KTP) projects, grant for R&D schemes and the innovation vouchers programme, so we have been through all the different processes. There are quite a lot of challenges for SMEs engaging in framework programme 7, and I suspect that that is why we have such a low uptake. I suppose that the first challenge is the awareness factor. I would say that only a very small percentage of SMEs are aware of what the framework programme 7 is and how they can get involved in it. The second barrier they will come across is probably the timescales involved in the programmes. If we were to come up with an idea for a framework programme 7 project today, you would be doing well to turn that into revenue in four years' time. In our business, we are thinking about how we are going to ensure profitability next month. As market forces become more challenging, companies are becoming more tactical and less strategic, unfortunately. The end outcome of that is that the economy as a whole is going to be less competitive on a global scale.
242. Once you have sorted out your timescales and things like that, the next big challenge is writing the proposal itself. It is typically a 120-page document that is very technically complex. I cannot think of any SMEs in Northern Ireland that would have the resources to write that unassisted. They tend to partner up with academic institutes or other research and technology providers in Europe or consultants who specialise in that to actually write the proposal. That is a big undertaking in itself. We paid around £35,000 to get the proposal written for us, and it tends to be no win, no fee, so there is a big risk there. Are you going to outlay that money in the hope of something in four years?
243. Once you have done that, you submit the proposal, and then you have to get funding. The average success rate is about 20%, so you have put in a phenomenal effort at the front end for a 20% chance of a reward in four years' time. If the funding is granted, there are some other challenges that you come up against, one being the very large in-kind contribution required from the SME. Typically, the grant will be something between £1 million and £3 million over a two-year period. That is 70% funded, and the SME usually gets 10% of that funding. My budget was about £100,000 over two years, so I had to make that up with an in-kind contribution. That was my time. It is a full-time job for somebody fairly senior in any SME. That in-kind aspect should not be underestimated. I do not think that a lot of SMEs realise exactly what is involved once they kick off on the process.
244. Once you have got over that, the co-ordination can be quite a challenge. You tend to have maybe seven organisations across Europe that have been pulled together by someone. It can be difficult enough to co-ordinate seven people inside your own organisation, never mind that very large pan-European grouping. There tends to be a drift towards the technical and academic side of things rather than the commercial side, because at least three quarters of that resource will be going to academic institutions. Sitting around the table, there may be three or four people from the commercial business side and perhaps 10 or 12 people from the academic side, so it is very easy to end up with a project that is technically good but commercially useless if you are not very careful.
245. As for recommendations, it is very important to measure the bottom line impact and economic impact of anything that we are going to do. Do not think about how much money we have brought

- into the economy through funding. It is about the end product, not about getting the funding. Getting the funding is only a very small part of it. We need to take a holistic approach, not just focusing on how many millions of European funding we pull in. Also, we need to be careful that any project we get involved in has very clear commercial goals, not just technical goals. You can hit all the technical goals — though it is not easy to do so — and then end up with something that is not commercial.
246. There is a big challenge around reviewing intellectual property (IP) agreements. Most SMEs know almost nothing about intellectual property agreements and so on. The agreement that we have come up with is very complex. Even our patent attorneys do not fully understand the implications of the agreement that we have signed up to. So, some help around IP agreements would be very valuable.
247. Thank you, that is all that I wanted to say.
248. **The Chairperson:** Thank you very much, Dr Beaney. We will move on to questions.
249. Reflecting on what you have said today and on what is contained in your written answers to our questions, I have a general question to put to you. Clearly, the process is complex and expensive in terms of time, money and effort. There does not seem to be much by way of an impact by local industry into framework programme 7. The question is, I suppose, how to improve the process so that it becomes attractive to Dr Beaney's firm or the firms that Mr Sloan is dealing with. I know that there are attempts to improve the system with Horizon 2020. How would you reshape and improve the system?
250. **Ms McManus:** In recommendation 11 in our response paper, we point out that, in framework programme 5, funding was received by a full partner and the services were contracted out. That model would make it easier to engage more SMEs. Unfortunately, the framework process will be engaged at a European level, which means that all member states will engage in the process, and it is difficult for us to have influence. However, I would not underestimate the influence that the Barroso task force would have on that.
251. We have to recognise that not all companies can or will engage in the framework funding. It is a matter of engaging more companies and getting them on an R&D escalator. Stephen can talk about some of the research programmes that are available on an all-island basis, such as Fusion and Innova. We would encourage companies to get on that ladder though such programmes.
252. **The Chairperson:** They are not part of framework programme 7, are they?
253. **Ms McManus:** No, they are not.
254. **The Chairperson:** They come under the aegis of InterTradeIreland.
255. **Ms McManus:** Yes.
256. **Mr Sloan:** I want to come back on a couple of points. As Kirsty said, there are a number of issues about trying to simplify the arrangements. That will probably take a long time, so the easiest thing that we can do is to take the pain out of the process. Our role in that has worked. We have taken the pain away from companies and have encouraged them to become involved. The paperwork and all the running around has still to be done, but the companies do not have to suffer that pain. All they are seeing is the benefit. They can look at the situation cleanly, from a commercial point of view, and ask what will come out of the project and whether that will be useful to them. They can make the decision to be involved in that.
257. The point about the duration of the projects and the involvement of SMEs has been recognised. They did try, in framework programme 7, to pilot a number of options. Having received a project application, they would split it. They would get validation of the project from the SMEs, but they would not necessarily ask them to engage. Once the research had been completed,

- they would advertise the results to see whether any other SMEs — not necessarily the original ones — wanted to commercialise it. That process has not been all that successful either.
258. **The Chairperson:** If you were one of a number of firms engaged in the process, I am not sure that you would like the final product to be commercialised by other people, would you?
259. **Mr Sloan:** That would happen if the SMEs that were originally interested were no longer interested. If they have moved on or changed direction, there is an opportunity to bring in new SME partners. If a company is no longer interested or has changed direction, the research can be advertised and made available.
260. **Mrs Overend:** Thank you for talking to the Committee today; we appreciate it. You explained the time-to-grant process, which was very informative. As I understand it, Horizon 2020 has cut that time frame by 100 days. How will that affect your ability to respond to market development and feed into your business again?
261. **Mr Sloan:** It will come down to how easy it is to sell the process to the SMEs and whether it reduces the pain and the duration of the engagement.
262. Another point to be aware of is that different calls come out and the funding arrangements are different for each call. That is something else that the SMEs do not really want to know about. We are currently involved in two projects. In one of those, the breakdown of finances is agreed upfront. If that project is approved, the finance will come through, and you know what your grant will be. There is a different call, however. What happens with it is that, if the project is approved, everybody sits around a table, and then, to use a colloquialism, the bunfight starts. It is about carving things up to see who gets what. So, there are different issues, different calls and different programmes.
263. Even inside Europe, there are two-stage projects — major projects can be €10 million or €15 million — that are called integrated projects (IPs); there is a single-stage one, which is a specific targeted research project (STReP); and there are coordination and support actions (CSAs). Companies do not want to know about those or do not need to. We are hoping that Horizon 2020 will simplify that and will simplify the funding process. They are talking about doing that. They are saying that the SMEs will be funded at 100% plus 20% overheads. At the moment, in a lot of the projects, it costs an SME money to get involved. It varies depending on the different call that comes out, but, normally, it is around 75% funding with 20% overheads. OK, it is 95% funding effectively, or nearly that. However, it is difficult to say to somebody, “We would like you to be involved in this project, and, by the way, it will cost you money straight away and you do not know whether you will get anything out at the back end of it”. So, we are hoping that those things will encourage SMEs to look at coming into Horizon 2020. The reduced time frame makes it more attractive, as does the fact that it does not cost them money.
264. **Mr Frew:** Thank you for your answers so far. Recommendation 8 is on the mentoring services and schemes and the cradle-to-grave approach throughout the life cycle of a project. Stephen, what you said about small businesses resonates with me; they just do not have the time or capacity to deal with this major funding tool. What type of mentoring support is required? I know that Invest NI has started with the research institutions. Is that the best model? How can that be adapted for the SMEs?
265. **Ms McManus:** I will comment on the mentoring programme. We had spoken with Enterprise Ireland and taken its model. The mentoring is from cradle to grave for the SMEs. It addresses some of the issues that have been raised previously about legal advice, so that you know what you are signing before it is signed. It also addresses issues with patents and with application

- writing, so that there is training in the company and that skill set is maintained within the company. It also helps with the negotiation process, because a lot of the budgets are not set until after the approval process when the budget is negotiated. So, there is a piece on negotiation skills.
266. The initial pilot, which cost £250,000, returned projects to the value of £3 million. That is from only the initial stage. Long term, there will be a number of successful applications further down the line from those applicants. It is a tailored programme for the SMEs, which not only gives legal advice but helps with the application process, how to engage with Europe and how to negotiate. So, it would be a bespoke programme for SMEs that, as we said before, takes the pain out of the process and helps to guide them through it.
267. **Mr Frew:** Who should provide that support?
268. **Ms McManus:** I think that it should be facilitated through Invest NI. The institutions have a lot of skill sets around application writing that could be utilised for SMEs. I see a natural fit through Invest NI.
269. **Mr Sloan:** We also find that there are great opportunities for mentoring through the projects that you become involved with. People with an awful lot of experience have co-ordinated and developed different projects. They can give you the information and are very good at helping you to network. The biggest problem that we had initially was that we had no visibility, but now, through the projects we have been involved in, we are getting visibility. I am now getting contacts from different regions in Europe asking if we are interested and if we have the companies. I am used to all the background information that comes with the request, but it then allows you to say, "Yes, there is a company that fits that or a couple that I can approach", or to say, "The answer is no".
270. That has been very beneficial. We have recently been approached by a consortium where one partner has dropped out and it is looking for a replacement. That project has already been approved and is worth €355,000 to the association. I am talking to a number of associations both North and South to see which one is the best fit. Those are the kinds of opportunities you get because of networking and the partnerships you develop.
271. **Dr Beaney:** Mentoring is important, because the typical SME, if it is doing well, may have two framework programme 7 (FP7) projects in its lifetime, but that does not give it much opportunity to learn. If they have a mentor who is embedded in the project from start to finish, they will quickly learn a lot more than anybody else, and there are not many projects in Northern Ireland. The experience that a mentor could provide in a short time would be really beneficial. They will have seen all the pitfalls at first hand and be able to give good advice. However, it has to be very hands on — not at just one particular stage or another but seeing it right through from idea to commercial project.
272. **Mr Dunne:** You are very welcome. We found your presentations interesting and informative. With regard to collaboration in R&D, your submission states that a lot of time is lost trying to find enough partners to satisfy the requirements. Do you think that collaboration with other states, the Republic and elsewhere, may help to meet those R&D requirements? Is that worth exploring?
273. **Mr Sloan:** Yes. That was one of the big selling points when we initially went to engage with European partners. Momentum is engaged with the Irish Software Association through the project that I run. It is a good selling point to be able to agree between ourselves beforehand and then walk in and say, "We have a project idea. We need you as a partner, and, by the way, here are the other two partners that you need for the consortium". That is a big help. It helps people to focus on you. They ask, "Who is the other partner? Have

- you worked with them before?" You can answer, "Yes. We know them well. We are both agreed. We are bought in. Who is interested?" You can then normally find your third European state quite quickly.
274. **Mr Dunne:** I suppose that the problem would be identifying partners. How do you go about doing that?
275. **Mr Sloan:** That depends on the project and where it is initiated. If it is initiated by an SME, it would be a case of looking at other SME associations, for example, and using their knowledge and core skills to find a logical company to approach. We have that access route due to the relationship we have. We have the same access route with regions in Paris in the digital media and ICT sectors. We are developing ones in Germany, and we have some in Cyprus. The key thing is to have a key contact who you can go to and say, "This is the kind of company we are looking for. Can you find it?"
276. If it was a project developed by an RTD performer, you would normally find that they would have their own contacts. They would use their own network to identify contacts, and you would find that contacts would flow down from them.
277. **Mr Dunne:** What about gap funding? The point was made about non-Invest NI clients. Is there an issue there?
278. **Mr Sloan:** I am not sure whether that is being looked at. You can get support funding for academic institutions to write the application. I believe that the funding is up to £12,000. That is available only to academic institutions. That is probably something else that would be a bit off-putting for SMEs that come up with an idea. Did you get any support, Paul?
279. **Dr Beaney:** No, not really. I gather that support was available, but we did not avail ourselves of it at that time. Financially, it cost the company an awful lot more than it would have gained with any funding. In my opinion, the SME really only benefits from the final product. The funding would be largely irrelevant relative to the costs.
280. **Mr Sloan:** Although academic institutions can apply for a grant, I do not believe that they are available to private companies.
281. **Mr Dunne:** On a general point, we were talking last week to a large company that is involved in a lot of R&D work. It came out in the evidence that it never got round to applying through framework programme 7. Do you agree that there is a reluctance and almost a fear? I suppose that, like a lot of things in Northern Ireland, people never get round to doing it. However, there are obviously barriers that people have to work their way through. A lot needs to be done to break those down.
282. **Dr Beaney:** I think that you are right. There are barriers at all stages. The question is whether you focus on the more strategic goal or the day-to-day running of the operation. You nearly need to have someone in the organisation who is responsible for that or someone like a mentor who is supported to do an awful lot of the heavy lifting at the proposal-writing stage and all that, where there is a massive barrier. You can partner up with a technology developer or a university to write the proposal for you, but the only thing is that they will write it with their best interests at heart, rather than yours, and it can be difficult for an SME to determine or know how to write those things. There are definitely barriers in that area, but they are there to be overcome. At the end of the day, if more companies in Northern Ireland were to do that in the long term, the economy would be more competitive on the global scale.
283. **The Chairperson:** Thank you very much, Mr Dunne. From what you said, Mr Sloan, throughout the years there seems to have been a build-up in knowledge of other companies that are available to partner, and that is done through networking, through associations or generally at large. We seem to have at least some advantage here, in so far as we have an opportunity to partner with

- a company in the Republic. It is almost like having a ready-made partner on the shelf, as it were, where you can just go along and get a partner and develop a project. However, do you not also need a third partner, at least?
284. **Mr Sloan:** You do. You need three European states for most of the European projects. As I said earlier, that is where networking becomes key. You have to get your backside on a plane and go out and meet those people, which is how we got the partners. Reputation has a lot to do with it. For example, in the Regions of Knowledge, which is one of the calls that we submitted recently, we went to Paris and met a partner whom we had dealt with before to talk through the idea and, basically, get them to say yes or no as to whether they wanted to partner. We had to do the same with an association in Cork. We had to travel down there. Therefore, there are opportunities. Also, as your reputation builds, more people will want to work with you. We approached a very experienced partner, but because we did not have the track record, they simply said that it was very interesting but the answer was no, and that was because we did not have a big enough profile. I am sure that you are all aware of how it works. When the projects go in, they all get ranked, and whether you get funded or not can be down to half a mark in the assessment. If they approve six projects and there is £4 million available, if the first project asks for £2 million and the second project asks for £2 million, that is it; the money is gone. That is one of the other issues.
285. **Dr Beaney:** One of the criteria is often the ability of the consortium to deliver the projects. Therefore, if you are partnered up with people who are not capable of doing it, that will count against you. Therefore, you have to be very careful who you choose.
286. **Mr Flanagan:** Thank you for your presentation. I thank the CBI for its response and its 11 very useful recommendations. The first recommends that a Horizon 2020 contact point or champion should be appointed to co-ordinate the funding across the public and private sector. I would like to go into that in a bit more detail. How do you see that working? What kind of a person do you see filling that role, and what sort of an organisation would they sit inside? Would it be a government organisation or a private organisation? What would the roles and responsibilities of that entity be?
287. **Ms McManus:** That really combines recommendations 1 and 2. As a region, we need to focus on our core areas, such as agrifood, ICT and renewables. In my opinion, Stephen would be a great Horizon 2020 champion for the ICT sector, because he has the experience of networking; securing partners and making those links north and south so that you have two member states there naturally; helping with the application process; and perhaps taking on the mentoring role that we talked about earlier. He has the experience of framework funding and he has those contacts across Europe to make those partners, but also create clusters in Northern Ireland, so the ICT sector would have a Horizon 2020 champion bringing those SMEs together, finding partners in the South, encouraging more participation in calls and helping with the application process. So, on the technical and strategic sides, the champion would build on those connections for our various sectors across Northern Ireland.
288. A key piece is helping companies deal with the European Commission. The feedback that we have received from a lot of companies is that once they were successful they were left to deal with any issues that came up themselves. There were specific companies who had issues locally where their partners were not delivering what they were supposed to. We were thinking that the Horizon 2020 champion could help negotiate through the Commission and also leverage in the Barroso task force. That is my interpretation.
289. **Mr Flanagan:** The target for spend on R&D is 3% of GDP. What is your assessment of that target? Is it

- achievable, is it overambitious, or should we be aiming for something higher?
290. **Ms McManus:** At the moment, it is very difficult to say without having the specific champions. The universities are very engaged in the framework, and their involvement could easily secure that. There needs to be a more co-ordinated approach when we are setting goals so that the industry is involved in the process much more than it is today. That is my only comment on that. The target should not just be set from a Government perspective; it should work with the ICT sector or the agrifood sector and set a goal that is ambitious for both parties.
291. **Dr Beaney:** If the only goal is spend on R&D, it would have to relate to some sort of economic benefit. Otherwise, you could end up with an R&D salesman who goes around selling R&D whether or not it relates to any economic benefit. That is more difficult, but it is crucial.
292. **Mr Flanagan:** Is that measurable?
293. **Dr Beaney:** It is. You could look at how much of a company's profit was as a result of R&D carried out over the past few years. There is a lot of stuff available for that. The gathering of that data might be much more complex, but I do not know the infrastructure around that. Having a metric such as that is good to start with, but I urge everybody to be careful about whether that relates to any economic benefit.
294. **Mr Flanagan:** I completely agree with you.
295. **Ms J McCann:** Thank you for your presentation. It strikes me that we constantly hear about the need to develop the SME sector here, because it is crucial to growing the economy. I know that foreign direct investment (FDI) is important as well. *[Inaudible due to mobile phone interference.]* If we are really serious about creating jobs for people, we need to develop the SME sector so that it is able to export. That is where we need to put a particular focus. You have given some good recommendations on how we can do that. We heard in the last presentation about skilling people and how the FE colleges are working with business to take that initiative forward in R&D.
296. You mentioned the evaluators. In your paper, you say that there are relatively low numbers of evaluators from here who would probably understand the problem better than someone from Europe. How do we ensure that people who are sitting on these panels are looking at where funding is going? There is a lot of funding out there, but sometimes it is not going in the right direction. How do we ensure that there are people here who know the issues, are directing the themes of funding and are looking at the projects that are key to delivering what we need?
297. **Ms McManus:** That is where the Horizon 2020 champions come into play. We select the sectors that we want to play in across Europe; the agrifood sector, the ICT sector and so on. That role can help facilitate the selection of the programmes and projects which we will go ahead with. The evaluators are a key piece, and I can leave a copy of this document. We did a comparison of evaluators across the various calls in the UK, Ireland and Northern Ireland. The evaluators really make the decision as to which projects will be successful. We are missing a piece there; evaluators, when they come back to the region, are giving feedback to the projects that were not successful. *[Inaudible due to mobile phone interference.]* They are learning a lesson so that they are successful next time. We need to encourage more academics and people from industry who have been successful in frameworks and have that expertise to become evaluators so that, when a local project is being evaluated, there is someone from a local perspective to help increase our success rates. We can leave this analysis with the Committee. It shows clearly that in Northern Ireland there is a very low uptake of evaluators across all the calls in Europe.
298. **The Chairperson:** That will be very helpful. Thank you very much indeed.
299. **Ms J McCann:** There seems to be a need for some sort of consortia for the

- small and medium-sized sector. That happened with some of the community organisations in drawing down European funds. It strikes me, from what you are saying, that you do not have the time to devote to what some of the larger companies might have or whatever.
300. You talk about a champion for this. As I have said, we hear, time and again, even in accessing public procurement contracts, that the SME sector, though central to our economy, does not seem to get the same type of focus from organisations such as Invest NI. Would a champion for that sector create jobs? I remember that, at a Finance Committee meeting, it was said — I cannot remember who said it — that if we could increase the capacity in exports and development of each small and medium-sized business here, and create one or two extra jobs, we would have full employment. It seems to me that the necessary energy or drive is not given to that. Maybe we could have a champion to try to develop all that? We need to look into the future to create employment opportunities for our young people.
301. **Ms McManus:** Nationally, we have just completed a report called 'Future Champions' which looks at medium-sized businesses, that is, anyone with revenue above £10 million. We have identified those businesses as a core area. Just as you said, they could contribute £20 billion to the growth of the economy by 2020. They will create the jobs, if they are promoted and fostered. I am happy to distribute that report to the Committee. Some of its key findings are about addressing key burdens, including access to finance. In Northern Ireland, there is a dependency on bank finance. We do not look at alternative sources of finance, such as venture capital (VC).
302. There is also a management and leadership issue. We need to encourage more of our indigenous companies to look at and export to foreign markets. How do we support that growth? The CBI is creating a programme for that this year, and it will be one of our key focuses for the year. How do we challenge and raise the level of ambition in those companies to look at all other markets, consider alternative finance models and look beyond Northern Ireland as a market?
303. **Ms J McCann:** Also, to encourage young people to come forward and create their own businesses.
304. **Ms McManus:** Absolutely. That is key.
305. **Mr McKay:** What about funding streams? You mentioned InterTradelreland — *[Inaudible due to mobile phone interference.]* Do you find that some sectors, maybe the better established ones and those that are less fluid, are better at availing themselves of funds? Are they better prepared? They know the European market and who to go to. Certain sectors will be better than others.
306. **Mr Sloan:** Yes. The companies that are experienced in accessing funding use the likes of the Innova programme, because they have contacts. Innova encourages cross-border R&D projects between two companies. I work closely with some of the companies that are on the Innova programme, and we need to make people aware of what is involved and whether it is the right thing for them. It comes back to awareness and a little bit of hand-holding. I have approached a couple of companies that have talked to me about applications that they wanted to develop, and I worked it through with them. They had looked at Innova, but were a little bit scared of it. However, when they understood it, they moved forward and have been approved for a couple of project development grants. Therefore, the answer to your question is yes. The companies that are more solid and experienced understand exactly what they have to do.
307. **Mr McKay:** Is it not the case that the ICT sector is much better developed at doing that than the agrifood sector? Do certain sectors need to up their game?
308. **Mr Sloan:** From my knowledge of some of the applications, I would say that participation is quite widespread. There is quite a lot of participation

- from agriculture and a number of other sectors, including pharma.
309. **Mr McKay:** What about renewables?
310. **Mr Sloan:** I have not seen enough of that and cannot comment. However, from the ones that I have seen in passing, there seems to be a reasonable cross section.
311. **Ms McManus:** I have a report here from Enterprise Ireland. This is an all-island framework initiative, and the largest areas of success are seen in agrifoods, health, ICT, Marie Curie, energy security and transport.
312. **Dr Beaney:** On the SME side of things, we find that it very much depends on local universities and how interested the individual departments in those universities are in collaborating with industry. Some departments are not interested and just want to write academic papers, while others are very hands on. Often, SMEs are not necessarily thinking about this and the universities can show them that there is a whole world of funding that they did not know about. In our sector, the level of engagement that the companies have with their local universities is probably the biggest correlation with how much funding they will draw down. Some do almost nothing with the universities and get no funding. In my experience, that tends to be where that comes from.
313. **Mr McKay:** Is that changing? Do you find that colleges and universities are opening up more?
314. **Dr Beaney:** Not really. I know that that is what they are saying, but on the ground I am not so sure.
315. **Mr Sloan:** The innovation vouchers are helping. They almost force an initial engagement, and that can lead on to the likes of a KTP programme or a Fusion programme, through which a dedicated PhD student will work on a particular issue. In turn, that can lead to a R&D grant for a bigger research and development project through the Invest NI funding programme or Innova. There is a pathway, and the innovation vouchers are forcing that engagement, which was always an issue, to happen. Once people start to network those barriers are gradually broken down.
316. **Mr McKay:** You referred to different streams and programmes. Is there a danger in tinkering with those? Obviously you want as many funding streams — *[Inaudible.]*
317. Is what is there at the minute through the Innova programme adequate, or should we tweak — *[Inaudible.]*
318. **Mr Sloan:** I have not sat down and analysed the whole pathway, but good steps seem to be taking place. As I said, the innovation vouchers allow companies to see whether their ideas make any sense, KTP programmes allow companies to get further research done and, if a company is the right size, Invest NI can offer further support through a R&D grant to get the product to market. There seem to be good opportunities there. As regards generating ideas, there is Invest NI's collaborative networks programme. It helps to bring local companies together with this central idea. They identify gaps and niches. To answer an earlier question, they can identify gaps where there is an opportunity for a new business to be created and help fill that for the network. Does that answer it?
319. **Mr McKay:** Yes.
320. **The Chairperson:** Before I conclude, there are a couple of small points. As far as I am aware, the final thematic elements in Horizon 2020 have not been completely or exhaustively defined or determined. Are there any thematic elements that you think might be usefully added to the list? If you do not have an answer to that now, maybe you could have a think about it and forward an answer to us. That would be worthwhile — unless you have some ideas at this moment.
321. **Ms McManus:** Yes, OK.
322. **The Chairperson:** You talked about evaluators. That is a concept that I find hard to understand, and I am not sure where it has come from. However, you do need an evaluator to evaluate these

- projects. I am sure that evaluators do not grow on trees and that you have to get people who are competent in this area. How do you get to the point where you are considered to be an evaluator? Do you have to have some recognition from the European Union? What is the process?
323. **Mr Frew:** You have to evaluate them. *[Laughter.]*
324. **Mr Sloan:** Anybody can apply to be an evaluator. You sign up and, when certain themes come up, they will look at your past history, the skills that you have identified, your qualifications and your past track record. They will pick you from that. If you do not have the skills, you will just not get called.
325. **The Chairperson:** Right; it is as simple as that.
326. **Mr Sloan:** Also, through the networking, they build up an idea of who certain people are and who can do what. They will look for certain things. If there was one on cloud computing, they would put in a search for people who had experience of working with cloud computing. They would search for those words and pull those people out. They would then look at what level those people were at, whether they were in the private sector, third-level institutions, large companies or whatever, and select from those people. There is no harm in anybody. No one gets marked down or told, "No, you are not qualified to do this." People may have a specific skill.
327. **The Chairperson:** Yes, but what you are saying, Ms McManus, is that for the process to really work, we need more evaluators. I think that you are all in agreement with that.
328. **Ms McManus:** Yes, absolutely.
329. **The Chairperson:** One other point. How well do you think research and development tax credits work? Do you think that they would be useful here?
330. **Dr Beaney:** From my point of view, they do help. They help to take some of the risk out of the potential innovation. If I have a new material that I want to try — something like that, small basic research projects — they are quite useful. If it works, that is fine. If it does not work, at least it has not left you out of pocket. The whole process of how you claim the money seems to work fairly well as far as I am concerned. I am pretty happy with it.
331. **The Chairperson:** Are there specific tax credits already available?
332. **Dr Beaney:** Yes. The way that you claim it is that you submit annually, if you want to, all the R&D activities that you think are eligible. You then get a rebate for the corporation tax that you paid on it, or something like that. I am not from that side, but, generally speaking, it is a matter of keeping a log of what R&D you do so that you can recover some of the money. It rewards companies that —
333. **The Chairperson:** Is it specifically identified in your company's tax return that this is research and development, or is it just seen as another business expense that is used to reduce your tax bill?
334. **Dr Beaney:** I see what you mean. It depends on the company. It is open to both, really. The definition of R&D is quite broad, so it could be used for either.
335. **The Chairperson:** Therefore, a smart company — I do not mean that in a mischievous sense — would say, "If we put so much into R&D, we could claim that in tax relief."
336. **Dr Beaney:** Yes, sure. We get approached by people who say that they are specialists in that area and can maximise your claim.
337. **The Chairperson:** OK. I think that that is everything.
338. Thank you very much, everybody. That was a very interesting session. Once again, thanks for the written submission. If we have any further questions, perhaps we can send them to you in writing and you can respond to them along with any further information that you think might be useful. Thank you very much.

23 February 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Daithí McKay (Deputy Chairperson)
 Mr Steven Agnew
 Mr Gordon Dunne
 Mr Phil Flanagan
 Mr Paul Frew
 Ms Jennifer McCann
 Mrs Sandra Overend

Witnesses:

Mr Thompson	South Eastern Regional
Keating	College
Mr Ken Webb	

339. **The Chairperson:** I welcome Mr Ken Webb, chief executive, and Mr Thompson Keating, director of corporate and economic development. Thank you for permitting us to meet here in the college. Part of our policy is to get round as many institutions and to meet as many people as possible in the community. We were delighted to take up your invitation, and we look forward to hearing what you have to tell us.

340. **Mr Ken Webb (South Eastern Regional College):** Thank you very much. On behalf of the college, I formally welcome you. We are absolutely delighted to see the Committee here today. We have a short presentation, and then we will take questions.

341. **The Chairperson:** Thank you very much, Mr Webb.

342. **Mr Webb:** I welcome you to our fourth largest campus. After the meeting, we will give you a tour of the environmental skills centre, where you will be able to see how closely engaged we are with businesses. In the presentation, I will give you a brief outline of Colleges NI and the South Eastern Regional College (SERC), and we will give examples of how further education (FE) can support the economy.

343. You have some details of Colleges NI in your pack, and I do not intend to go down through any of those. The sector is a significant size, with a turnover of £250 million. Under the stewardship of the Department for Employment and Learning (DEL), the colleges have taken a tremendous leap forward in the past four years, since the merger process that took us from 16 colleges to six. I am a Johnny-come-lately to the FE sector: I have been here for less than four years. However, even in that short time, I can see how far and how fast the colleges have moved in their role in supporting the Programme for Government and, in particular, supporting the economy. Speaking on behalf not just of myself but of other principals across the sector, we are keen to do more to assist and promote the development of the economy.

344. The six Northern Ireland colleges are of a scale that, quite frankly, would be deemed to be large on a UK basis. With that comes the resources and the capabilities to be able to deliver real assistance to the economy. Northern Ireland is competing on a world market. Its businesses need to be world class, and they need to be supported by a world-class further education system to enable them to succeed. That is our aim.

345. I move to the 'FE Means Business' slide. As I said, we had the merger to form the six colleges, moving away from a supply-led to a demand-led model. Thompson will speak to some examples of that. It is very much focused on delivering the Programme for Government, taking cognisance of what industry itself — not just the sector skills councils — wants, and being very close to businesses. We have a desire to get as close to businesses as we possibly can because it is only by knowing and understanding what businesses need that we can make sure we are delivering what businesses

- want. As a sector, our belief is that we are highly flexible and highly responsive. That is an important factor.
346. I will set the funding into context. The FE total budget, in terms of what is distributed for courses to the colleges, is about £145 million. In contrast to that, the school transport budget is £75 million, and the higher education (HE) in FE budget is about £25 million. We provide some 20% of all higher education provision in Northern Ireland. When you consider that, as shown on the 'Colleges NI' slide, there are 180,000 enrolments, you get some sense of the scale of how many people we are dealing with and the amount of money involved.
347. SERC has about 1,100 employees and 32,000 enrolments. I will come to that briefly. We deal with over 1,100 businesses across the island of Ireland, and we have a £45 million turnover. Critically, again under DEL's stewardship, there has been nearly £80 million of capital investment in the short time that I have been at the college. We have new campuses in Newcastle, Downpatrick, Ballynahinch and Lisburn. Here in Ards, you can see that half of this campus has been rebuilt. We have world-class facilities. The same has been the case in many other areas of FE. Sadly, a few colleges are still operating with resources and facilities that are not as good as ours. There is no doubt that the significant investment in facilities is allowing us to give students opportunities to access the very best equipment and enabling us to promote a culture of excellence.
348. The next slide gives you some idea of the mix of enrolments. We have some 4,200 Training for Success and ApprenticeshipsNI enrolments; over 8,000 enrolments on essential skills, that is, numeracy, literacy and ICT; and some 18,000 enrolments in further education and 1,500 in higher education. You can see the spread of those enrolments across the college area.
349. At any given time, we have about 1,000 students on placements with companies. Those range from students who are doing higher education courses — we run courses right up to full degree level — right down to Training for Success students. We are very focused on getting industry projects and real-life projects on which the students can work. We have done that very successfully across most of our programmes.
350. We are, obviously, experiencing difficulties in getting students placed, because industry is finding things tight. In recent weeks, things in the construction industry, in particular, seem to have been getting more difficult. We are faced with a situation where students may not have an opportunity to get a placement with a company to develop their skills. Therefore, we have been creating projects with not-for-profit and private sector organisations in which we can get the students working on real-life projects and getting actual experience. Examples of those have ranged from creating prayer walks at the Belfast Bible College, to refurbishing boiler rooms and replastering and rebuilding parts of the college with other voluntary groups. The experience that those young folk are getting means that, whenever they apply for or get a job, they will have the necessary practical experience to enable them to do the job.
351. STEM (science, technology, engineering and mathematics) is a vital part of our work going forward. Just under one third of our enrolments are related to science, technology, engineering or mathematics. As a college, we have very much taken the view that we want to promote STEM. In fact, practically every new course includes a STEM element. We also have students coming not only from across Northern Ireland but further afield. In fact, we have students from 44 different countries studying at the college.
352. The next slide is about success rates. We say that retention times achievement equals success. If 100% of people are retained on a course and 90% pass, you have a 90% success rate. Our higher education success rate is 91%. Many universities would die for such results.

- Across the sector, the standards in higher education, which are checked by the same quality assurance organisation that examines universities, stand testament to what the colleges can do.
353. We have a success rate of 57% in essential skills. That is for individuals who have not been able to achieve a grade C or better at GCSE in maths, English or ICT. Some 81% of those who sit the exam are passing it. Again, that is a testament to the work of the staff in getting people forward.
354. Thompson will now focus on how we can work with businesses.
355. **The Chairperson:** Thank you very much, Mr Webb.
356. **Mr Thompson Keating (South Eastern Regional College):** I will narrow the presentation down a little bit to how we engage with businesses. Before I do, I will speak to a slide on how we promote public value through our return on investment from the public purse. You heard Ken talk about how effective we are as a college. The slide highlights the fact that it takes 3·4 years to get a return, through taxes, on the public investment that it costs to get a level 2 qualification. If you go from level 2 to level 3, or from level 3 to level 5, it takes only 1·9 years for the public to reclaim the money on that investment through taxation. Given a 1·9-year return on an investment, most people in business would make such an investment.
357. I move now to business engagement. Ken mentioned that we engage with over 1,100 companies throughout the whole of Ireland, from Coleraine to Cork. We do that in various ways and through various means. One initiative we used was FGAs. Some legislation around gassing and recharging came out for the air conditioning industry, and that entailed a lot of training. We set up a mobile training centre that could travel around industry to service that level of qualification. We trained 300 people in the North of Ireland and 600 in the Republic of Ireland. We are continuing and diversifying further. That demonstrates how flexible and responsive to sectors we can be.
358. Although we engage with a high number of businesses, we are forming partnerships and partnership agreements with some of the bigger companies in Northern Ireland. We have had a long-term partnership with Denman, for example. We have invested in *[Inaudible.]* measurement machinery that has helped the productivity of that business. There has been a more recent partnership with Coca Cola over the last year and a half. It not only sponsors our enterprise system but engages in our industry projects. A recent project actually saved it a substantial amount of money. At the moment, we are developing online training for it to reduce its downturn and to improve its corporate governance and productivity. I could go on through all the major companies listed, but I am just trying to highlight how we are engaging at many levels.
359. One of the strategic aims of FE Means Business is about being responsive to industry needs. We are doing that in various guises and through various work streams. One example is upskilling through the software testers course. Through working with Momentum and e-skills, it rapidly came to our attention that there was a huge demand and lack of skills in software testing. Software testing involves a different skills set to that needed for software writing. In conjunction with DEL and with its support, it took five weeks for the college to put on a level 5 qualification in order to provide a conversion course for those who had attained a certain level and convert them into the required skills sets for business. Once we created the course, we advertised, and we got 700 applications for 20 posts. Those were guaranteed interviews. We ran the course in Lisburn, and 19 of the 20 completed the course and achieved the interviews. That is an example of how engagement with the sector and with business can identify skills that are relevant and required and moves us

- away from the supply-led model to the demand-led model.
360. In relation to workforce supply, we are forming a partnership with Grafton at present. We went to Allen and Overy because, as you are probably well aware, Invest NI brought in Allen and Overy. It is a very London-centric organisation and is used to different cultures. It went through a recruitment process, and it has concerns about culture in many ways. The company told me that it had recruited for behaviour and attitude, and it now has skill issues. The skills that it requires are modern-day office skills. It is about document creation and proofreading. It is a level above normal office administration. The company trades in documentation around the world. I am currently working with Allen and Overy on courses and skill requirements to provide the level of expertise it wants. If that company has that level of skill deficit, it leads me to believe that so do PwC, Carson McDowell and the other companies that have to work in a global society.
361. Another area that we are focused on is productivity. There is a flagship scheme called business improvement techniques, which has proved very successful. The example I will cite is Huddleston Engineering. We have done not only level 2 business improvement techniques but level 3. We are currently the only college delivering level 3 business improvement techniques. That company has been very impressed with improved productivity. It is very difficult to quantify, but the company says that it has made in the region of over £200,000 of improvements through its investment in that training.
362. We are also working on applied research. We set up the environmental skills centre just over a year ago, and we have had two companies coming through. One was a company called Bluebuild Energy, which wanted to focus on the renewables markets and saw the opportunity coming up. With the renewable heat incentive coming in, its timing was pretty good. We brought his workforce here, upskilled it, and helped him to source new product material. He is up and running now, and it is proving very successful for him. The second company is called Astar, which is in the process of redeveloping a heat pump that has the unique selling point of not having a fan. We are doing the final research and development work for that company, which is in late negotiations with Four Seasons Health Care to put the heat pumps into its nursing home. The company's focus at the moment is on social housing. We are also working with the Northern Ireland Housing Executive in respect of upskilling the workforce for retrofit and passive housing.
363. One example of reskilling is where Bombardier advertised for mechatronics engineers but could not get them. So, it came to us, and we put on a course that took its basic maintenance engineers and upskilled them to mechatronics engineers. We were very pleased with that, and we are now going on to get progression routes up to the next level — level 3 — in mechatronics.
364. That is a range of examples that shows how we are responding to industry needs. We are working hard to understand what the skill sets are and to meet the demands of making the curriculum more relevant. We also try to underpin strategic decisions for Northern Ireland. For instance, there is a food strategy for Northern Ireland that highlights jobs and skills deficits, and one particular area, in keeping with today's theme, is that Invest NI wants to ensure that Northern Ireland is leading in low-carbon research, design and manufacturing. That strategic aim, combined with the fact that 17 of the 24 sector skills councils highlighted that there were skills deficits in the environmental and low-carbon areas, prompted us to take a hard look at what we needed to do, and we came up with the vision of the environmental skills centre.
365. FE is responding collaboratively. One of the big wins out of the merger is that there are now six colleges and signs that communication and collaboration are more focused. One particular emerging market is the low-carbon economy, and we have a collaborative

- approach to that. Three years ago, we started our carbon-zero project, which has been hailed as a success. Its aim was to look and raise awareness and to create a fit-for-purpose curriculum. Belfast Metropolitan College (BMC) has taken on apprenticeships in wind turbine maintenance; we are focusing on offshore accreditation among other things; and the wind industry foundation degree has been created at South West College. That college is part of the global wind and maritime alliances, as are we. We are just about to set up a cross-working group to see how we can respond to the offshore wind skill sets that will be landing on our doorstep next October.
366. The environmental skills centre is a little bit more focused and wide-ranging. As I said, it was set up to address the skills deficits highlighted by the sector skills councils. It has to do two very simple things: to help to exploit the opportunities, and there are many of them coming down the line; and to help to meet the challenges. People do not know enough yet. The renewable heat incentive is coming in in April, and a lot of people still do not even understand what a biomass boiler is. The centre is about having access to somewhere that is independent. That is a big plus — we are independent, and we are not trying to sell you anything. Everybody else is trying to sell you something. We can carry out research and development and teach you whatever you want. It is a big triangulation between industry, education and, hopefully, government, where people can come and access information.
367. The environmental skills centre currently works on three key work streams. The renewable energies lab is there to show you and to identify all the different types of renewable energies, so you can feel it, touch it, train on it or do whatever it is that you want to do. The other area is low-carbon design, because that is the future in respect of passive housing and how you can reduce expenditure through energy.
368. We set up the environmental skills centre less than a year and a half ago. In one year, we had received five awards and accolades. However, what has impressed me most is how industry wants to engage with us. Every time we hold a seminar here, we get 100-plus people coming to it, and industry has actively approached us to form active partnerships. For example, JP Corry wants to be part of the scheme, and it is highlighted in an initiative called the render centre. Rendering is going to be an important part of skill development in respect of retrofit and reducing fuel poverty. Kingspan wants us to be its solar centre and to take on its training instead of that being done within the organisation. Baxi came to us and said that it wanted to set up a Baxi academy here.
369. It is hugely important that we engage with business and that business engages with us, because technology is moving at a tremendous pace. If we have to teach children the latest technologies, we need to be tied into industry. We need to have access to their innovation hubs and networks and to be able to solve issues for them going forward. So, by having that connection, our lecturers, technicians and students are being upskilled to a world-class level.
370. I think that we have spoken for 10 minutes, so we are now open to questions.
371. **The Chairperson:** Thank you very much, Mr Keating, and, once again, thanks to Mr Webb. The presentation was most interesting. It certainly dovetails with the Committee's approach to renewable energy, in particular, and to trying to push that agenda with government. So, we are very pleased to acknowledge your work in that area. I suppose that, in a sense, it is not about pure research but about skilling or upskilling people for the renewable energy sector. It is more about the application of research than the pure research itself. I think that that is very important. I was very impressed by the facility you have here to respond quickly to the needs of business, and you should be commended for that. Setting up the centre is, of course, part and

- parcel of that, and it seems to be fulfilling a need and filling a gap that exists.
372. In respect of your contact with business, does business come to you or do you go to business? Mr Webb, you have some association with, I think, the Confederation of British Industry (CBI). Is that right?
373. **Mr Webb:** Yes, Chair.
374. **The Chairperson:** It is very easy to say that colleges and education generally should try to satisfy the needs of business and industry. You can make that statement, but doing it is an entirely different thing. So, does business come to you or do you go to business? What is the position?
375. **Mr Webb:** I will start off, and Thompson can jump in. It is a bit of both. As Thompson outlined, businesses certainly come to us. However, we are also very active in reaching out to businesses. As outlined, we are actively looking for student placements with businesses, and that helps us to engage with them. We are also looking to assist businesses with their development, so that is another area where we engage with them. We engage with businesses and the business community on multiple levels through, for example, the councils and their work on economic development activity; Invest NI; the Department; the CBI — I sit on the CBI council; the Institute of Directors (IoD); chambers of commerce; and city centre management groups. The college is a national skills academy for retail. Last week, all the city and town centre managers were with us in Lisburn to look at how we could provide upskilling for staff working in the retail industry during these very difficult trading times. So, we engage with businesses on multiple levels. However, we are always keen to do more and to engage more.
376. **Mr Keating:** I will add a couple of points to that, but before I do so, I would like to pick up on the point about research that you made. I am mindful of the Committee's inquiry and our response to it, and one thing that I did not bring out very clearly in the presentation was our working relationship with the University of Ulster and Queen's University. This facility is equally important for signposting research and development, and we have done that on many occasions. We have excellent working relationships. One of the points that I made in our response was that the colleges could augment the research and development process by developing research centres for applied research and development. The majority of companies in Northern Ireland are small and medium-sized enterprises (SMEs) that do not necessarily align themselves to universities but are more comfortable to walk through the door of a college [*Inaudible.*]. Once they get the helping hand, we can signpost them into the universities.
377. **The Chairperson:** Is that approach in association with other colleges or simply within your institution?
378. **Mr Keating:** It has always been here, inherently, but the environmental skills centre has put a lens on it and has enforced that, because we need to work collaboratively with both universities. There are synergies. Increasingly, the universities need to have a bit more understanding about the applied side of the house. They can come here and touch and feel and get a bit of experience for their students. Equally, we need a path into the universities for businesses that are developing and need that extra step forward.
379. **Mr Webb:** That is the approach that other colleges wish to follow and are following. For example, South West College is moving in exactly the same direction. All the colleges are keen to do that.
380. **The Chairperson:** Sorry, I interrupted you, Mr Keating. Have you finished?
381. **Mr Keating:** I was going to make one more point about business engagement. There are various ways of engaging with businesses, and I am noticing now that one of the more successful ways is to use existing channels

- through such organisations as IoD or CBI. Organisations of that nature have already made network channels, and we can be part of that and can align our strategic aims with theirs. That gives you good access in and raises the profile of what you can do.
382. **The Chairperson:** Thank you very much indeed.
383. **Mr McKay:** That was a very good presentation, and an important point was made about ensuring that students and lecturers are up to speed with industry. In this area of work, you need to be ahead of the curve as technology moves forward at rapid speed. We are always talking about the need for communication, and, from the presentation, it comes across to me that everything is well interlinked and gelled together. Have there been many difficulties in getting to that stage?
384. **Mr Keating:** It is well linked because our network is extensive, so we look at it from every perspective. We look at it from the perspective of where Northern Ireland's strategy on the economy wants to go, and we make sure that we are aligned with that. We are also connected to sector skills councils, to the sector and to businesses, so we have a rounded perspective of where we can go. We have evidenced here that we have provided a facility that meets the needs of business through having that rounded perspective, and, because we have done that, it is proving very successful. Those businesses would not be coming to us or wanting to be part of this if they did not think that it was going to be a success.
385. **Mr McKay:** Do you find that students who come from education are geared towards the environmental and renewables sector? To be honest, we do not hear that much about the work that you are doing. Is more public discussion needed around how that can steer the economy?
386. **Mr Keating:** At the moment, we are satisfying the demand of the existing workforce. There is a bit of work to be done on the framework and the environment to start creating the jobs. I have no doubt that the renewable heat incentive that is coming in very soon will start to change people's thinking and that there will be a demand for new ways of doing things, which will have to be reflected in upskilling and reskilling. New career pathways will be created on the back of that.
387. Creating new careers has to go back a few years to our supply chain in schools. It is about motivating schoolchildren around the future types of employment to do with the STEM subject areas. We are beginning to do that under the entitlement framework and by working with careers and having careers days here that are focused on STEM. Last year, over 2,000 children came to our Bangor campus, and the theme was STEM and renewables. It will take a while for that to filter through, but it is about how we are focusing on our supply chain for the future.
388. **Mr McKay:** There is a bit of debate now about the future of DEL and whether it splits up into Education or Enterprise, Trade and Investment. You are looking in both directions: you are looking towards business and the economy and also towards the earlier stages of education. What is your view on that?
389. **Mr Keating:** I am firmly looking at the principal at the minute. *[Laughter.]*
390. **The Chairperson:** I suppose that, in essence, it is a political question. However, do you have any comments on what might take place?
391. **Mr Webb:** Under DEL's stewardship, the colleges have come a long way in supporting industry, but one also needs to keep sight of the work that we have done on the entitlement framework and how important that is. So, presently, we are in one Department *[Inaudible due to mobile phone interference.]*. As Thompson outlined, it is vital that we help to shape the curriculum and career paths in schools so that children move through education in a route that will ultimately take them to jobs and

- will satisfy the needs of industry. Our workload and funding tend to indicate a move towards a Department of the economy rather than a Department of education, but we need to recognise that we have a role in education as well.
392. **The Chairperson:** In essence, it will be a political decision. You can advise, but you cannot determine it.
393. **Mr Webb:** Absolutely, Chair. Once that political decision is made, whichever Department we, as a sector, are in, it is vital that we have the resources and mechanisms to allow us to deliver for the Executive, the Programme for Government and society as a whole. I, personally, am comfortable that, as long as we have the resources and mechanisms, the decision is an organisational and political matter rather than a matter that is directly for us.
394. **Mr Agnew:** Thanks again for your presentation; it is good to speak with you again. The Deputy Chair, as he often does, has stolen much of my thunder.
395. Do you feel that enough is being done to push us in the direction of the ambition for Northern Ireland to lead in low-carbon research, design and marketing? I compare us with Scotland. My assessment is that Scotland sees a low-carbon economy as an opportunity and wants to do as much as it can. I sometimes think that we see it as something that is coming down from Europe that we have to do, certainly at government level. What is your assessment of that and what more should we be doing? If we are to compete with Scotland, we are starting behind them at this point.
396. **Mr Keating:** I have two comments on that, because there are two ends of opportunity in the low-carbon economy. Invest NI has clearly set the stall out on research and design and on being at the forefront of the knowledge economy around the low-carbon economy, and Queen's University and the University of Ulster are gearing themselves up and working very closely with Invest NI to promote that.
397. However, I fear that we are, potentially, missing another opportunity at the other end of the market, which is about working in the offshore market and maintaining and accessing jobs. The recent initiative of placing offshore wind turbines in the Irish Sea could create a lot of job opportunity, and I am not wholly convinced that we are taking full advantage of that. As you may or may not know, DONG Energy has won two contracts to install and maintain two offshore wind turbine farms in the Irish Sea. They will manufacture those in Germany and bring them across to Hull, where they will assemble, test and commission them to a degree where about 12,500 jobs will be created. They will then come across to Belfast, where the logistics and assembly plant is being created by Farrans. That £50 million of investment will, potentially, create 4,500 jobs, of which only three are currently guaranteed in Northern Ireland.
398. The offshore market holds many opportunities, particularly for a construction sector that is suffering. In order to work offshore, you have to lay cable and put foundations in the seabed and to erect the huge structures. A lot of the skill sets already exist in the construction industry here. However, you need a ream of health and safety legislation to work offshore. You cannot put one foot offshore if you do not have minimum safety requirement training, such as minimum industry safety training (MIST), OPITO and Client Contractor National Safety Group (CCNSG) training and a helicopter dunk test. In Hull, all that infrastructure is in place, so the indigenous population can access those qualifications and local people can avail themselves of the job opportunities. In this college, we are working to create some of those qualifications, but there is an opportunity to open up some of the potential jobs to people by skilling them in offshore accreditation.
399. **Mr Dunne:** I apologise for being late this morning. It is good to see you, Ken and Thompson, and we congratulate you on the excellent work that you have done at

- SERC. It is to be commended, and you have shown a lot of leadership. The new buildings that you have throughout the area are a great credit to you and show the commitment that there has been.
400. Ken, you mentioned apprenticeships. That is a big issue. During a recent visit to the college, I was struck by the young lads who were doing work within your own buildings and were keen to learn basic skills. That brought it home to me and others that there is a tremendous shortage of opportunity for young people like that. What more can be done to address those issues?
401. **Mr Webb:** As I outlined in the presentation, a lot of companies have been unable to offer apprenticeships and the numbers of apprenticeships have fallen by the wayside. The Department for Employment and Learning introduced the programmed apprenticeship scheme over two years ago, which allows young people on that course to get placements with companies. They spend two days in college to get the underpinning skills and, hopefully, spend two days with a company in the same way as an apprentice would.
402. Unfortunately, getting placements has been difficult and is becoming more difficult, particularly in the construction industry. To ensure that students get opportunities to practise and embed the underpinning skills, we have created projects with not-for-profit organisations and the voluntary sector, through which the students can undertake work to practise those skills. As I said in the presentation, we have worked with the Belfast Bible College, where students have created prayer walks, refurbished boiler rooms, built walls, replastered rooms, and painted and decorated. Indeed, those young people have also been involved in the full construction of buildings. At any given time, about 400 of those young folk are out on projects across the whole of the south-eastern area. There are projects with Autism NI in Newcastle, the Atlas Women's Centre in Lisburn, organisations in Bangor, and so forth.
403. The benefits of that are many. Those young folk get the opportunity not only to practise their skills but to work in an environment that is like a real work environment. They have to turn up on time and to behave properly as they would do in the workplace. They also interface with people who they may not otherwise have had the opportunity to interface with, so it helps with their personal development. The charities also benefit. They get work done that they could not have afforded to pay to have done. They provide the materials, and the materials or supply industry benefits because the project would not have happened at all. So, it is one of those situations where everyone is a winner. However, in particular, it is the personal and skills development for the young folk that is so important.
404. We frequently hear from businesses that graduates or students coming out are not work-ready and that they do not have the attitude or the necessary skills to come straight into work. That is why we have pushed to have industry projects and placements. We have also introduced a City & Guilds qualification aimed at students' personal development and promoting enterprise and entrepreneurship. From September, universally across the college, students will not just do a single vocational course. They will do a range of courses, from their vocational course through to the essential skills courses on ICT, literacy and numeracy, and the City & Guilds personal development course, which will embed the skills to enable them to be work-ready when they come out. That is why, as a college, we promote student companies as part of our programme, so that students can gain an understanding of what it is like to be in a company and to be in a work environment.
405. **Mr Dunne:** OK. Thank you very much. I have a couple of other questions. Do you see universities as a threat or a challenge?
406. **Mr Webb:** I see them as neither. We are complementary to one another — very much so. As Thompson outlined, we

- work very closely with both universities in Northern Ireland and those elsewhere. We each have our role to play. Universities are very focused on the big “R” of R&D — the blue skies research. Colleges are more focused on the development side. Our skills are complementary. The mixture of the two and the promotion of the two working together will only add to the strength that we, as part of the education sector, can deliver for industry.
407. **Mr Dunne:** Do you feel, Ken, that we need to get away from the idea that everyone needs a degree to be successful?
408. **Mr Webb:** I think that there should be more higher education in further education, particularly in apprenticeships at levels 4 and 5. There are insufficient numbers of those. The way in which schools have approached education has been that you go through GCSEs, get A levels, and go to university to get a degree. That is it; that is the route. However, since 2008, we have been seeing situations where lawyers are becoming unemployed, and the traditional route through education of getting a degree is not necessarily delivering the best outcomes for students. We can certainly improve on current careers advice. Higher education in further education is an area that is underdeveloped and needs further development. The applied area of higher education is one that needs a greater focus because it is ultimately what industry needs.
409. Randox, for example, will tell you that, when it advertises jobs, it gets people with PhDs who have aspirations for pay. However, what it wants them to do is not PhD research work but is more akin to level 4 or 5, and it finds that such people do not have the skills necessary to start to work. In simple terms, those are pipetting skills, titration skills and so forth. Those people have not gone through an educational process that is practical in its nature; it has been academic in its nature.
410. I think that is the area that needs further development.
411. **Mr Flanagan:** Thank you very much for your warm welcome and your presentation. Thompson said that many people would not know what a biomass boiler looked like. That is largely accurate and is the case for most forms of renewable energy, apart from a wind turbine. That is also the case for the payback period and the costs associated with installing such devices. How do we go about addressing that? A conference on renewable energy was held yesterday in the agriculture college in Enniskillen, where a wide range of businesses displayed their products. It attracted a big crowd. There is huge demand for those things, both with the security of supply it brings and, eventually, the lower prices for electricity and heating homes. It also has economic benefits and the potential for job creation. How do we improve people's knowledge of renewable energy and the different forms of renewable energy generators out there?
412. **Mr Keating:** It is around communication, and communication as a two-way process. At the minute, we are communicating one way — the environment framework is not enough for people who want the information. As I said before, when the renewable heat incentive comes in, neighbours, friends, businesses and companies will start putting in those renewable sources because of the grants associated with it. That will be the proof of the pudding, and people will be asking the questions.
413. Along with a lot of other stakeholders, such as Action Renewables, we put on seminars and tried to raise awareness. The information on biomass came from an Action Renewables survey. However, until such times as it becomes a reality, like the renewable heat incentive, it is very difficult to get the message out there. There needs to be the framework around the environment before we can communicate properly and start to create the demand for the skills. Again, it is like the Housing Executive around fuel poverty and the Programme for

- Government. That will probably secure some action now. We are also working with the Northern Ireland Housing Executive on areas of development.
414. **Mr Flanagan:** What do the majority of students do when they leave here? Do they go and work for some of the businesses that you collaborate with, or is there a high level of entrepreneurial spirit among your students to start up their own businesses? Is it the case that there is not enough support for young people who want to leave college and start their own business? I am interested in what your college is gearing young people up for.
415. **Mr Webb:** We are gearing them up to either to start their own business, go into employment or go on to further and higher education. We do not want them to end up unemployed. This year, significant numbers are progressing into further education. Almost 1,000 students from this college made applications to the Universities and Colleges Admission Service (UCAS) for university places, so we are very much part of the progression route. Significant numbers of our students are starting their own businesses, and significant numbers are going into employment. Indeed, the young man at the back of room, who is controlling the sound system, was a former pupil of this college and now has a successful career. There is a range of outcomes.
416. **To go back to personal development:** because the economic climate is changing so quickly and because areas of business and industry can find themselves facing an economic downturn very quickly, with new areas arriving, we try to make sure that our students have a mental attitude that enables them to have confidence in themselves so that if the job opportunities in one area diminish, they can reinvent and reskill for jobs in new areas.
417. When one company was closing down in west Belfast, I listened to an individual on the television say that he was a lathe operator for 18 years but that there were no opportunities for him going forward. It is absolutely criminal that he thinks that he is finished and washed up. He said, "You can only have so many taxi drivers in west Belfast." As a lathe operator, he was operating complex machinery. He was having to operate to very fine dimensions. He had huge skills that he did not properly appreciate. He had a mindset that said that he was finished. We have to instil our young folk and our older workforce with confidence. We are endeavouring to do that. They need to understand the skill sets that they have and that they can reinvent themselves and seek out and take new opportunities.
418. **Mr Flanagan:** Do you think that the Executive, or society as a whole, reacts quickly enough to large scale redundancies like that? Is enough support provided to people who have find themselves out of a job and who, with a bit of money, could maybe start up their own business? Is there anything that you would like to see changed to give people more of an avenue to get back into employment quicker?
419. **Mr Webb:** There are a range of facilities on offer. As with everything, there are areas that can always be tweaked and improved. However, in some ways, this is not about money. It is about instilling an entrepreneurial attitude and an attitude of confidence in people and society as a whole. That is about communication as much as it is about money. It is about ensuring that people have the attitude and the skills to be able to deliver on it.
420. **Mr Frew:** Thank you very much for the presentation and your answers. I will name-drop a few businesses in my constituency. Willie Wright of Wrightbus is very vocal on where further and higher education should have gone 20 years ago. What he said then is taking place. There are other industries and large companies around Ballymena, such as Japan Tobacco International (JTI), Michelin and Moy Park. They all say the same thing, which is that, for years, the further and higher education facilities looked down towards their student base rather than up to their business base. What is happening now is the

- realisation of Willie Wright's dream. He has always talked, and probably more so in the past seven years, about the skill sets that people leave school with, especially numeracy and literacy skills. You talked about the additional skill sets that companies need above that, with regard to office work and so on. How big a problem is it? Do you recognise it as a problem? Is there a vacuum or void in the numeracy and literacy levels of our young people?
421. **Mr Webb:** It is well known that significant numbers of young people are coming out of school without having attained a grade C in GCSE maths. Although that number has been declining, it still is a hugely significant number. As a college, we have 8,000-odd enrolments. Across the whole sector, 25,000 students are enrolled in essential skills courses to get them to a level that we really should have had them at when they came out of school. It is a significant problem, and we are playing our part in addressing it. There is no doubt that, if we had students coming to us with a grade C in GCSE maths, it would be easier to push up attainment levels in the college. DEL has been focused on it, and it has had a very high priority in that Department. It has had a very high priority in this college, and the Department of Education is very focused on it. It is absolutely a top priority. Also, in addressing this, we find students coming in with not just educational problems but a wide range of social and financial problems that, quite frankly, have more impact on them not attaining *[Inaudible due to mobile phone interference.]*.
422. **Mr Frew:** I see that you have a wide range of engagement with businesses across the island of Ireland, and that you have enrolments from all over the Province. What makes people come from other areas of the Province to this college? If it is because you prioritise one subject or a series of issues, what are the other colleges doing throughout the Province? Do they have niche projects or markets?
- How does that network together in a Province-wide scheme?
423. **Mr Webb:** If you look at enrolments for other colleges, you will, to an extent, see the same sort of pattern. However, we run courses that some other colleges do not run, as do they. Students will travel to go to those courses because there would not be enough demand to warrant a course in each college. That is easier to do for level 3, level 4 and level 5 courses, but at lower levels, people will not travel or cannot afford to travel distances. You will see from the breadth that people are travelling that it is probably at the higher levels of provision rather than the lower levels. We need to have campuses that are accessible to the local population without them having to travel too far.
424. **Mr Frew:** My final point is about the construction industry. Do you feel that the construction industry is adapting to renewables with the bad time that it is going through, and, although it pains me to say it, there being no real sign of recovery? Do you see that drive there? Also, what interaction do you have with the agricultural and agrifood base with regards to adapting in this very worrying climate? We have been talking about renewable energies, and we have targets of 40% in the strategic framework, but I am one of these people who believe that you cannot convince a household to go down this route unless it costs them money not to have it or it saves them money by having it. Until you convince them of the pound in their pockets, renewable energy and the environment does not really come into it. Do you see enough change happening in the construction industry and the farming community?
425. **Mr Keating:** Some change is happening, although I am not sure whether there is enough. There are opportunities around two or three areas. I mentioned the renewable heat incentive that is coming in, and I think that will create demand. With demand, I think there will be the potential for jobs and reskilling people in those areas.

426. There is a potential around the green new deal, but by the same token, housing associations are forwarding the agenda on fuel poverty. That is going to require skill sets and upgrading and regrading. It is also going to capitalise on new skills in the construction industry. There is the potential also of offshore working in the Irish Sea and beyond, which is a massive market in maintenance. As I said, the skill sets in the construction industry around budget management and laying cables are transferable as foundations would be needed in the seabed, and I think we should be doing more to open up those opportunities to the construction industry. There are opportunities, and I think there will be an opportunity for the construction industry to diversify by going into renewables and various workstreams.
427. **Mrs Overend:** Thank you very much for your presentation. It was very interesting. I feel as if I am back on the Employment and Learning Committee.
428. On work placements, it was very interesting that you are working more with charitable organisations. It often seems to be the case that you work with large organisations because it is easier to find placements. How are you finding working with smaller businesses? Is it possible to change their mindset to the same as that of the charitable organisations? Maybe they could get more done if they took people on. How are you finding that?
429. **Mr Webb:** A significant number of our placements are with small businesses. In our Training for Success and ApprenticeshipsNI areas, we have training support officers who engage directly with small businesses to endeavour to get placements. The officers engage with businesses during the placements to ensure that the students are getting the benefit of the placements and that the employers are happy. That presents opportunities for us to develop wider engagement with the businesses. That is something that we have been doing, but we recognise that we need to do more in that area, because, at the minute, those training support officers are focused on the placements. Obviously, we need to expand that to make placements more fulfilling for small businesses. That is an area that, as a college, we are working on to help improve the service that we are giving to small businesses so that the staff who are engaging with them on placements are able to offer them help and advice or signpost them to where they can get additional help and advice, and give them encouragement to employ more people.
430. We find that, when a business takes a student on placement, it ultimately moves towards employing them because it has had time to see them developing in their workplace. You can see that significant numbers of students, having been through placements, do get jobs.
431. **Mrs Overend:** I was most impressed by your links with businesses and your ability to respond to their demands. How is your careers advice adapting to reaching into schools and the community? How are you getting your message through? Are you working on that as well?
432. **Mr Webb:** Increasingly, we are working closely with schools through the area learning communities. There are area learning communities across Northern Ireland, and in north Down there is a particularly active one. That is an opportunity for the local colleges and schools to get together to look at how they are going to deliver on the entitlement framework. That also gives us an opportunity to engage with the schools on careers.
433. Careers advice is also about helping to form the curriculum that students should consider and be offered. Through that process, we are working with schools to help inform them about what we see as career opportunities for students and routes of study for students. In the 45 schools that we are dealing with, not just in the south eastern area but in greater Belfast and beyond, 11 of which are grammar schools, we have seen them changing their curriculum to take

- account of what we are suggesting. The curriculum is becoming more focused on what industry needs.
434. **Mrs Overend:** Very good. That is very interesting. I want to make one final point about the Department of Enterprise, Trade and Investment (DETI). Is Invest NI helping you in any way? How is it supporting you?
435. **Mr Keating:** The relationship with Invest NI has become quite strong over the past three or four years, and certainly since the merger. There has been better recognition that further education colleges can contribute to Invest NI's strategic aims and objectives and to the economy. In particular, we have strong relationships in areas such as environmental matters and renewables. We are working with Invest NI at all levels, and the working relationship is a good one.
436. **Ms J McCann:** I apologise for missing the beginning of your presentation. You mentioned the need to work together with business and to encourage young people to take up STEM subjects, because of the apparent decline in uptake. I was interested in what you said about the impact of an individual's social and economic background on their studies. You are obviously setting out a clear pathway for the jobs that are going to become available in the future, which represents common sense and is good practical advice.
437. The diagram in your brochure shows that, for the most part, enrolments for the STEM subjects are low in socially and economically deprived or disadvantaged areas. You mentioned the location of the colleges; is that the reason for low enrolment? Is it because people cannot afford to get to them, or that no transport is available, or is it because further education is undeveloped as a whole? Do we need to look at the types of subjects that some of the other colleges are delivering? It seems to me that you are delivering a focused subject range. I know that you deliver other things, but I am interested in building the STEM subjects. Is there a disconnect from some of the other colleges in other areas?
438. **Mr Webb:** All the colleges are focused on the priority skills and on improving the STEM subjects. You will have seen that there has been an increase in priority skills and STEM subjects across all the colleges. The grammar school sectors have been stronger in STEM subjects than the secondary school sectors. That is why we, as a college, have been keen to look at the mix that we are providing under the entitlement framework, and, perhaps, look at giving further opportunities for pupils in secondary schools, which tend to serve more disadvantaged areas, to engage in the STEM subjects at an earlier stage. That is very much part of the process that we are developing to improve opportunities for students to study STEM subjects. All the colleges are focused on that.
439. **Ms J McCann:** Why is there such a low uptake in Belfast?
440. **Mr Webb:** I am sorry; I should say —
441. **Ms J McCann:** Is that just the uptake in your colleges?
442. **Mr Webb:** Those are the enrolment figures for our colleges. They show that, although an individual may live in Belfast, they may choose to attend one of our campuses. Belfast Met has a similar map that shows students coming from the south eastern area being in Belfast.
443. **Ms J McCann:** Are they enrolled on similar programmes?
444. **Mr Webb:** There are similarities, but the answer to the earlier question is that each of the colleges has areas of specialism. Up to and including level 2, you will find that all colleges will, in the main, offer the same provision. Above level 3, there are differences between colleges that reflect those areas of specialism. We provide a huge amount of information, communication and technology (ICT), for example, in comparison with other colleges that offer different subjects.

445. **The Chairperson:** During the week, I met Mr Jim Nicholson MEP, and he is very keen on the further education colleges working together on research and development. He feels that Northern Ireland as a region is too small to indulge in a fragmented approach to research and development and that that applies not only to what I have termed pure research but to applied research. It is a strong point that he made to me, and he is looking at it from outside as it were and saying that this is what should be done. It was a strong message that he delivered, and I have sympathy with it. I leave you with that message.
446. **Mr Webb:** Collectively, all the colleges are keen to progress on further collaboration, particularly in the areas of research and development. More recently, we have been doing that in international work. Colleges Northern Ireland, including a representative from our college, was in Saudi Arabia recently, and Thompson has been in India. We have a sister college in Japan, Toyama National College of Technology, and students from Japan come to our college. There are a wide number of examples of the colleges collaborating and working together, and I see that further developing as we go forward. By the same token, individual colleges will further develop their areas of specialism individually and collectively. We will be much more collective operating as a sector.
447. **The Chairperson:** Thank you very much, and, once again —
448. **Mr Agnew:** Chair, can I ask a quick final question?
449. **The Chairperson:** Yes, of course.
450. **Mr Agnew:** Phil made a point about people's awareness of renewables, and, in one sense, it is a great strength of renewables that there are so many diverse technologies. At the same time, getting people to understand what is out there and what they should go for is a problem, so they may not start to try because it involves too much research. Do you have any ideas about how we can help that process?
451. You mentioned the importance of word of mouth; your neighbour gets in it and says that it is great. Obviously, poor-quality installation or the wrong technology in the wrong home damages the whole industry. Is there merit in seeking an industry standard, something like CORGI? Would that help to give people confidence in the industry?
452. **Mr Keating:** That was three or four questions. It is critical that there be industry standards going forward, both for installation and for where people are selling renewable energies. We see a lot of situations where people are selling renewable energies that do not meet the claims that they made. The strength of this college is its independence, and suppliers see that and are keen to have their products here. We can work with products and explain them. The Northern Ireland Housing Executive is piloting schemes around passive house and retrofit, and we are looking at ways to create an accredited workforce that it can have confidence in and at having auditing systems that can maintain that confidence level.
453. **Mr Agnew:** Thank you, Chair, for your indulgence.
454. **The Chairperson:** Thank you very much, Mr Agnew. Thank you, Mr Webb and Mr Keating, for your presentation and your answers to our questions. On behalf of the Committee, keep up the good work. It is very impressive, and this has been a very positive engagement.

1 March 2012

Members present for all or part of the proceedings:

Mr Paul Frew (Acting Chairperson)
 Mr Steven Agnew
 Mr Gordon Dunne
 Mr Phil Flanagan
 Mr Paul Givan
 Mr Stephen Moutray
 Mrs Sandra Overend

Witnesses:

Mr Ronnie Harrison *Aerospace Defence*
 Dr Leslie Orr *Security*
 Mr David Raymond

455. **The Acting Chairperson:** I advise members that briefing the Committee today are David Raymond, who is deputy chairman of Aerospace Defence Security (ADS) Northern Ireland, Ronnie Harrison who is Thales's technical director, and Dr Leslie Orr, who is manager of ADS Northern Ireland. I apologise on behalf of the Chairperson, Alban Maginness, who has probably just passed you in the corridor, but he has had to go to another engagement. Members have put me in his place for the rest of the meeting. You are very welcome to the Committee, gentlemen. Without further ado, if you have a presentation to give, please be our guests.
456. **Dr Leslie Orr (Aerospace Defence Security):** On behalf of ADS, I thank you for the opportunity to share our thoughts with the Committee. I will say a few words and then I will pass over to my colleagues Ronnie Harrison, who is from Thales, and David Raymond, and both of them are members of ADS.
457. I will talk through my paper and pick out some items. ADS is the trade body for aerospace defence and security. We represent 900 companies across the UK. We established here in Northern Ireland in 2010, and we have 45 member companies here. Those companies represent 7,500 employees, so it is a key sector in Northern Ireland.
458. The aerospace, defence and security sector in the UK contributes £23 billion to the economy in the UK. The sector invests £1.7 billion in research and development (R&D). Therefore, it is a big part of the economy. The UK has 17% of the world's market share in this sector alone. The defence sector employs 314,000 people, and R&D in the sector accounts for about 8% of sales.
459. The space sector is growing by 10% a year. In the UK, it contributes £7.5 billion to the economy. The security sector contributes about £2 billion to the economy. Therefore, all those sectors together across the UK are a very big part of the economy.
460. In Northern Ireland, we did a survey last year, and I will pass round a copy of it. The four parts of the sector contribute about £1 billion to the Northern Ireland economy, so it is a key sector. As I said, it employs 7,500 people. In Northern Ireland, R&D in the sector is about £34 million, which represents 3.5% of turnover. Therefore, the figures back up the findings of the Committee that R&D in Northern Ireland is 3.5% of sales, whereas, in the UK, it is 7% of sales. Our goal is to increase the business for ADS Northern Ireland members and to increase investment in R&D.
461. Many of the projects in this sector tend to have a long lead time. It can take up to 15 years before investment in an aircraft is recouped. So government investment is required to make such programmes work.
462. That is a little background. I will pick up on some of the questions that were raised in the consultation paper. What opportunities were we aware of? We went out to our members in Northern Ireland and asked what investment opportunities they wanted and were

- aware of. Replies to question 1 included the response that they are getting and are aware of Invest Northern Ireland grants, as they are of grants from InterTradeIreland, the UK Technology Strategy Board (TSB) and European Union framework project 7 (FP7). All of the member companies were aware of those sources of help.
463. The second question that we asked our members was how appropriate those opportunities were. A number of companies said that a lot of resource tends to be required to respond specifically to EU funding. Only very large companies tend to benefit from EU framework 7 funding. The challenge is that Northern Ireland is, in essence, a country of small companies. We have a few large ones, but 90% of our companies are small, so they do not find that they can benefit from EU funding. That is one of the key responses from our members. Members came back to say that, going forward, we need to focus on funding for small to medium-sized enterprises (SMEs). My colleague David Raymond will highlight an opportunity we have found to do that.
464. Aerospace has been identified nationally as a key growth area for the UK. Business Minister, Mark Prisk, is leading the Aerospace Growth Partnership in the UK that ADS manages and in which all the aerospace companies are involved. Nationally, the Government are asking what areas and themes of aerospace research and development we should invest in, going forward. So, the Aerospace Growth Partnership is key, and many Northern Ireland companies, such as Bombardier, are already involved in that. As a local Assembly, you should be very much into that growth partnership. I wanted to highlight that aerospace is a growth area and an opportunity for us.
465. Of the UK's £23 billion revenue from aerospace industries, Northern Ireland gets £1 billion. Applying the Barnett formula, that £1 billion is twice what we should get, so we are bigger than we should be. We are twice the scale that we should be, but that is great, and there is opportunity for further growth.
466. I want to highlight some answers to question 5, which asks what the main barriers are to R&D. We found that lack of confidence in local companies in investing in R&D is one of the main barriers, specifically for small companies that are unaware of the global market opportunities. It is difficult for an SME to be aware of such opportunities and to invest in that R&D. We are trying hard to get companies to come with us on trade missions to find out about the worldwide market opportunities.
467. Other barriers that we highlighted in section 5.2 of our submission show that we found that many of the calls for R&D are not market driven. A lot of them are very much blue-sky R&D, and small companies feel that they need market-driven business opportunities that will return investments fairly quickly. So, market-driven R&D is very important.
468. The other factor in EU projects is that the time involved is excessive. It just does not work for a small company to have to wait a year before knowing whether it was successful in an R&D funding programme.
469. In section 6 we talk about what government can do. Our members said that it should simplify the R&D application process. It would be great if you could streamline that. They also said that R&D funding projects should be market-driven and that there should be investment in growth areas for Northern Ireland. The aerospace, defence and security sector is very much a growth sector for Northern Ireland.
470. I want to highlight the additional policies. A number of the companies that responded said to make sure that the Executive maintain R&D tax credits. Those are key for large and small companies investing in R&D. Tax credits have really been a tremendous boost for such companies, so they want to make sure that they are maintained.

471. How can business and academia work together? We feel that the new Northern Ireland Advanced Composites and Engineering Centre on the Airport Road, where business and university academia are coming together, is a key opportunity for companies to research and work together. I would like to take this opportunity to extend an invitation to the Committee to come down and see the centre as part of another meeting.
472. Before I hand over to my colleagues, I want to highlight an interesting opportunity that probably is not mentioned in the paper. It is about how the Northern Ireland Government can help with R&D, which is key. I think that there needs to be wise procurement. The Northern Ireland Executive buy a lot of things. Very wise procurement can help R&D in Northern Ireland. For example, last year, the PSNI needed to renew several hundred armoured cars for several million pounds. The contract went through, and a company outside Northern Ireland won that business. We then got the same type of armoured car that we have had for the past 20 years, which is heavy and not novel or fuel efficient. Through wise procurement by our Executive, however, there is an opportunity to place a research project with existing companies in Northern Ireland to design a new armoured car for the PSNI and to build it using the composite materials that our new composite centre can handle. Such a design could also create an export product for Northern Ireland. That is wise procurement, and we want to encourage it very much. Before the Executive buy something, they should think to themselves, "Can we get this designed locally through a commissioned project?" That is still in the works. We want to encourage that opportunity. Forgive me if we raised something that was not in the paper. I will now hand over to Ronnie Harrison from Thales, which is a large company, and then to David from a smaller company.
473. **Mr Ronnie Harrison (Aerospace Defence Security):** Good morning, Chairman and Committee members. We are very grateful for the opportunity to give you some thoughts from our perspective. Thales is a large company, with about 70,000 people around the world. We have a variety of divisions. Thales Belfast is part of the land defence division, which looks after advanced weapons systems, protected vehicles and optronics. So you get all those sorts of technologies in Belfast as part of our activity.
474. I really want to talk about R&D from the perspective of how the UK is handling it, the effect that that has on us and how we address it in regard to export and the export market, because those are two slightly different issues. I do not need to say to you that budgets are very tight and that the defence budget, in particular, has been attacked quite severely over the past couple of years, which has affected us as a company. Traditionally, we expected to get funding from the early stages of technology development right through to qualification, but that does not happen anymore. Over the past few years, it has been our experience that we have had to invest from the very beginning of a project to get it to demonstrator stage before, for instance, the UK Government is interested in offering a contract. That is quite a different model for investment from the one used in the past, where, as I say, we would have been given a clear requirement and a clear path to develop the technology and to bring it into service. That would then have been used as an export product to sell to other countries.
475. That model is changing because of budgets and because of the competition in the rest of the world. For example, over the past few years, we have invested many millions as a company in developing a new missile product and a new launcher platform product. That has got to the point at which, once it had a demonstrator capability, the UK Government were interested in offering a contract for taking it further forward. That is a challenge for us. The UK recognises that and has put in place

- the Weapons Technology Centre, which brings together all of the main players and prime contractors in order to get the best out of the money that the UK is spending.
476. The danger is that the UK provides the money to all of the various players and they all develop the same technology and get paid six times for it. That would never have happened in the past, of course, but the Weapons Technology Centre is trying to be sure that we have got the best value for money. By joining with industry in doing that, the idea is to give us confidence to invest against that funding. The Government are saying that the UK is really interested in that particular area of technology and will be prepared to fund that activity, but they want you to invest against it. We have targets in the UK to invest against funding that is provided for research and technology (R&T) activity. Thales is committed, and has been committed over the last few years, to spending in line with those targets. We have been investing and committing. It is still early days for that model of procurement, through which we are expected to put a lot of money in up front, as opposed to the traditional method.
477. The UK has been a challenge. There are things afoot to try to help us there, but there is still work to do. The export activity is different. In the past, the model was to develop a UK product and sell that overseas, but that is not happening anymore. It would have been the case that the UK product would have been at the top end of the performance range and very sophisticated, but not every country wants that sort of product. Therefore, it is difficult to sell it. What we have to do is invest separately in some cases to develop an export product. It might be based on the local product but developed separately. The big issue there is confidence. The issue in research and technology for big companies is never money; it is confidence, because, if it is 100% certain that they will get a return, they are going to invest. It is the same in the UK as it is in the export market. The challenge for us in the export market is to be confident that there is an actual opportunity there. That is one of the areas in which we are very grateful to the Northern Ireland Assembly for help. Even over the past few weeks, we have had a lot of help from Assembly Members in dealing with export opportunities to try to increase the confidence. When we have that level of increased confidence, we feel that we can invest and work against that.
478. We are also very grateful to Invest Northern Ireland, which plays a big part in helping us with that as well. There are many areas in which the risk would be too great for us to take on our own, and, although we take a high percentage of the risk and spend some money, in many cases Invest Northern Ireland has helped us to put that extra bit to the investment, which gives us a real opportunity as opposed to having the job half done. Invest Northern Ireland has been very useful in that model of working with a hi-tech company, particularly in our business, where the investment occurs over many years. It is not as though we invest for six months and the product is sold after six months. It often takes 10 years, or maybe five years, if you are lucky, for a system to come together. There is a long period of investment to get to the point of actually providing an export solution in those areas. We are very grateful to the Assembly Members here and to Invest Northern Ireland for their help.
479. We also work quite closely with the Electronics, Communications and Information Technology (ECIT) centre and the Centre for Secure Information Technologies (CSIT) at Queen's University in the Titanic Quarter, and we have managed to bring some business to them from other parts of Thales. For instance, we have a Thales research and technology centre in the UK and one in France, in Palaiseau. That centre in the UK is working closely with CSIT on research and technology to do with secure information technologies and communications technologies, so there

- is quite a bit of investment from that point of view.
480. In the export market we need confidence in the market. We need to be backed up in dealing with the export customers, and we are grateful for the help we have been given on that, but the more we get that, the more we invest and feel confident to invest.
481. One of the issues is EU funding. We have tried to get framework funding to Northern Ireland. That has been difficult for us, partly because of our defence business and partly because of the cumbersome process involved in getting that funding. In the past, you were required to get several partner companies across the EU, plus several universities. You can appreciate that in our business, with the sort of issues we are dealing with, it can be quite tricky to get the right sort of companies and universities to be able to do that.
482. We have helped with activities related to the Seagate-sponsored centre on nanostructures here in Belfast. Thales has put a proposal together with it to get funding, which has been achieved. However, in general, our own business does not benefit much from EU funding, and we have talked with Invest Northern Ireland a little bit about that.
483. In summary, we have been investing. We are being asked by the UK to invest more and to do so against targets that we are lining up with. In the export markets, we are challenged because of the confidence levels; we have Russian technology, Chinese technology and other technology competing with us, which is quite tricky. We appreciate the help we get from the Assembly, Invest Northern Ireland and Queen's, but we face a challenge where our business is going to be much more export focused and we have to spend a lot of our time investing in that.
484. **The Acting Chairperson:** Thank you, Mr Harrison. Mr Raymond, do you want come in?
485. **Mr David Raymond (Aerospace Defence Security):** Thank you very much for having us here to talk to you. We do not have 70,000 employees; we are a very small company. I am the chairman of a small aerospace design company, BASE, with 40 people. We do design and stress analysis and sell that information to most of the big manufacturers worldwide, including Bombardier. If you bear with me, I will run through the SME position, particularly with reference to aerospace, the opportunities that that presents and how R&D can and does affect that.
486. In a small business, you want growth, profit, security and a whole lot of things like that. We look at our economy and see opportunities of a certain scale and think about how we can get outside that. We are working with companies around the world, but we are at a small scale. We look around and the question is this: what we can do to get R&D to be more of a driver for exports to create more jobs, more wealth and more choice here?
487. I may be wrong, but 90%, 98% or 93% of the companies in Northern Ireland are locally owned and are SMEs of 10 people or more. Our company has 40 people; some of them have 200 people. However, looking at the aerospace sector, as Leslie said, there are 45 member companies on our council — ADS — of which I am the deputy chair in Northern Ireland. SMEs tend to focus on immediate issues and things that are important to them next week, next month or next year. That is not outwith research and development. A lot of the research and development happens within a company and is to do with how things can be done better. That is not viewed necessarily as research and development. SMEs sometimes regard such research and development as being technology or information technology and something that they do not do. In fact, they do it all the time: they are thinking about improving all the time and are thinking all the time of doing something more effectively, cheaper, better and more competitively. They tend to focus on more immediate issues for that reason. That is an issue

- of scale, which is something I will come back to.
488. Companies like that are, by the way, all very well run and strong and have an international reputation in a small way. They are engineering, manufacturing and design companies with a great future and make a great contribution to this part of the world. They may look at the funding streams for R&D, and, if they are lifting their horizons, they might be thinking, "Maybe we could talk to some of the people we know in Queen's and look at some manufacturing technology." They look at the process involved in that and look at a one-year application to the TSB, for example. I have met with Iain Gray, the chief executive of the TSB, in London several times and talked about this. The SMEs think about the applications and the fact that they have to get two or three partners in Europe. That is beyond their scale and capability, yet they could have something really good. Consequently, the idea is set aside, and they are back to square one.
489. From the smaller companies' point of view, if it is a technology company, it can work with the university. The company could have a piece of high-level technology, which is extremely valuable. It could work at it and develop it into intellectual property. It is often thought that the intellectual property is then sold on, goes away from here and the company goes on to develop another piece of intellectual property, which is really good. However, the 500 jobs do not come out of that; they go somewhere else.
490. When an SME or small manufacturing company looks at doing something better or more economically, it looks at its customers, such as Bombardier, Airbus and Boeing, who continually say that they want the work to go to India or China. Yes; however, there are only certain pieces of that work. Often, what local companies do is of higher quality. It is easier to make, maintain and repair. There is a great deal of innovation and technology in those companies. Growing that is crucial to our economy. Without that, we tend to dumb it down to how much we pay people per hour in order to compete. We cannot do that; it is not going to happen.
491. I looked at some information on the UK research councils. The UK Government gives them £4.4 billion a year. The Technology Strategy Board, which I mentioned a while ago, is not an easy house to visit to get grant aid from because of the duration of the application. Nevertheless, to our minds, it is seen as being practical and on the ground, helping engineering and manufacturing projects for R&D. They have something like 7% of that. It is the wrong way round. Nevertheless, that is where it is.
492. You could suggest that there are two solutions from the point of view of SMEs in Northern Ireland. I suppose that the first thing is to say is that focus should be on SMEs' needs. Well, perhaps not; perhaps focus should be on the market's needs. Nevertheless, SMEs need to have an easier way to access support for research and development in areas that will actually make their businesses different. That is a clear, sound and practical need.
493. However, the problem that comes out of that is that they, then, have to think of the scale effect. You still have a SME with 50 employees. It has invented something or has developed a new process. If it has something and needs to know how to get beyond it, grow it, get investment, buy new equipment, build that area, that is not R&D. That is a different aspect of business altogether. However, that is something that can stop it dead in the water.
494. Then, you look at collaboration. Can you get companies to work together? Yes, you can. There are many good examples of that. However, the problem still arises as to how to move beyond that. I have seen companies that collaborated with a university and, in one particular instance, with a competitor. They came up with something. They developed it. They are the same companies, with 40 50 or 100 employees, that are out trying to get business five days a week. They

- are out trying to manage their accounts. They are out trying to look after deteriorating markets. They are doing all of that while, at the same time, trying to do this. They exhaust themselves doing that. They came up with a good solution. At the end of it, their first thought is whether they can sell it to anybody, because the next peak, going beyond that, is to get investment, create new product lines and get the sales team that they do not already have to go out and sell it to people who said tentatively that they wanted it. That is a hell of a hill to climb.
495. Given all of that, about a year ago, we started to look at how we could improve that, not purely for R&D, but to address the overall opportunity of which R&D is a significant part. With the help of ADS and others, we did a number of things. We started to look at what some of the major customers wanted and at collaborating. We got six interested companies together in Northern Ireland. They are six Northern Ireland-owned companies. They already sell in the aerospace circuit and in other sectors as well. Between them, they have turnover of around £50 million and around 600 employees. BASE is one of them. We started off with those companies and asked what interest we could generate in the major world aerospace brands in order to create a new business here that could move up the R&D scale, bring in investment to help us to do that and could also partner some of those companies.
496. We have had considerable success with that. We are already talking directly to Spirit AeroSystems. Two weeks ago, its vice president, directors and head of research and development visited here for the first time. They spent a day here, and they visited Invest NI. They had never been to Northern Ireland previously. That company has a \$5.3 billion turnover. It has 1,000 employees in Prestwick, which is just across the way. It has factories in Wichita, Saint-Nazaire and Malaysia. You might say that it will do all of its work in those places. No. Its strategy is to look for high value in the UK and in western Europe. Northern Ireland is strongly on its radar for manufacturing, and we are also talking to it about research and development. It can see that there is a scale here that it can become engaged and interested in doing business with.
497. We talk to Bombardier regularly. It has expressed a keen interest in working in partnership with us in R&D. Again, it has got to be on a scale. It cannot do that easily with a company of 10, 20 or 30 people, because of all the problems that we mentioned earlier. Bombardier has a turnover of \$8.5 billion.
498. Goodrich has a partnership with Pratt & Whitney engine makers, and it has a turnover of \$6.3 billion. I mention those numbers because it is evidence of big business and of access to opportunities that we do not have at this time. Those companies are talking to us about manufacturing and specifically about research and development opportunities. We have got to get to a sufficient scale to be able to access the funding and the partners who will work with us to help us to bring our businesses up to a higher level of competitiveness in the export market. That is our view of R&D in Northern Ireland in the aerospace industry.
499. **The Acting Chairperson:** Thank you very much, gentlemen. Before I open it up to other Committee members, I have a couple of questions. It is clear that there is a lack of confidence in SMEs, and all three of you mentioned that. That is not necessarily the case with your company, but it is overall. You said that a lack of market awareness is a symptom of that. How do we get round that and build confidence in the SMEs? You said that those companies are doing sterling work in the day-to-day running of their businesses. They are looking at tactics for the weeks, the months and the year ahead but are not maybe taking a strategic view, either because they do not have the capacity or are too busy with that day-to-day stuff.
500. **Dr Orr:** I will start off on that question. There are a couple of angles, and we

- need to get the companies to look outside Northern Ireland. A lot of that could be done through their attendance at trade shows and missions, and we need to get them to go on those. Invest Northern Ireland has trade shows and missions, but we need to focus more on aerospace defence and security. The Farnborough International Airshow is the biggest air show, and I believe the Prime Minister will open it this year. That is a key sales ground that we need to get the local companies to attend. A number of companies participate, but we need more to do the same. David talked about companies coming together. It would be key if those companies were able to come together and look outside Northern Ireland.
501. **Mr Raymond:** Leslie is absolutely right. Many of the companies go on trade missions and that is a key and important thing for them. However, often they do not follow that up. They put all their efforts into preparing for those trade missions, they go and come back and say to themselves, "That it is good, I met all those people, but what about that machine? Is it still working?" It comes back to the point about having a lack of resources to allow them to drive their companies forward. Some companies pull out all the stops and slowly grow and accelerate. However, I am talking about the overall picture.
502. I think that Leslie would agree. One of our companies — I cannot name it — has a turnover of around £7.5 million a year, and it is a very successful Northern Ireland company. Representatives of that company have told me that they have visited trade shows and have met other companies who tell them, "That is very interesting; we will see you next year," but nothing further happens. It needs the strength and the power of the sales team to follow that up.
503. Your question was about how we encourage companies. Most successful SMEs are either stressed because of a lack of orders and that is their only interest, or they have so much work that they can just about handle it and are equally stressed. It is cyclical. Those companies swing from one of those places to the other, and they are trying to manage it. To get them interested, we need to lift it to another place. I talked about collaboration, and that is one way of doing it. However, for government, it is about opening the eyes of those companies to what they can achieve and getting them to step up, join with others and try different things. You could talk to them all day and tell them that they should be doing R&D and they should be interested. They will tell you that you are absolutely right. However, given the scenario we have, we need another business model to help us to do that.
504. We are being helped by Invest NI to build that collaborative arrangement, so I give it credit for that. It has taken time to get it to the table but it is doing it, and that is fine. At the end of the day, more issues like that, where companies are able to come together to collaborate and bring their strengths, will get them interested like nothing else will get them interested, short of going and giving them a whole lot of money to do it.
505. **The Acting Chairperson:** You talked about the plans Invest NI put in place to assist. Is that enough to integrate EU funding into a Northern Ireland plan? Do you see that being of real product or does something else need to happen that is not happening? Do you see the work with Invest NI achieving something of greatness here?
506. **Mr Raymond:** The nature of our business spectrum is SMEs. Thales has been talked about, and, with respect, Bombardier, Wrightbus and organisations like that have the scale and can deal with that. They manage Invest NI and the Technology Strategy Board very well because they have the strength to do that. A lot of companies do not have that. You can give them advice but they know their own business. Listening to them carefully and making investment in R&D easier for them to access is absolutely critical. Unfortunately, maybe because Invest NI does not have control of TSB in all those things, a lot of that help is in how to work through this ridiculous process,

- which lasts a year but that they have to get through.
507. **The Acting Chairperson:** A number of you spoke about simplifying the process through streamlining. Will Horizon 2020 help that?
508. **Mr Raymond:** I do not know enough about that to be able to say.
509. **Mr Harrison:** From our perspective, most of our customers are government customers in other countries. So, the likes of Invest Northern Ireland is very helpful because it acts as a local government organisation. The exposure we spoke about operates on two levels. One is through trade shows and things like that and the other through trade missions. We all go to normal shows such as the Farnborough and Paris air shows. The level below that, however, when you are engaging with the R&T communities as opposed to just the companies, is where Invest Northern Ireland can help at times. We certainly had engagement with R&T communities in other countries across Europe with its help, which then gets us access to companies involved in that community that, perhaps, we would not otherwise have seen.
510. There is a process to be gone through with Invest Northern Ireland but it is not half as complicated as the EU process. I appreciate that there are forms to be filled in and committees to be gone through but if it is worth it, it is worth doing that. For a bigger company, I suppose that it is usually worth doing that, although I appreciate the issue of SMEs, etc.
511. **Dr Orr:** We do not know enough about Horizon 2020 yet but, because we are a nation of small companies, it would be good for Northern Ireland if the Executive highlighted how a region with small companies could benefit more from EU funding. That is key because we are not getting our fair share.
512. **Mr Raymond:** Iain Gray, chief executive of TSB, was brought over by ADS last year. I followed up and met him a few times in London. He said that they have £300 million a year to disperse and we are not getting our fair share of that. So, knocking on the door and talking to him, the picture was, "Well, this is our process and this is what you need to go through." That is fine but we need to have a way to make that amenable to SMEs but not as a policy, as in, "You must make this amenable to SMEs." It is about making it amenable to good business ideas, good collaborative ventures or to three or four companies coming together to try something. The key to it is making that easier to do, because if you keep driving it to the individual company, you are not moving away from that but coming back to the same problem all the time. The guy with 20 to 30 employees is limited in what he can do. We need to lift him up the scale a wee bit and give him a chance to be able to do that. Instead of coming together with someone in Germany, someone in France and two universities, let him come together with some of his colleagues around the countryside, or maybe someone in Scotland. He should aim at something that is workable and achievable, and then go for it; no question about it.
513. **Mr Agnew:** Thank you, gentlemen, for the presentation. Dr Orr, you mentioned various streams of financial support, including FP7, Invest NI, InterTradelreland and a UK funding stream that I did not get the details of. Do you have figures as to how much each support pays into the industry, and how dependent the industry is on that support?
514. **Dr Orr:** I did not get a breakdown of what companies are getting from each region but, with regard to EU funding, I was surprised to find that a firm even on the scale of Thales in Northern Ireland is not benefiting from EU funding. There are only one or two firms, small numbers, benefiting from it.
515. A lot of companies responded that, yes, they are working with Invest Northern Ireland and some with InterTradelreland. We are trying to get them more engaged with the Technology Strategy Board, and we had a number of events where we

- brought the Technology Strategy Board over here. The companies are absolutely dependent on the source of help to move forward.
516. **Mr Agnew:** I appreciate that you do not have the figures. Can you give us rough proportions?
517. **Dr Orr:** I do not have a breakdown.
518. **Mr Agnew:** That is fine.
519. You mentioned support for Queen's University a number of times. Where does that support come in? How does it fit in with the picture?
520. **Mr Harrison:** From our point of view, one of the centres of excellence at Queen's is aerodynamics, so we have a lot of connection with the aerodynamics chair and we provide lectures to Queen's as a part of that. The linkages include making sure that Queen's use the same tools as we do, so that we can outsource work to it to allow it to do academic and even postdoctoral activities. We sponsor those activities to help that community develop an expertise that has exploitation routes. That also helps us. We have provided quite a bit of sponsorship to do postdoctoral-type work in areas where we either would not have the time or would not be prepared to devote the level of expertise to over time. That is part of the engagement that we have with Queen's.
521. There are other areas too, such as the communications and information technologies people. They do research into things like systems on a chip. Those are very high-tech small electronic processing units that are very useful to us. We look at that. They also have a lot of activity on image processing and that sort of thing. So, there is interaction. It is not just Thales here in Belfast that has direct contact with Queen's University but Thales in the rest of the UK.
522. **Mr Agnew:** Let me just ask one final question. Export was mentioned. Obviously, exports are key in this industry, and indeed, in the economic strategy, growth through exporting has been highlighted as key target. Are there particular countries that you target when you are looking at trade missions? Are particular countries the best areas to export to, or which you would seek to target for exporting?
523. **Mr Raymond:** As far as Aerospace is concerned, anywhere, basically. Obviously, it is not just anywhere, but America, Asia, India, China, Europe — everywhere. Leslie has the figures. The expansion of the commercial aerospace industry is so great and widespread across the world. It is the one place that we have to be. Without question, if we could build our business there, on its own, it could transform the Northern Ireland economy. China will have a bigger middle class in the next 20 years than the enlarged European Union. Those people will want to visit their grandmothers. They will only do it one way, and that is on a plane. That is very simple. Some 35,000 new aircraft will be needed over the next 20 years. That is new aircraft, apart from the ones that are being maintained, fixed, refitted and all that sort of stuff. It is not going away; it is growing and it has huge possibilities for us. With regard to which country to go to, they have a lot of people in their industry.
524. **Dr Orr:** Page 14 of our booklet highlights exports of £86 million in this sector from Northern Ireland, which is for sales right across the world. As David said, a number of sectors are suffering as a result of the financial downturn. In this sector, however, passenger numbers are growing at 5% a year. The business is expected to grow from a current worldwide market of £200 billion, where we have £1 billion of that £200 billion, to £300 billion in 10 years' time. If we are to maintain our current Northern Ireland market share, it will require 3,500 new jobs. Our goal is to increase that. Our goal is to do more than maintain our market share. There is real opportunity in the sector.
525. **Mr Harrison:** With regard to emerging countries, clearly China is an issue, as is India. There are the BRIC countries — Brazil, Russia, India and China. In

- our industry at least, we found that there is a challenge to R&T, because most of those countries expect us to transfer technology of some sort as part of the deal. So, we have to protect that by ensuring that we do the R&T efficiently here in Northern Ireland. Increasingly, therefore, we are faced with the situation of being given a contract, but we are expected to give a level of technology in return. We like to stay ahead. Investment in R&T in Northern Ireland would allow us to do that. It is important to us as a company, but it is also important for Northern Ireland to stay ahead of those other countries that are hungry, not just for the product, but for the technology and the know-how behind it. It is a big challenge for us.
526. **Mr Agnew:** I asked Dr Orr about financial support. How much does your company receive from the various support streams, and how vital are they?
527. **Mr Harrison:** The help that we get from Invest Northern Ireland is certainly very important. It is a percentage of what we do. We invest a lot more than we get. However, it is important to us, and it is in those risky areas at the front end of the technology streams. It is not down to the production end; it is not quite blue skies, but it is the grey skies before you get to the hard-nosed production area. That is where we get the help. We have a thing called the valley of death, which is where you have a good idea, it gets a little bit of work done in the laboratory, but it has to get to market. The valley of death is where that idea dies and you do not have the funding, or you have a little bit of the funding but you do not have it all. That is where Invest Northern Ireland can really help.
528. **Mr Flanagan:** To follow on from Steven's point, initially, we were told that companies are absolutely dependent on that funding to move forward. Do you agree with that statement, Mr Harrison? You said that it was very important, but someone who spoke previously said that companies were absolutely dependent. Would you say that your company is absolutely dependent on the funding it gets from Invest and other funding streams?
529. **Mr Harrison:** It was important that Invest Northern Ireland gave us assistance and help at the front end of the business. Without it, we would not benefit from being able to develop products that are competition-beating. We could probably keep up with the market, but we could not move ahead. It is the additionality that Invest Northern Ireland brings that allows us to make that step ahead of the rest of the market and keep the business moving forward.
530. **Mr Flanagan:** The graph on page 14 shows that 44% of the exports that leave Europe do not go into America. Where is the majority of that 44% going? It is an amazing statistic, and it is probably an anomaly for any industry here that nearly half its exports are not going to Europe or America.
531. **Dr Orr:** What I highlighted there was very much the US or the EU, and we have bucketed everything else from Asia to Latin America to Canada, which, as far as Bombardier is concerned, is quite a big shipment. It is really the rest of the world.
532. **Mr Raymond:** I will give you an example. Our company base has a co-operation agreement with an Indian design company that sells to Bombardier. That company employs us to do highly specialised work that it cannot do.
533. **Mr Flanagan:** That is fine. It is a strange statistic when you look at other sectors where at least 70% is normally in the EU or America.
534. **Mr Raymond:** You are right, but that reflects the truly global nature of the business. In all continents, it is strong and growing.
535. **The Acting Chairperson:** It could be true to say that we are trying to encourage those companies to spread globally. That is where they will see their growth.
536. **Mr Raymond:** It is the right business to do it in because there is national need for the company that is buying it.

- If someone wants to build aeroplanes, we partner with them and help them to do that and design them. They want to operate profitable airlines and want their population to be satisfied that it can travel and has freedom of movement. So, all those things work for them.
537. **Mr Flanagan:** I have another couple of questions, but I will be brief. Other organisations that have appeared before the Committee, such as further education colleges and the CBI, were very straightforward in the type of work that they do. Can you give us some practical examples of the sort of research and development your organisation carries out? What is the benefit of that research and development?
538. **Mr Raymond:** In design work, we are looking at ways of manufacturing composite components for aircraft that are more resistant to damage and more easily repairable because it is a new material, relatively speaking. That is very important to companies that want to make lighter aircraft that are cheaper to run, etc. That is in the early design phase.
539. On the other side, very often, small engineering companies in Northern Ireland are in a build-to-print situation. In other words, they are given information and told that they have to make 10,000 of those products. We are looking at that and asking how they could be redesigned slightly to be more effective, easier and more economic to make. That directly competes with low-cost economies in doing that. Those are two things that are at different ends of the spectrum. It is not as sophisticated as Thales, but it is looking for the same result at the end of the day.
540. **Mr Flanagan:** Is that largely in the aerospace industry?
541. **Mr Raymond:** In my case, yes.
542. **Mr Flanagan:** Do you have anything to add in respect of security and defence, Mr Harrison?
543. **Mr Harrison:** There is a crossover between the aerospace industry and our industry. We have done work with the likes of Queen's University on novel ways of controlling an aircraft. Conventionally, that is done using flaps, rudders and elevators, but there are novel ways of doing that by getting rid of those actuators and using airstreams or other more efficient devices that cut down the cost, reduce the weight on the aircraft and reduce the weight on any other flying object that we manufacture. So, there is a range of front-end technologies like that.
544. We are also involved in a variety of products that have commercial and defence application, such as laser technologies, which you can find everywhere when you walk around the supermarket. Those sorts of technologies have dual use, so we tend to be involved in those as well. So, it is a very wide application.
545. **Mr Raymond:** The other aspect is that an aircraft has a 20-year lifespan, and an awful lot of things happen to it during that time. A lot of retrofitting and change takes place, and a lot of R&D that is done is put into them later to make them more efficient. For example, aircrafts get new engines to make them more effective. So, the R&D work is quite broad in its scope.
546. **Mr Flanagan:** Is much research put in to finding out the impacts of the more controversial products that the industry designs and uses, particularly the Starstreak missile, which is listed on page 10? What sort of research and development is done to find out the impact that it could have on people who might turn out to be innocent casualties of war in far-flung corners of the globe? Is that something that your company looks into, or is that left to national governments to deal with?
547. **Mr Harrison:** First, I have responsibility for safety and environmental effects in respect of the products. The first thing is that they have to be safe for the general population. In other words, in peacetime, they have to be safe and not harm

- anybody. Secondly, environmentally, they have to be manufactured using a clean process, and, even after they are used, the effect on the environment in other ways than were originally intended to has to be in line with all the green technologies etc that are around. Yes, we design from the point of view of safety and environmental impact.
548. **Mr Flanagan:** So, it might wipe hundreds or thousands of people, but, if it does not cause any damage to the environment, it is ruled all right by your company.
549. **Mr Harrison:** We provide to a requirement. Our company is providing to a customer. As a company, we simply provide to a requirement, and any Government around the world can ask for that. On a point of correctness, the Starstreak missile is a precision system.
550. **Mr Flanagan:** I understand that.
551. **Mr Harrison:** We are not talking about the nuclear industry here or anything like that.
552. **The Acting Chairperson:** I will have to pull it back to R&D and the business opportunities that the companies have.
553. **Mr Dunne:** We welcome ADS here. It has been an informative and hands-on session, and we really appreciate it. As a Committee, we express our thanks and appreciation for the good work that you are doing, and the input that that has on the local economy needs to be recognised. We also appreciate your comments on the work of Invest NI. The MLAs in the Northern Ireland Assembly have been supportive of your work. We will also make sure that the Minister is made aware of it, and I know that you appreciate the work of Arlene Foster and the commitment that she has made to you.
554. Most of the issues have been covered. I know Thales very well, having worked alongside it in my previous employment. I recognise the good work that it has done. It works to high-quality standards and is very professional. It is renowned for the work that it has done throughout the world. Ronnie, the points have been well made. Our main objective is to ensure that the next phase of funding is simplified. Do you see Thales locally getting involved in making applications for funding in R&D in the future?
555. **Mr Harrison:** Yes. In fact, our general approach to R&T is that we take a strategic view. We try to do three-to-five year involvements. The company commits to saying what its strategic plan is, and we will share that with the likes of Invest Northern Ireland or some other group and invest against that. Our plan is always to think strategically. It is not just to do the short-term stuff, but to ask, over this period of time, what we can guarantee on our commitment to R&T locally and to jobs. In line with that, we leverage funding that is available to us. We intend to invest, and we already have plans in place for the next three years.
556. **Mr Dunne:** Good. Leslie, you talked about Bombardier. Has it used that funding in relation to its technologies? We are aware of the leading-edge work that it has done on composites.
557. **Dr Orr:** Bombardier has participated in and benefited from EU funding programmes. It is one of the few companies in Northern Ireland that is benefiting from that.
558. **Mr Dunne:** David, as you mentioned, the problem is that the existing system is too complex, cumbersome and off-putting for SMEs. Is there a risk for SMEs in collaborative working because you let your neighbours know what you are doing?
559. **Mr Harrison:** That is good question. The problem is not so much that, but, if people come together, they collaborate not only to do R&D work but to win bigger pieces of business. Doing R&D work is part of that, and that is seen as part of growing a bigger business for the group, rather than me looking at what he is doing and him looking at what I am doing. It is this business of taking it to the next stage so that, if you have three or four companies working together on finishing, machining and design,

- they are talking to manufacturers on a bigger scale. They are saying that they would like to bid for much bigger packages of work, involving tens of millions of pounds a year, rather than a few hundred thousand pounds a year. Therefore, they are also listened to quite strongly by those manufacturers, and we quoted Spirit, Bombardier and Goodrich as examples. Those companies could look at doing some collaborative R&D work with us. So, the tension between the companies is not like that in that instance. That is why that is probably the best model to take it forward with. I understand that small companies find it difficult to talk to each other at the best of times about what they are doing. So, it is advantageous to lift it out of that scene.
560. **Mr Dunne:** We have talked to a number of further education colleges — we had one in before you. Do you see where they perhaps would have a role in training staff and running training and development programmes on how to access European funding? Is that a possibility or something that is worth checking out?
561. **Mr Raymond:** I do not see any problem with that. Anything that simplifies it is good. My only caution is that, if you have a complex thing to start with, investing talented people's time in working out how to work through that complex thing is advantageous to the beneficiaries. However, finding a simpler way to do this has got to be more useful. We have examples of large companies that have failed. We have worked in parts of Bombardier and, on occasions, failed to get access to large funding, and Bombardier is no mean chicken. When that happens, what hope do you have for a small company doing it? I do not know; I think that it would be useful to look at that, and —
562. **Mr Dunne:** It is worth exploring.
563. **Mr Raymond:** — to explore it. Yes.
564. **Mr Dunne:** We should be thankful for the good, positive comments about the work done by Invest NI in particular. We often hear the negative stuff, the bad news, but thank you for the positive comments.
565. **The Acting Chairperson:** Thank you, Mr Dunne, and all members for the questions, and you, gentlemen, for your informative answers.
566. **Mr Agnew:** May I ask a final question?
567. **The Acting Chairperson:** As long as you are brief. People need to get away and we have quorum issues.
568. **Mr Agnew:** I need to get away, so I appreciate that.
569. Mr Harrison, to come back to Mr Flanagan's point about where products are exported to, are there any conditions on the public funding that you receive? For example, exports to oppressive regimes with which the UK on one hand may have trade barriers but on the other provide public funding.
570. **The Acting Chairperson:** I am going to —
571. **Mr Dunne:** That is not relevant.
572. **The Acting Chairperson:** If the gentlemen wish to answer, that is fine. However, the question is really not about R&D or the business opportunities that we are here to discuss.
573. **Mr Agnew:** It is about funding by this Department, Chair.
574. **The Acting Chairperson:** Again, I do not feel that it is appropriate for today's agenda. I want to draw back on that, if I may. You are free to ask about it after the meeting, Mr Agnew. I just do not want to lose the present focus on R&D.
575. Gentlemen, thank you for your time. I wish you all the best for the future.

1 March 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Steven Agnew
 Mr Gordon Dunne
 Mr Phil Flanagan
 Mr Paul Frew
 Mr Paul Givan
 Mr Stephen Moutray
 Mrs Sandra Overend

Witnesses:

Mr Damian Duffy *Belfast Metropolitan*
 Mr Justin Edwards *College*

576. **The Chairperson:** Briefing the Committee today are Mr Damian Duffy, director of business generation and learner services, and Mr Justin Edwards, assistant chief executive, of Belfast Metropolitan College. Gentlemen, you are very welcome. Please make an opening statement and then we can move on to questions.

577. **Mr Justin Edwards (Belfast Metropolitan College):** Thank you. We are delighted to be here today to meet the Committee and to take the opportunity to share our views on research and development and innovation. My name is Justin Edwards, and I am the assistant chief executive. I represent Marie-Thérèse McGivern, the chief executive of the college. I am joined by my colleague Damian Duffy, director of business development and learner services. Between the two of us, we will take a moment to outline the college's contribution to the agenda.

578. I know that many members of the Committee are aware that the college was founded in 1906. It currently has 35,000 learners and an annual turnover budget of £54.3 million. We have 1,003 staff engaged in education and training over a very wide range of curriculum areas, from entry-level qualifications through to postgraduate qualifications at

level 7. Primary delivery is through our five main campuses, and our flagship campus in the Titanic Quarter opened recently. Our new Springvale E3 campus will be coming on line in April.

579. In terms of our provision, we have not only our five main campuses but a heavy engagement with industry, offering training and learning development through further and higher education with employers in the Belfast region and beyond. Our education provision reaches out to international work as well. With that overview, I will hand over to Damian, who will take us through the research and development and innovation side of Belfast Metropolitan College.

580. **Mr Damian Duffy (Belfast Metropolitan College):** For clarification, it is important to point out that we have added the element of innovation to the debate because we see that as part of an encompassing framework. Following up on the briefing paper that we submitted on our work at the minute, Belfast Metropolitan College is one of the most successful colleges in Northern Ireland and the United Kingdom in respect of knowledge transfer partnerships (KTPs). We have delivered over 20 KTP programmes to date. As Justin mentioned, we are about to open a brand new facility on the Springfield Road in April. It is a high-tech digital hub, a unique facility. The £15 million spend was supported by the International Fund for Ireland (IFI) and the Department for Employment and Learning (DEL). It provides us with new facilities for digital media, composite materials and renewables.

581. We collaborate with Queen's University and the University of Ulster on the Connected programme, which is managed by Colleges NI and focuses on bringing in expertise on innovation and product development to companies and small and medium-sized enterprises

- (SMEs). We have recently signed a memorandum of understanding with BioBusiness Northern Ireland to explore opportunities for sharing expertise and skills with the bioscience industry. Belfast Metropolitan College and Queen's are also collaborating on a JISC-funded programme called Engage to develop a portal that, again, will promote the joint capability and expertise between Belfast Met and Queen's University.
582. Along with the other FE colleges across Northern Ireland, we recently submitted to DEL a three-year strategic plan for the DEL-funded employer support programme. Through that programme, we have identified a number of strategic priorities: Information and communication technology (ICT); bioscience; digital media; renewables; advanced materials in manufacturing; and tourism and hospitality. The six FE colleges will collaborate across those priority sectors over the next three years to deliver a range of mentoring and business support programmes to SMEs.
583. It is important to highlight the fact that not only is Belfast Metropolitan College the biggest further education college in Northern Ireland but the sector itself presents a significant resource to the Northern Ireland economy. We have six regional colleges, employing 4,100 staff, with over £250 million in turnover. We deliver 18% of the higher education output of the region. So, we see ourselves as a very strong piece of the innovation ecosystem in Northern Ireland. We are keen to explore the opportunities to develop our role in the sector by working closely with the sector skills councils and the universities. In order to align our academic curriculum, we have just developed a five-year curriculum strategy that ensures that the delivery of the courses and programmes that we put forward in the years to come will be plugged in to the Northern Ireland economic strategy.
584. I will share with you more of the innovative ideas that we are working on. We recently submitted an application through the INTERREG programme,
- working with the Institute of Technology, Sligo and the University of the Highlands and Islands in Scotland. It is a £4 million programme to develop a virtual enterprise platform to put a range of toolkits around creativity and innovation and to share them through a digital and online medium.
585. We recently submitted a project, again through INTERREG, and this time Belfast Metropolitan College is leading the project in partnership with the Southern Regional College, and the South West College and three institutes of technology, Dundalk Institute of Technology, Institute of Technology, Sligo and Letterkenny Institute of Technology. It is a £3.8 million project entitled Colleges Actively Driving Digital Delivery, and it is focused on improving progression routes for higher and further education students on a cross-border basis. We are also active in a number of other European programmes, including Erasmus and Leonardo Da Vinci, and work on e-learning programmes and various sustainable design initiatives with our other European partners.
586. Uniquely, Belfast Metropolitan College is the first FE college in Northern Ireland to take on the development of a project under the European Commission's seventh framework programme (FP7), which is a significant challenge. We have a very interesting project in the connected health field, and we hope that we will be successful in the future.
587. In order to support the embedding of the curriculum of culture, creativity and innovation, we have developed an award-winning programme called FRESH, which won a national business education award last summer. That programme works with young people to help them to work and think outside the box.
588. **Mr Edwards:** We know that the 10 biggest spenders on research and development (R&D) in Northern Ireland account for 60% of the total contributing spend of R&D. A small number of companies engage in high-level R&D, such as Almac, Randox and First Derivatives. We have interacted with all

- those companies to help us to develop the skills bases and the ability to support R&D. We have significant connections with the three universities — the two local ones and the Open University — in developing our research and licensing capacity and our spin-out arrangements. When our E3 centre goes live, it will have a new composites tool called an autoclave, which, we understand, will be the only one in Northern Ireland. We have already had engagement with the universities to use that tool for research and development work.
589. For the majority of the SMEs that we engage with, we have to engage on small parts of innovation through the likes of our E3 centre and opportunities through some of our training. They are also picking up opportunities through our higher-level skills and our part-time higher education programmes to learn about streamlining business or improving business productivity.
590. As Damian has already outlined, we have reflected the Programme for Government and the Northern Ireland economic strategy in our whole-college quality improvement plan and our whole-college curriculum strategy over the next five-year period. We have identified the areas that Damian outlined, and we will be directing our curriculum to develop those areas, the first priority of those areas being digital media, interactive media and IT. For this year alone, we will increase the number of placements available in interactive IT and digital media by 4%. We will also bring on stream the first mobile learning and open source level-3 qualification in our E3 centre, working closely with local providers, such as Fujitsu IT, to help us support and deliver that to learners and bring on the next generation of IT.
591. The whole-college quality improvement plan is making sure that what we deliver is of outstanding quality, and we aim to be an outstanding college, comparable to the colleges in southern Ireland and England, and we have been working closely with those colleges.
592. If I may, I would like to outline some opportunities that we see as curriculum related, and Damian might take the opportunity to outline some of the funding opportunities.
593. Outside Northern Ireland, we notice that new opportunities are developing in higher education apprenticeships. We believe that the college is particularly placed to work with innovation and industry to develop higher education apprenticeship models. We would like to see the development of that opportunity here in Northern Ireland. We have had approaches from employers about extending beyond level 3 into level 4 and level 5. We have also been working closely with awarding bodies as they develop higher education apprenticeships in England and Wales. We see opportunities in the Scottish model, such as progression degrees of two years plus a further year between HNDs and degrees, and the opportunities that foundation degrees present with regard to our higher-education offer and accelerated learning paths, particularly for part-time and online learners. We see opportunities starting to arise in England, where awarding powers are being taken by colleges to offer such courses as foundation degrees in financial services. They are engaging with those particular industries. Again, we see opportunities in those areas should they arise in Northern Ireland.
594. We also see more collaboration in Northern Ireland between the six further-education colleges to explore areas such as renewables, digital IT and open source, where we collaborate through the sharing of source materials and our staff skills and capabilities in delivering programmes directly to industry. We think that, as a sector, we are maturing in that regard and can develop that further.
595. I will hand over to Damian, who will cover the EU aspect.
596. **Mr Duffy:** I will make points on areas where we see opportunities. We talked earlier about EU funding opportunities

- through the INTERREG and FP7 programmes. We think that there is significant scope for higher-education institutes, further-education colleges and the business community in Northern Ireland to extend their reach and engagement in those programmes, such as on a cross-border basis using the INTERREG and FUSION programmes and in strategic collaboration on the benefits of all-Ireland partnership on Europe-wide programmes in order to secure a bigger return.
597. We also believe that there is scope to build on the work of collaborative networks, which are supported by Invest NI. A lot of very good work is being done by Momentum, Digital Circle, Whisple, BioBusiness NI and other collaborative networks that have already been established. It is about trying to bring the work of those networks into a holistic system and to have a composite view of how we maximise the benefit of the work that they do and the opportunities that they identify. In order to achieve that, there may be a possibility of establishing some sort of overarching research and innovation council, as we have referred to it, to bring all of that research, development, innovation and implementation of opportunities together and to co-ordinate and facilitate the work of the various networks.
598. One difficulty that we have found with regard to the KTP programme, in which we have had recent great success, is that, often, it is not completely suited to the needs of SMEs. Therefore, we have tried to develop a route through the innovation system, starting with low-level innovation vouchers, which are low cost, moving to a KTP-lite scenario, which is a short-term KTP over six or 12 months, into mainstream KTPs, which are of longer duration. We see the possibility for some businesses to progress through that life cycle to the point where they could be ready for submission of FP7 proposals, which are quite onerous and labour-intensive with regard to finding relevant partners around the European Union.
599. In another area where we think that there are opportunities, there may be a role for Invest NI. It makes significant effort to support and bring the necessary information to the table. However, the fact is that the Horizon 2020 programme will increase spend in research, development and innovation from €55 billion to €80 billion. We need to get a bigger slice of that. The Republic of Ireland's share of the cake significantly exceeds that of Northern Ireland's. We are at the point now where we are looking at the next programme. We need to sit down and think solidly about how we improve our chances in that particular programme in the future.
600. I will finish on another issue with regard to opportunities, which is that, when we developed our curriculum strategy, we had a sense that we had to pin our colours to the mast and identify a number of sectors that we thought would be strong growth sectors. We will reshape our curriculum and course offering to meet those challenges. We often feel that Northern Ireland Plc needs to take a risk. It needs to identify some priority sectors where it feels that there are global growth opportunities, take long-term calculated risks and invest. Clearly, on the research and development side, the payback period on investment requirements on some high-level research and development, and even on innovation for SMEs, can be medium to long term. Therefore, that requires us to have a long-term vision of where we would like to go with regard to renewables, financial services, digital media or biosciences. We must choose the sectors where we think there are opportunities, take calculated risks and align our economic strategies and curriculum to respond to those needs.
601. **The Chairperson:** Thank you very much, Mr Duffy. I thank you both for your presentation and written submission, and I commend you on the good work that is being done.
602. If I may be so bold, your submission states that there is considerable emphasis on knowledge transfer projects, and that is a key element in the work you

- are doing in this area. I would distinguish that from what I have referred to as pure research at first instance, as it were. What you are really doing is going further, perhaps using research and applying it to a practical situation, seeing how it works, reporting back to companies and assisting them in skilling up their workers in a sort of bespoke fashion. Is that, effectively, the type of applied research work you are doing?
603. **Mr Duffy:** The reality is that, to date, the research and development arena has been the sole preserve of the universities. Our remit has been on the innovation part of the life cycle. We are looking at the implementation of —
604. **The Chairperson:** There is no point in having research and development unless you innovate. That is the whole point of it.
605. **Mr Duffy:** Our role is to support the implementation or skills development. We are the primary provider of support to Bombardier on apprenticeships programmes. We have a £2 million composites autoclave. That is a state-of-the-art facility. There is nothing like that on the island of Ireland, never mind in Northern Ireland.
606. What we are trying to do for ourselves and the FE sector is to have a conversation about how we move forward in a relationship with the universities from fairly sanitised co-operation or co-existence to real collaboration. How can we add value to the research and development work of the universities? That is what we presented in one of our slides about the innovation ecosystem. Our role is on the innovation side, and the success of the whole system can be improved if the FE colleges and the contribution that we have to make are clearly mapped out in the broader ecosystem. That requires us to have a more-structured dialogue with the universities about what our role can be and what capabilities we can bring to the table.
607. **The Chairperson:** But you are not trying to replicate the universities.
608. **Mr Duffy:** Not at all. It is a completely different thing.
609. **The Chairperson:** Your submission states that changes were made recently to the knowledge transfer project criteria, which made it more difficult for the partnerships with the FE colleges. When did that happen and how has it made the partnerships more difficult?
610. **Mr Duffy:** The knowledge transfer partnership programme was managed on a national basis. There is regional representation, and it is jointly funded by Invest NI. The changes happened around the tail end of last summer. The knowledge transfer partnership criteria were a wee bit more open-ended in the preceding three or four years. That meant that smaller companies could put marketing or export development proposals on the table.
611. The change in the criteria meant that it went back to being more pure research-driven and, let us say, more academic. Therefore, we were in a position where we had quite a number of successful big companies interested in KTP programmes. However, because the criteria changed and the focus seemed to shift backwards into research and development, their projects were not seen as being innovative enough.
612. At one stage, our KTP manager had a conversation and asked, “What would you see the success of a KTP programme being?” The answer was: “A good journal paper.” For us, the success of a KTP is increased turnover, job opportunities and the opening up of export markets. We are having a good dialogue and conversation with Invest NI to try to address the situation, so the discussion is ongoing.
613. **The Chairperson:** This is a national, UK-wide thing that has been brought in?
614. **Mr Duffy:** Yes, but it works against our regional interest, because, if you think about it, a small number of companies in Northern Ireland are hi-tech, hi-spec and invest in research and development. Sixty per cent of the investment comes from 10 companies, and the majority

- of other companies are SMEs. They are working in the innovation field and are in that slice where small incremental steps or new products or new services can move them into a different space. Our question is this: how does Invest NI support those companies in that space? A KTP was a key tool, but the change in criteria works against the fabric of —
615. **The Chairperson:** The change in criteria is pushing the whole thrust of things backwards towards more pure research rather than applied research.
616. **Mr Duffy:** That is right, and the key thing for KTP companies is to remember that they contribute a third of the costs, and that might be for a £60,000 programme. There are small companies that are prepared to put their own money on the table to be part of a knowledge-transfer process.
617. **The Chairperson:** I want to move to another aspect, and then I will open up questions to colleagues. You talked a lot about the importance of networks in your paper, and it is clear that you are networking throughout the UK and throughout Ireland and, indeed, even beyond that. The important thing is networking. You referred to the benefits of the Club Met knowledge network. Can you expand a little on that?
618. **Mr Duffy:** In my opinion, Belfast Met and the FE sector in general are much closer to the ground and to small businesses and are much more connected, flexible and responsive. Club Met is a vehicle through which we try to connect with businesses. The outcome of that engagement with Club Met and the various networks and groups that we set up is that we have structured dialogue with businesses around their needs. A recent example was that we set up a renewable energy steering group. We invited DONG Energy to come to talk to us, and we are working with a company called B9. DEL and Invest NI were involved in the discussions, and, as a result of those discussions and that networking process, we identified the need to develop a wind turbine maintenance qualification for the simple reason that we were going out to attract investors to come into the wind turbine market but there were no accredited qualifications. Therefore, we set ourselves the challenge to go through the process to ensure that Belfast Met is the second college only in the UK to offer an accredited wind turbine maintenance programme. The programme was financed and its development went through the DEL assured skills programme, so it is matched closely to the needs of business.
619. The real benefits of the process on the networking side are that we have had the opportunity, in a structured way, to listen to the needs of a number of companies. We have reflected on that, and, in discussions with DEL, we have been able to put a solution on the table. A lot of good work is done in the sector skills councils and in the various collaborative networks that have been established, but some of the implementation of that is lost. The strategic vehicle to translate that good work into the priorities and the skills needs is lost in some way because of the lack of an overarching body to facilitate that and cherry-pick the good ideas. We come up with good ideas from partners that we meet, and we would like to feed in to the business community, but, sometimes, we set up our own networks to do that.
620. **Mr Dunne:** You are welcome. We are impressed with the presentation that you have given to us so far. Has the college any plans yet to become involved in Horizon 2020, and, if so, how would you go about that?
621. **Mr Duffy:** We would like to be involved, but, in reality, under our current strategy, we have one FP7 project that will probably come to fruition next year. Horizon 2020 is an ambitious programme that will run over six years. It involves a big amount of money, and we would like to be involved. We feel that, although we are the largest college in Northern Ireland and the fourth largest in the UK, we are small in our size and experience. That is why the relationships

- with the universities are important, and it is through collaboration with the universities that we will have something to bring to the table. If the universities, the FE colleges and businesses can put clusters together, we could, legitimately, create sizeable projects to secure funding under Horizon 2020. There is such a broad range of sectors. What work against us are the time and resource commitments that are required. We do not have any dedicated resources for that, and we try to do it on the fringes of our existing business development activities. With their large knowledge transfer resources, the universities are probably much better placed to do that than we are.
622. **Mr Dunne:** Do you feel that the system is too complex?
623. **Mr Duffy:** FP7 is an inherently complex process. The institutes of technology in the Republic of Ireland evolved from a vocational setting to take on a degree-awarding status. One of the things that we have learned from our contacts with the institutes is that the Republic has had much more success. It seems to have a better set up and it is more actively engaged in FP7 and the opportunities that are presented by Horizon 2020. It also realises the benefits of putting together the European clusters and the return that can be made by doing that. We do not seem to be as well tuned in to that.
624. **Mr Dunne:** You mentioned that Northern Ireland companies will have to try to get more out of Horizon 2020. As a college, can you do anything to develop a programme for customers on how to source EU funding? Is that a possibility?
625. **Mr Edwards:** If that was to fall within the remit of education and training and providing people with that as a service, the college could explore that. That could be a possibility.
626. **Mr Dunne:** We were impressed by how you customise your programmes to meet the requirements of industry and your various customers. I think that that would be worth looking at.
627. **Mr Duffy:** Our engagement with the Leonardo Da Vinci and Erasmus programmes has been beneficial. The Erasmus student exchange programme will be massively expanded under the next round of EU funds. It is now called the Erasmus for All programme, and it really opens up the possibilities of student and staff mobility across Europe. Our staff get learning opportunities from those programmes, and two of our business advisors have just returned from Germany, where they were looking at the cradle-to-cradle approach to sustainable design that was developed there. We are involved in those programmes to learn from them and to bring back tools and techniques and look at their application in Northern Ireland. From an education and skills point of view, that type of engagement in European programmes is very useful. However, we need to work on and fund the mechanisms by which we share those skills and experiences and transfer them to the businesses that we engage with.
628. **Mr Dunne:** Is the challenge in getting the necessary funding to run the training or mentoring that is required?
629. **Mr Duffy:** Yes. The previous regional innovation strategy provided funds that supported companies to engage with and secure FP7 funds. I do not have the detail on the success of that, but you probably do.
630. **Mr Dunne:** On a general note, you mentioned the autoclave. I have been to Bombardier and have seen its impressive set up. Were you involved with it in the earlier stages?
631. **Mr Duffy:** Yes, we worked hand in glove with Bombardier to develop the spec for our autoclave. We are the main providers of apprenticeship programmes in Bombardier, and Michael Ryan and others fed into our discussions on what that autoclave would look like and how it would be used. We are also trying to ensure that Belfast Metropolitan College is a member of the new Northern Ireland Advanced Composites and Engineering Centre (NIACE) in the Titanic Quarter.

632. **Mr Dunne:** Is that the new building that has just opened?
633. **Mr Duffy:** Yes. If someone is doing an MSc in aeronautical engineering at Queen's University or the University of Ulster, the chances are that he or she will train on our autoclave. That is an example of the odd connections between the FE sector and the universities that people are not always aware of. If those connections were enhanced and we had a structured discussion, those connections could be much more beneficial in trying to link together the different pieces of the jigsaw. We do collaborate, but it is a matter of broadening that collaboration.
634. **Mr Dunne:** Would you say that composites technology is moving further beyond aircraft production?
635. **Mr Duffy:** Wrightbus is using composites, and composite materials are used in body armour. There are all sorts of applications for composite materials.
636. **Mr Edwards:** We directly link composites capability into various areas of our curriculum including the motor vehicles side. We also have the sports motor vehicle academy running in Mallusk, so we are taking opportunities to take in learners at all levels and expose them to the technology so that, as they progress through to higher education, they are already aware of facilities and have an underpinning knowledge of how to use them.
637. **Mr Flanagan:** Gentlemen, thank you for your presentation. I think that Belfast Met is making fantastic progress, and the new building is tremendous. I hope that all works out for you in the future.
638. In your response to the Committee's request for information that was sent before Christmas, you mentioned that Belfast Met will hold an FP7 event in February or March. Has that happened yet? Can you give us any more details on that?
639. **Mr Duffy:** It has not happened yet. We are working with Belfast City Council to secure, through Enterprise Ireland, an expert, who has a hell of a lot of experience and a track record in success, to present to businesses and give his perspective. There is actually limited experience in Northern Ireland. There are a few people who have experience of FP7. So, we have not organised that yet. We are in discussion with Belfast City Council about funding for it. The event would be open to any of the businesses that we work with and to anyone who has any interest in it.
640. **Mr Flanagan:** It would be useful if this Committee were to be given an invite and were able to attend. Once again, I hope that goes very well for you.
641. We heard from the Confederation of British Industry (CBI) when we were in Newtownards last week. It has advocated that a champion should be put in place to drive forward research and development here or that an organisation should be established by Government that would co-ordinate all R&D work here. Would you buy into that opinion? What are your views on that?
642. **Mr Edwards:** As Damian has outlined, collaboration is happening, and connectivity needs to come beyond collaboration. We would welcome the idea of exploring how we could better collaborate or better engage to benefit from each other's research and application. Joined-up education services can only support Northern Ireland further.
643. **Mr Duffy:** If you look at the model that we have presented to the Committee, you will see that there are different pieces to the jigsaw. It all needs to work together. If it is fitted together, then the engine can run quite well. We — the CBI, the Northern Ireland Science Park and the FE colleges — are all doing very good things. There is just a bit of glue missing that needs to hold all of this together and facilitate it. It does not need to be an expensive body; it just has to be a framework to facilitate the next piece of this discussion to really work through the research and come up with action plans to say that

- this is what we are going to do. There are the regional innovation strategies, which we have had for the last two iterations, but we need a bit of a push to try to bring the various parties to the table. At present, we have no vehicle to bring any ideas that we have to the table unless we were to have bilateral discussions with each university. There is no overarching framework to have a discussion around research, development and innovation and to co-ordinate the strategic policy approaches to delivery against that.
644. **Mr Flanagan:** That is the view that we are getting from most stakeholders, so I presume it will be an important facet of our report eventually. In your collaboration with institutes of directors and businesses in the South, which are really ahead of us in innovation and R&D, can you give us an example of a practical success or a win you have had as a result of working with an organisation in the South?
645. **Mr Duffy:** Good question.
646. **Mr Edwards:** We would have to go back and look, but we could report back to the Committee on the range of companies we have engaged with and had success with.
647. **Mrs Overend:** Thank you very much for your presentation. It was very interesting. From reading through your submission, it seems often to be the case that research and development requires a longer-term investment and the available funding is available only in the short term and there is no return within that. Is that something that you are finding or is your innovation work more short term?
648. **Mr Duffy:** The funding available for research and development from Invest NI and other sources usually has a three-year time frame. The employer support programme, for which we have just developed a strategic plan with DEL, looks at strategic interventions across a number of priority sectors, and that is a three-year programme. So, funding sort of runs in three-year slices, which
- is probably tied in to the budgetary processes in some way.
649. **Mrs Overend:** That is what I am saying. The funding has that sort of time frame, but does that match your project? Do you have to re-adjust?
650. **Mr Duffy:** We have an action plan that will try to deliver a range of activities over a three-year lifespan, or we will engage staff to deliver on a programme in one three-year slice and then the next three-year slice. The employer support programme, to which we have just submitted a plan, was the successor to the DEL innovation fund, which was also a three-year programme. The Connected funds and so on run in cycles of three years rather than any longer-term commitment.
651. That is not necessarily a bad thing. Things can change quite quickly in three years. The priority sectors we identified in the regional innovation strategy five years ago, and those we identified in the current Northern Ireland economic strategy, have changed. Three years is a reasonable time frame, but the assurance of a role in the delivery is more important than the timescales of the programme. We would like to feel that we had a long-term role and engagement in the delivery of research, development and innovation, whatever that role may be, and were assured of where we fitted in the ecosystem. We could then get on with that.
652. **Mrs Overend:** Your presentation mentions that curriculum development is part of the long-term development. Surely that requires tailored careers advice to make sure you have the appropriate students coming into those roles?
653. **Mr Edwards:** We identified the seven areas through our curriculum strategy and mapped those back to the various strategies on economic engagement. With regard to a delivery package for that strategy, there were nine key areas, one of which was careers advice and guidance to learners prior to entry and increasing the amount of pre-entry

- advice and guidance that the college was giving, particularly around those curriculum areas.
654. We implemented that in September of this academic year and have had a significant increase in engagement from the public on that. We now require learners to attend a pre-entry session, regardless of where they are going to take up a place on the course, to make sure they have to hand all the information about what is involved with the industry directly.
655. With regard to developing the curriculum, Damian outlined how we are engaging with industry the other way. We are also able to use that back the way, so that we can ensure that what we are offering in assessment and curriculum areas is what the industry wants through our full-time learning. For example, Bombardier came in to tell us not just about the autoclave but the skills that are required to make best use of that autoclave and then adapting it. There was also the work with B9, where we were writing the qualification with them, because there was no qualification there, and putting it on the framework with major awarding bodies. The college uses its links with industry to shape its curriculum.
656. The institute is talking to our colleagues in Dundalk Institute of Technology (DKIT) in about the benefits they have in being able to do that at higher education as an independent body, whereas, as further education colleges in Northern Ireland, we are constantly going to various awarding bodies to try to work with them, which brings another party into the mix. Many of the awarding bodies that we work with have picked up the challenge and have become more responsive to industry. However, specialist areas can slow the process, and we just want to be as fast as we possibly can in delivering back to industry.
657. **Mrs Overend:** That is very interesting. On balance, do you do more work with the larger enterprises or small and medium-sized enterprises?
658. **Mr Duffy:** We do about £3 million a year of apprenticeship programmes with a large number of big employers. On balance, because of the scale of the programmes, a larger amount of money comes through big employers, but there are more engagements with SMEs, because the fact is that 90% of the businesses in Northern Ireland are SMEs. Uniquely, we have delivered KTPs all over Northern Ireland, for example, in Fermanagh and Warrenpoint. The KTPs that we have done have been across the piece from small businesses and niche businesses to large, hi-tech ambitious companies with big plans and big turnovers. Depending on the needs, we can respond to different requirements. We are working with Citigroup, Allstate and Liberty IT — big companies and small companies. That is not unique to us, but is particular to the Belfast metropolitan area, where there is a large number of big employers that we connect with in different ways. Other FE colleges in other parts of Northern Ireland are in the same position in that they have a mix of interactions with large and small businesses.
659. **Mr Edwards:** One of the interesting developments is that large employers are seeing the relationship with the college developing with their suppliers, particularly in the IT industry, where we are developing relationships with small, innovative suppliers around mobile technology. Therefore, although we are doing the training for the large companies, they are then asking us what we are doing directly back with their suppliers and whether there could be an opportunity to roll out that training or education into the supply base. At that point, that hits the SME base. They spin off in the two directions in that balance and mix between big and small.
660. **Mr Duffy:** Let us say that Almac, a big company that we talked about earlier, has 2,000 employees. Probably only 200 of those are high-level, PhD-qualified with a costly input. The vast majority of the other 1,800 jobs will be technician-level, logistics and management jobs. We are in the volume

- skills-development-capacity game. Our bioscience laboratories at Belfast Met are industry standard and are as good as you can get in the whole of the European Union. Some of the historical perspectives around the role of the tech have completely changed, and we will be delighted to invite you to our new E3 facility when we get the keys. You will get a feel for the future of further and higher education, because we deliver further education and degree-level qualifications, so we are an FE/HE institute. We are keen to expand on our ambition to have a responsive and ambitious curriculum, and we are flexible enough and able enough to do that.
661. **The Chairperson:** We will look forward to that invitation. Are you happy enough, Mrs Overend?
662. **Mrs Overend:** Yes, I could probably go on, Chair, but thank you.
663. **The Chairperson:** There are no other questions from members. I have one final question on innovation vouchers. I am not sure how they work. Can you explain briefly how they work?
664. **Mr Duffy:** It is a very quick and easily accessible scheme. It uses innovation vouchers, probably of around £4,000. The company identifies a project and connects with Invest NI. If Invest NI agrees that they have a particular piece of work that they need done, it will give the company a voucher, through which that company can buy in a particular input.
665. **The Chairperson:** It is a very simple system.
666. **Mr Duffy:** It is a very simple process, and Invest NI has tried to make it as easily accessible as possible. You can have three or four innovation vouchers to look at different aspects. In the presentation, we were trying to say that that initial engagement around the pretext of an innovation voucher can lead to a discussion with the company about a bigger opportunity around KTP and so on. It applies to all sorts of businesses, including retail and agricultural businesses. It is a very open-ended brief.
667. **The Chairperson:** Thank you very much for your reply. That is very helpful.
668. **Mr Agnew:** Sorry, Chair, for not indicating earlier. Thank you for the presentation. As was mentioned, we were at the Ards campus of the South Eastern Regional College (SERC) last week, where Thompson Keating spoke about DONG Energy having a contract for offshore wind projects. If I remember correctly, it will manufacture in Germany and do the assembly and installation in Kent. Basically, it was felt that Northern Ireland was not in a position to take on those contracts. I hope that colleagues will correct me if I get this wrong, but one of the reasons for that, which he highlighted, was that we do not have sufficient training in health and safety in working offshore. I see that offshore energy is mentioned with regard to your Titanic Quarter campus.
669. You also mentioned work with DONG Energy and B9, which are key players in the industry; B9 is a local industry. What work is being done with the likes of B9, DONG Energy and Harland and Wolff to ensure that we have the capabilities to go right through the process, namely the manufacture, assembly, installation and retail of renewable energy projects? There are so many aspects of the business. Green energy is now one of the few growing sectors. It is a big question, but where are we now? Where do we need to get to, and how do we make that journey?
670. **Mr Edwards:** You talked about supporting the offshore industry from design to production to maintenance. As has been highlighted, Belfast Met, as a college, has the full qualification at the maintenance end. That includes the health and safety component and all the training requirements to allow for offshore maintenance support works. We are in a position to support the industry right now. We are already working on the delivery of that training. We had to completely innovate the way that we deliver and assess the

- courses, inventing new equipment to record the activity taking place at a windmill and deliver it through FlickKey. We had to integrate technologies. Therefore, not only did we have to redevelop the curriculum, we had to redevelop approaches to the delivery of the curriculum. We are in place. We are one of only two colleges in the UK that is capable of delivering that training. We are at the leading edge of that technology.
671. As has been outlined, in respect of manufacturing capability, we have foundation degrees on composites at both level 5 and level 3. With the new autoclave facility coming online in April, we will have the technology to deliver composite design and manufacturing as well as to support those skills areas. We are moving on with that agenda, and it will go live for delivery with our mainstream curriculum in September.
672. We already have the design skills capability in the college. It is not necessarily specific to wind farm or green technology, but it is design in construction manufacturing and, therefore, goes across that field. As you identified, Belfast Met has worked with the companies. It is that collaboration with companies that will deliver the skills as they roll this out. It is a growing area of the economy, and B9 itself is a growing company. As opportunities arise, we are stepping in.
673. You talked about the development of qualifications from start to finish. We are reducing the development time of qualifications significantly so that, as soon as the demand arises, we put in place the qualification for the skills. B9 is an example of exactly how we want to operate in future. Although some points of that are not on stream right now, they are very near to coming on stream and have the capability to do so.
674. **Mr Duffy:** In the centre for business excellence, we have now appointed a dedicated renewable energy sectoral adviser, whose full-time job is to look at and understand opportunities and participate in European programmes to bring back expertise. Our E3 facility is a BREEAM category-1 building. We have made any sustainable input that we could make. It has a wind turbine, a woodchip pellet burner and so on. It will probably be one of the most sustainable buildings in Belfast.
675. In the sector, a working group has been established to work with SERC to explore and understand the DONG opportunity, what it constitutes and how we, as a sector, respond to the renewable energy agenda. It is the same for the other priority sectors that we have identified. There is a lead college in each of those six or seven sectors. SERC has an expertise, and we have a capability. We will bring those capabilities together and offer a collaborative solution to the likes of DONG and other investors and say, "Listen. The FE sector in Northern Ireland has a capability to respond to your skills requirements, whatever they may be." DONG has been in Belfast Met, and we have presented to it. We have also talked to Invest NI and DEL. The discussions are ongoing. When we looked at the workings of wind turbine maintenance and operation, we found that the electronic bits and pieces inside the wind turbines are being developed by Siemens. That led us off to Dublin to talk to Siemens about the contribution we may or may not be able to make to the electronic boards that control the wind turbines. We are trying to get up to speed quickly and to be able to offer a solution.
676. To go back to the point that I made about making decisions and taking risks, renewables would be one of those areas. The Northern Ireland economic strategy says that work is still ongoing to identify the opportunities. Let us tune in quite quickly to those opportunities, because there is tremendous scope. We, as a college and as a sector, are trying to respond to those opportunities.
677. **Mr Agnew:** I appreciate that. You will not be surprised to hear that I absolutely support you in taking a risk in renewables. As risks go, it is one of the safer ones. It is inevitable that

the industry will grow further. Are you aware of any other barriers to Northern Ireland getting those contracts? If so, is there more support that you could be getting from the Department of Enterprise, Trade and Investment or any Department?

678. **Mr Duffy:** Scotland has a £70 million or £80 million renewable energy fund in place to support the development of the industry, attract foreign investment and so on. I am not sure that we plan to set aside that sort of money. However, if we think that it is a priority sector, and if we want to compete in a global market place and gain a foothold quite quickly, we need to think about how we can use the likes of Horizon 2020 and other programmes to attract funds to do that.
679. **The Chairperson:** I think that that brings our session to an end. Mr Duffy and Mr Edwards, thank you for attending and for your important input into the inquiry. If we need to write to you about any other matters, I am sure that you will be able to respond.
680. **Mr Duffy:** Thank you.

8 March 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Gordon Dunne
 Mr Phil Flanagan
 Mr Paul Frew
 Mr Paul Givan
 Ms Jennifer McCann
 Mr Stephen Moutray
 Mrs Sandra Overend

Witnesses:

Professor Tony Gallagher *Queen's University Belfast*
 Mr Scott Rutherford

681. **The Chairperson:** Briefing the Committee today are Mr Scott Rutherford, who is the director of research and enterprise, and Professor Tony Gallagher, the pro-vice chancellor of Queen's University. Gentlemen, you are very welcome to the Committee meeting. Thank you for your very considered, detailed and interesting written submission to the Committee. It is very helpful to our work on this important inquiry into research and development.

682. We see research and development as crucial to developing our economy and generating innovation within industry and business throughout the economy. Thank you for your attendance and, once again, for that submission. Would you like to make an opening statement? Then we can ask questions.

683. **Mr Scott Rutherford (Queen's University Belfast):** Thank you very much, Chair. As you have indicated, it is quite a comprehensive and detailed response, and I will keep this briefing as short and succinct as possible. I will go over just a couple of the key points.

684. With regard to the list of questions that we were asked in the inquiry, the opening part is about funding opportunities and sources of funding.

The drawdown of EU funds is a high priority on the agendas of governments and universities at present. I will focus on that. I want to draw your attention to a couple of things in that area.

685. As you are perhaps aware, there is a lack of infrastructure and expertise to support academics and businesses in drawing down EU funding. It is more than a lack of infrastructure; it is more like a lack of embedment of expertise close to the research base and research institutes in Northern Ireland. An example of it is to the fore at present. We have a small allocation of funding from the Department for Employment and Learning (DEL), which allows the universities to embed a consultant, on a part-time arrangement. It is proof that having that level of expertise closer to academics and businesses linked into academia makes a huge difference. It has allowed us, since November 2011, to put forward 11 funding applications to a value of up to £30 million. It is a small example, at an operational or tactical level, of how expertise that is closer to the research base makes a huge difference to the drawdown of EU funds.

686. Another aspect that is critical to funding is the Higher Education Innovation Fund (HEIF). It allows the universities to have in place an infrastructure of people and expertise, working alongside academics and brokering on gaps with industry and businesses. It has experienced a small number of cuts in recent years, and that is out of kilter with other parts of the UK where it is seen as a key driver of the economy and a key mechanism by which universities engage with outside organisations and, essentially, exchange knowledge out of the institution. I included an example in our written response. HEIF, in general, leverages between £3 and £5 of income for every £1 of investment from government.

687. As to the process of accessing programmes that support R&D in Northern Ireland, it is fair to say, as I outlined in the response, that it is seen at times as a bureaucratic and drawn-out exercise. I am sure that that issue has been raised consistently. I included the example of the knowledge transfer partnership (KTP) scheme, which essentially involves an academic — a graduate — who is placed in a company and works on a problem. That is a great way of tactically engaging with a range of small and medium-sized enterprises (SMEs) across a region. A national appraisal of the scheme was undertaken in September 2009, and it concluded in February 2010. The scheme is actually endorsed across the whole of the UK. It was adopted and implemented in all parts of the UK except Northern Ireland, where an additional review was conducted in October 2010. We have heard, this week, that the scheme will be launched, hopefully, later in the year. So, as you can see, it is a long process of evaluation and appraisal. As a result of that, our KTPs in Northern Ireland have declined by 30% over the period. That is an example of the implications of a longer-term appraisal of those sorts of schemes on the SME base in Northern Ireland.
688. A number of other schemes are under assessment and appraisal, such as proof of concept, which is a key way in which, for researchers who have early stage ideas, the technology is made available to move those on to an actual application that is used by industry.
689. It is not just about funding and investment, important as that is. It is also about people. Certainly, the Northern Ireland Science Park (NISP) has a CONNECT model, which is a way of increasing the entrepreneurial ambition of the region and bringing together the elements of networking from a social point of view. I endorse and support that. It is incredibly important that universities engage in that arena. I have seen, however, in recent months, perhaps a bit of a scope creep around NISP CONNECT. It is hugely important that it focuses on the entrepreneurs. An increase in entrepreneurs in the region would make a huge difference in building new start-up firms and companies.
690. I touch on a range of other elements in the written response. As the range and models of funding in place in Northern Ireland are largely similar to those across other parts of the UK, I think that it is the implementation of those, the actual beefing up of those, that would make a huge difference to the wider ecosystem here.
691. **The Chairperson:** Thank you very much. Do you want to add to that, Mr Gallagher?
692. **Professor Tony Gallagher (Queen's University Belfast):** I am fine.
693. **The Chairperson:** Thank you for the candid analysis of the situation here with regard to R&D. I have a couple of points to make.
694. It seems to me that Queen's University is attempting to try to bring together research and development and business so that it is, really, business orientated. We are not dealing with pure academic research, although there may be elements of pure academic research. Largely, you are trying to engage with business, apply that research into business and, therefore, into the marketplace and to create innovation. That is the main thrust of what you are doing, is that right?
695. **Mr Rutherford:** Absolutely. As we are experiencing at the moment, it is about engagement by industry at a much earlier stage. The idea of us pushing our research onto companies or industry is a very old-school approach. It is very much more about engaging much earlier in the process, understanding what the problems of industry and companies are and ensuring that our research pieces are tuned to those needs and that we work in partnership. As I said, HEIF is a key element of the brokerage part of that.
696. **The Chairperson:** Can we come to HEIF? You are a bit critical of the reduction in funding to HEIF. Is that decided locally?

- Is that something that DEL or the Northern Ireland Executive decided, or was that decided at a UK level?
697. **Mr Rutherford:** My assumption is that it is regional.
698. **The Chairperson:** It is regional.
699. **Mr Rutherford:** It is a small reduction overall, but it does have implications, as I said, in the context of our driving innovation and having it as a pillar of our strategy in the region.
700. **The Chairperson:** It is going in the wrong direction. What you are really signalling is that that is valuable stuff. It produces results. For every £1 that you put in, you get £3 back. Therefore, why go in the opposite direction? I think that is really what you are saying.
701. **Mr Rutherford:** Absolutely.
702. **The Chairperson:** You have not concentrated on European funding because the research and development is much wider than that. That is very clear from the programmes that you support. Just taking European funding in isolation, particularly framework programme 7 funding, we have not been particularly good at getting that here. Uptake has been fairly poor here in comparison with parts of England, Britain and, indeed, the Republic. Is that really the result of bureaucracy and the difficulties of navigating through the labyrinth that has been created around framework 7 funding?
703. **Mr Rutherford:** There are, probably, a couple of reasons. Influence in Brussels is critical. Having sustained engagement in Brussels and understanding and being involved in shaping the agenda over there is critical. At some point, it comes down to implementation. There is a range of EU strategies and priorities. It is actually the people on the ground who understand the schemes and networks who can help academics and businesses to navigate a range of complex funding areas. Therefore, as I said, it is twofold. It requires that influencing and lobbying element as well as dedicated expertise that is not out of kilter or in any way disconnected from the research base and companies. It needs to be embedded. You need to understand researchers and how they work and operate.
704. **The Chairperson:** Where is our deficit? You talked about infrastructure. I think you said that the infrastructure is OK and adequate but there is a problem with people. Is there a lack of knowledge, expertise and experience in accessing that type of funding and, perhaps, other funding as well?
705. **Mr Rutherford:** I suppose that, at Queen's, I see researchers who have capabilities. There is certainly no issue as regards quality and ambition. It is just a matter of understanding, the ability to take the first step and knowing how to apply. As I said, it takes a certain level of administrative expertise to help researchers to engage in that way.
706. **The Chairperson:** Finally, the issue of knowledge transfer partnerships came up in evidence from the Belfast Metropolitan College. Because of changes in the criteria, which you touched on in your oral and written submissions, there has been a significant drop in knowledge transfer partnership projects between the universities and SMEs in Northern Ireland over the past year or two. Is that correct?
707. **Mr Rutherford:** That is correct.
708. **The Chairperson:** The reason for that is the change in criteria, which has been established at a UK level. Is that correct?
709. **Mr Rutherford:** It is because of an absence of funding at regional level. Applications go to a national assessment framework. Those assessment frameworks are not necessarily attuned to the needs of a region, hence there is a different set of criteria — a different threshold, I suppose — and a different set of priorities. In that case, applications that might have secured a degree of funding in the region are not funded at national level.

710. **The Chairperson:** You said that there have been some changes. We heard about some changes during the past week. Are they good or bad?
711. **Mr Rutherford:** Yes. I am aware of those changes. I think that they are positive. The scheme is likely to move forward now.
712. **The Chairperson:** Therefore, that could remedy itself?
713. **Mr Rutherford:** Yes. I think it is about how we optimise it as quickly as possible, given that there has been a hiatus of a couple of years and that a pipeline of industry contacts and companies are interested in engaging in the scheme. It is about moving as quickly as possible on that front.
714. **The Chairperson:** I am going to move on to another member. Professor Gallagher, if, at any stage, you want to intervene, please feel free to do so.
715. **Ms J McCann:** You are very welcome; thank you for your presentation. Among the responses we have had so far in evidence sessions and in writing, a lot of people or organisations are saying that it would be helpful to have a one-stop shop that had responsibility for co-ordinating all research and development. At the minute, it is happening in different places. What would that sort of one-stop shop look like? Would it be beneficial to have somewhere for representatives from the different organisations, business or the universities to go to for support or signposting, for instance?
716. In your briefing paper, you refer to the industry-led competence centres, which Invest NI initiatives have funded. Do you see a new model for developing research and development being developed within Invest NI? Would it be helpful if Invest NI looked at it in a different way or if there was a different structure within it?
717. **Mr Rutherford:** At the highest level of the economic strategy, the Programme for Government and the university strategies, there is a consistency and an alignment in what we are all trying to achieve here in Northern Ireland.
- As I have indicated, it is, perhaps, the operational and implementation area that is not as cohesive or coherent as it should be.
718. With regard to the one-stop shop, I will use the EU as an exemplar. There is already a capability in Invest NI to support the EU. I do not know whether that has had an impact on the increase and drawdown of funding in recent years. If you are asking me whether that is a suitable home for a one-stop shop across the region, I think it needs dedicated expertise close to the research base and an ability to draw on our research expertise, our industry links and contacts in those areas. I am a big fan of having integrated approaches, as opposed to a detached approach, in that sense.
719. **Professor Gallagher:** It is worth remembering that, as things stand, the two universities work together very well on some issues. The Science Park is a particularly good example. It is an initiative in which the two universities provide a very good model of how we can promote motivation. The Advanced Composites Centre is another good example. It is an industry-led initiative, which the two universities are involved with, and we hope that a cluster of industries linked to research expertise will develop around that. It is maybe not so much about needing another mechanism to help the thing along; in some senses, the problem is that it takes a long time for decisions to be made. The system has too many audits built into it, which slows everything down, and there is too much risk aversion. All of that is getting in the way of making genuine change quickly. That is the bigger problem.
720. **The Chairperson:** Does that apply across the board, or is it only in specific areas?
721. **Professor Gallagher:** I think it is across the board. If you are going to encourage genuine innovation, you need to have quick access to small amounts of cash to try out ideas. You have to be prepared for some of those ideas not to work,

- but the pay-off is that the things that do work, work well. If you want to create that type of innovative environment, those are the sorts of things you are going to have to put in place. However, we often take ages and ages to make decisions on things and actively drive creativity out of the process.
722. **Ms J McCann:** A more flexible type of structure is required.
723. **Professor Gallagher:** Yes.
724. **Mr Rutherford:** An acceptance of the fact that, in some cases, failure is part of the learning process is also required. It is part of R&D.
725. **Mr Frew:** If I can, I will go up to the higher level of government and its knowledge and understanding. I think that we would all agree that there is a lack there at the minute and that that could be improved on. Various parts of government will know some aspects of R&D, and other bits of government will know others. We really need that to be joined up, so that we all can get a spectrum of understanding of where we are at in Brussels, Westminster and, I suppose, the Republic of Ireland. We could learn from the Republic of Ireland and the high levels of success that it has had in R&D.
726. In your view, where are the gaps at present? What would be the most appropriate way to fill those gaps?
727. **Mr Rutherford:** As I said, at the highest level, in the strategies that are in place, there is an alignment across Departments and across each of the schemes. I have been involved in a commercialisation review, which Invest NI is leading on at present. It is acknowledged that the hand-offs across the process of R&D are not always as smooth as they ought to be. As each of the programmes work, as each of the engagements occurs and as each of the pieces of funding is put in place, they are not always cohesive and aligned. That, I guess, is largely a communication issue. I am not sure whether it is a structural issue. Do we need to radically overhaul all the structures, or is just a lack of communication or, perhaps, even a silo approach in some areas of the system?
728. I have indicated in my response that I do not think that anybody has stepped back and looked at elements of best practice across other economies or looked at the system as a holistic area and come up with a sustained, long-term plan. It has to be a long-term ambition here. It is not about a short-term, three-year turnaround with the EU or R&D competence hubs and so on. It has got to be a long-term and sustained period of investment. Tony may want to add to that.
729. **Mr Frew:** More specifically, on Horizon 2020, what ideas does the university have that we need to engage with or learn more on? Do you have any ideas around that programme? Is there something that we need to learn quickly to get the best benefit out of Horizon 2020?
730. **Mr Rutherford:** I have mentioned a couple of things already. As you said, the Republic of Ireland has invested heavily over the years in a network of experts across the island who are cohesively and, in some cases, thematically aligned. Again, that links to the ground challenges in Brussels and contained within the Horizon 2020 programme. Here in Northern Ireland, there is the MATRIX framework. Our universities have their capabilities and strengths as well. It is about the alignment of those areas and the embedment of dedicated expertise with a long-term approach on Horizon. It is in the operational parts and the implementation. I do not think that it is in the strategy. Our strategies are understood and clear. It is that implementation arm that is not working.
731. **Mr Moutray:** You are very welcome this morning. Following on from Paul Frew's question, some respondents to the inquiry so far have indicated that they believe that government must be more connected. What are your thoughts on connectivity and networking, not only between business, academia and government in Northern Ireland but

- across the Republic of Ireland, Europe and the mainland? Do you see scope for improvement there?
732. **Professor Gallagher:** There is certainly scope for improvement. One thing that we have been doing in Queen's recently is trying to significantly enhance our engagement with businesses in a variety of ways. In doing that, there is a recognition that we need to improve that. We have done that quite quickly. That will have all sorts of benefits for the programmes we provide and also for the R&D knowledge-transfer opportunities that come out of it. As I said earlier, we have provided some examples — particularly good examples — of that at the moment, such as the Science Park and the Advance Composites Centre, which are very useful models to work with.
733. As for engagement in the UK and Ireland, we are talking to Trinity College Dublin and University College Dublin (UCD) at the moment on innovation work. We are trying to develop that further. There are various funding mechanisms, whereby we have engaged with innovation-type programmes on an all-Ireland basis to try to bring people over and let them engage with businesses. That has often been very successful as well, and it brings in high-quality international expertise to get that across.
734. So, yes, there are plenty of ways in which that type of networking can be improved. Where we have been doing it, you can see the very tangible benefits. There is clearly a hunger in the SME sector for access to that type of expertise as well.
735. **Mr Moutray:** So that is something that you would like to expand further?
736. **Professor Gallagher:** Absolutely.
737. **Mr Rutherford:** There are a few initiatives, some of which are run by InterTradeIreland, that are cross-border. FUSION is a funding initiative that is cross-border. We have engaged in both of those areas heavily. In the context of the EU, it is about getting partners and consortia. If we have cross-border initiatives, that allows the possibility of increasing our partnerships and building links with consortia. If there are ways of accessing information and intelligence on those sorts of areas where there is mutual compatibility and strength, we welcome that as well.
738. **Mr Flanagan:** Thank you for your presentation, gentlemen, and for taking the time to complete the Committee's form. Many of the respondents that we have spoken to so far have said that not enough is being done by government to promote R&D. Is that something that you would agree with? What do you think government should do to promote R&D? What steps should it take?
739. **Mr Rutherford:** Moving away from a strategising role to implementing policies is incredibly important. This is about action as well. We have already touched upon speed of response. It is fine having ambition, targets and whatnot in place, but speed of engagement and follow-through in those areas is critical. Also, it is incredibly important to have a joined-up approach. Consistency in approach and in the mechanisms of funding and engagement is also key. There is an absence of detail in some of the strategies. Strategies say that there will be significant investment in R&D and significant investment in innovation, but a quantifiable amount is not given. Is there a degree of financial commitment in that? In the longer term, this is about building a knowledge economy. That is at the forefront of all the strategies.
740. **Professor Gallagher:** Let me add to that. One of the important things about trying to encourage an innovative environment is to create a situation whereby new opportunities can be seized as soon as they arise. By definition, you are trying to allow new things to develop rather than putting in things that you already know. Sometimes, we get the impression that there is an excessive tendency to try to direct things, as though it were possible to steer things to particular places, when what government should be doing is creating an enabling environment that allows creative opportunities to emerge.

Once they emerge, something can be done to try to drive them forward. From a personal point of view, that notion of creating an enabling environment, rather than taking a directive approach, might make a huge difference.

741. **Mr Rutherford:** Finding a balance of accountability is incredibly important and is inherent in the system. Government must balance a little autonomy and freedom with accountability in the system, in an area that is inherently flexible and unpredictable in its nature.

742. **Mr Flanagan:** Going back to your point on targets, the Executive have set a target in the draft Programme for Government to get R&D to 3% of GDP. However, at the same time, they cannot tell us what GDP is now. If we cannot predict it for 2020, how will we know what 3% is and, therefore, what we are aiming towards?

743. Your recommendations for what you would like to see done are very broad. They are all logical and I do not think that anybody would argue with them. However, if the Executive could take one specific measure to help to improve the levels of R&D here, what would be the best one?

744. **Mr Rutherford:** The Higher Education Innovation Fund is the critical piece of people infrastructure that can bridge the gap between the R and the D of R&D. It is the research base that connects with business and other sectors outside the university. Having that as a core, sustained element of funding would enable the university to really improve its business engagement areas, develop its licensing activities and spin-out and attract foreign direct investment into the region. It is the crucial nuts and bolts.

745. **Mrs Overend:** Thank you very much for your presentation. You mentioned support through the application process. That has come up time and time again with other respondents to the inquiry. Do you find that that is very important to accessing R&D? Furthermore, do you think that it would be beneficial if you had ongoing support, mentoring

or training while you go through the process? How do you feel about that? Others have raised that issue. Is it relevant to you?

746. **Mr Rutherford:** With regard to researchers and academic members of staff, over the years, as funding has increased and become much more complicated and competitive, there has been a need to have individuals in place who understand the system, the necessary nuts and bolts of applications and how to make a successful application. At Queen's, it is recognised that dedicated expertise in helping and supporting the application process is needed. Therefore, I would say that, yes, it is incredibly important, particularly as R&D funding is now constrained internationally. As I said, it is complex and competitive. Ensuring that there is expertise to help us to identify opportunities and target our staff in the best ways is critical. Otherwise, it becomes a scattergun approach, which is burdensome in respect of overheads.

747. **Professor Gallagher:** The support that is needed is a range of expertise at different points in time. Therefore, the trick is to try to find a way in which it is possible to fold in particular types of expertise at particular times. When a particular type has had its use, it steps out of the picture again. In some senses, the Science Park provides a pretty good example of how that operates, because a constellation of support is provided to people there, which allows them to go from very small to very large. People who are involved in that expertise fold in and out as required. Sometimes, the difficulty is that if you assume that there is a particular mentor or support that you have to have, it may be useful at some point, but if used the entire way through, there is a risk that it could become a drag in the system.

748. **Mrs Overend:** So the Science Park is a good model for that?

749. **Mr Rutherford:** Yes. Also, our approach at Queen's is to help people who help themselves. It is not about mentoring for

- everybody: it is about trying to embed expertise in those people who are winners — those who are most capable. It is about recognising who needs help and at what point in their careers, whether it is during an application process or in their research.
750. **Mr Dunne:** Thank you for your presentation. A number of issues have been covered. I want to deal briefly with funding opportunities, which have been mentioned. Could more be done to provide funding opportunities that are best suited to firms in Northern Ireland, considering that we have so many small businesses? Among the complaints that we get is that the process is too heavy and complicated. The uptake is very low; it has been eye-opening to see how low it has been. Do you have advice on how that could be improved from the university point of view?
751. **Mr Rutherford:** I agree with all of those thoughts and comments. R&D engagement is generally fairly low in the region, and it is not helped by the bureaucracy of the schemes.
752. **Mr Dunne:** It is too heavy.
753. **Mr Rutherford:** Yes, it is too heavy-handed and out of sync with other needs of business, in relation to the timescales involved. Perhaps there is a role for trade associations and other such organisations to aggregate the needs of SMEs. If there are particular consistent needs or consistent problems, I think the university is able to help more. It is difficult in such a dispersed area where we have such a wide and expansive range of issues. Sometimes it is hard to engage tactically across a huge range. If there were a way of aggregating, consolidating and understanding the needs of business, it would certainly help improve things.
754. Knowledge transfer partnerships, as I have noted, have been a key tool in universities. I think they have been a huge hit and success across the UK. That is a key way of tactically engaging.
755. **Mr Dunne:** Is it fair to say that short-term funding is available in a lot of cases, but not long term? Risk is a big issue in relation to R&D. Does the risk of committing to funding that, in the long term, may not produce anything, stop people getting involved?
756. **Mr Rutherford:** It is a consideration in any decision on any type of investment; there is risk attached. As we have indicated, it is an area in which there needs to be a degree of flexibility, understanding of the process and assessment of risk in a rational and logical way. It is fair to say that there is a lack of venture capital investment in Northern Ireland, in comparison with other areas of the UK. Addressing that is a priority in the strategy.
757. **Professor Gallagher:** I want to reinforce a point I made earlier. The other side of that coin is that we have an overly risk-averse culture. That is reflected in very high levels of audit. The reason why people will not take those steps is that the penalties can be huge, if things do not work. Allowing a degree of risk is necessary and important if we are going to get genuine innovation. It should not matter if some things fail, because, if you want to encourage innovation and gain success, you have to allow that to happen. I understand why people want to play safe, but it dampens down what is possible.
758. **Mr Dunne:** You mentioned the audit. Were you talking about audit in relation to European funding?
759. **Professor Gallagher:** It is general audits across all programmes. There is layer after layer of audit.
760. **Mr Dunne:** European funding is highly audited.
761. **Professor Gallagher:** Yes, and it creates huge bureaucracies and huge opportunity costs, which drive people away.
762. **Mr Dunne:** That is a fact; it is restrictive as well.
763. **Mr Rutherford:** It should be a consideration. We have an ambition to drive up EU funds, but the management of those funds has a high overhead.

We are looking to increase the amount of money brought in, but how will we address and manage it if that increase materialises? It comes with a huge amount of overheads. Funding schemes such as INTERREG are hugely costly to administer. I believe that both universities are considering looking carefully at the amount of engagement in those areas simply because of the amount of bureaucracy that is involved.

764. **Mr Dunne:** I have one more short question. We heard last week about a new composites centre on the Airport Road. How is your R&D engagement for that going?
765. **Professor Gallagher:** Is it the one in the Titanic Quarter?
766. **Mr Dunne:** Yes.
767. **Professor Gallagher:** That has launched. It is a particularly good example of an industry-led initiative, with both universities playing a key role in supporting it. The ambition is that having that sort of facility, with high-quality research and development, will encourage a cluster of companies to develop around it, tapping into the expertise as they need it. I think that it is a particularly good example of the sort of thing that can have hugely beneficial effects for the economy and link in with SMEs and other businesses very effectively.
768. **Mr Rutherford:** It is an example of both universities here and companies being involved. It is a piece of infrastructure that houses all those types of people in one building and in one place.
769. **Mr Dunne:** It is a good example. We are looking forward to visiting it. I think that we will get an invite to it at some time.
770. **The Chairperson:** Gentlemen, that completes the questions. Thank you once again for your very interesting oral and written submissions. It was very helpful.

8 March 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Daithí McKay (Deputy Chairperson)
 Mr Gordon Dunne
 Mr Paul Frew
 Mr Paul Givan
 Ms Jennifer McCann
 Mrs Sandra Overend

Witnesses:

Professor Tony *University of Ulster*
 Bjourson
 Mr Tim Brundle

771. **The Chairperson:** Our next item of business is an oral submission from the University of Ulster. The papers on this item are in members' packs, and include the University of Ulster's very detailed and helpful response to the inquiry, for which we are very grateful. Briefing the Committee are Tim Brundle, director of innovation, and Professor Tony Bjourson, director of the Biomedical Sciences Research Institute. We are very pleased to have you here today and look forward to hearing what you have to say. We already have your written submission, but I invite you to make an opening statement.

772. **Mr Tim Brundle (University of Ulster):** We would be delighted to do so. We will make a few opening remarks and briefly take the opportunity, on behalf of the University of Ulster, to reinforce and echo some of the comments made this morning by colleagues from Queen's. We are very thankful for the opportunity to be here and thankful that the inquiry is taking place. It is certainly welcomed by the university. We are very pleased to be providing evidence to you.

773. As it says in our submission, we are a unitary institution. As you will be aware, we have four main campuses across Northern Ireland: Belfast; Coleraine; Jordanstown; and Magee. We are a

modern, leading university. We have a strong regional mission, which I will come to later. We have performed exceptionally well in developing and enhancing the relevance and quality of our research, innovation and taught programmes. We have established excellence in chosen research areas and contributed substantially to developing regional, economic and societal capacity through technology and knowledge transfer. We are a major contributor to research and innovation capacity in Northern Ireland in support of local business and industry. We have a research strategy that focuses on a selective prioritisation based on performance, and our research base has strengthened and expanded rapidly in respect of funding and quality. We have established research institutes in 16 disciplines across the university.

774. Following the publication of the results of the 2008 research assessment exercise, the independent and authoritative 'Times Higher Education' league tables of research quality placed the university in the top third of UK universities, ahead of many longer-established universities. Of the 25 disciplines that we submitted to the RAE in 2008, 21 had research assessed as being world-leading, with a four-star ranking, and biomedical sciences, which Tony Bjourson leads, nursing and Celtic studies were each ranked in the top three in their field in the UK.

775. Essentially, at its heart, the University of Ulster is about the creation of knowledge through research and the dissemination of that research through teaching and innovation. The production of high-quality, high-impact research is essential to maintain the intellectual and civic mission of the university, and the diffusion of research outputs into the economy are led, internally, by the university's office of innovation, which is, in effect, our one-stop

- shop for innovation at the university and, externally, by our wholly owned knowledge transfer and investment company, Innovation Ulster Ltd. We believe that a buoyant research base is important, not only for our collective education — that is, is the collective education of the people of this region — but for economic growth and social and civic advancement. We believe that creation and diffusion of knowledge are critical to development, not only economic development.
776. We welcome the inquiry, and we are hoping that the research and the evidence that has been presented to the Committee will have an impact so that we will increase the levels of research activity and innovation activity in Northern Ireland and the competitiveness of the companies in the region. It will also have a social impact on the back of that greater level of research and greater level of diffusion of the outputs of research into society.
777. I am Tim Brundle, director of innovation at the university, and I am also chief executive of Innovation Ulster, which is our technology transfer vehicle. I am also a board member of Invest Northern Ireland, and I am a director of a number of start-up companies that are based on the outputs of research. We were hoping to have with us Professor Hugh McKenna, but, unfortunately, he had to fly off to Italy. I am very grateful that Professor Tony Bjourson, director of the Biomedical Sciences Research Institute, is able to join me. Tony is an academic who has led a world-leading research institute.
778. I will amplify some of the comments that our colleagues at Queen's made a moment ago. The levels of business impact that we see are increasing from the outputs of research. We have seen a much higher degree of engagement from business into university research and development activities, and we have seen a higher outflow of research into the economy. We have seen a much higher degree of engagement from academics in business activities. We reckon that, in 2011, around 37%
- of our academics are working with companies today. There are a number of reasons behind that. Not only are they seeing the institutional benefits from engaging with industry, both to their teaching and research endeavours, but, as the changes have been made to the research assessment exercise and research excellence framework, we see a much higher degree of emphasis placed on impact. That is the translation of research outputs into the economy, including providing competitiveness for industry; policy inputs and impacts; and societal inputs and impacts. That diffusion is becoming increasingly important for the university sector across the UK, and we are seeing the benefits of that.
779. I will also highlight some comments that were made about economic strategies. At the University of Ulster, we also have an alignment between our corporate goals, the draft economic strategy and the objectives of various task forces and strategy documents in Northern Ireland. There is a strong alignment there. Historically, where the region has fallen down, as Scott Rutherford indicated earlier, is in the implementation. One thing to note is that, when we are dealing with innovation and research-based competitiveness in industry, time is a massively important factor for those companies and projects. One of the examples that was provided earlier was of the knowledge transfer partnership (KTP), where we have, in effect, lost two years of enhanced funding into industry. That is two years of activity that did not happen in a proportion of companies in Northern Ireland. That programme is still running, but at a lower level than it could have been. Therefore, we have lost opportunities for our companies to have an impact.
780. The Higher Education Innovation Fund was also highlighted: we believe that there was around a 16% drop in that. That is the interface between the universities' research world and the economy. That interface translates one into the other and grabs requirements from industry and brings them back into

- research. We have reduced the level of that activity by 16% at a time when we are highlighting the importance of innovation and R&D to the economy.
781. I will also touch very briefly on issues of bureaucracy, which is a problem that presents many barriers. Cherry Pipes presented evidence to the Committee some weeks ago, and it highlighted that it was spending around £35,000 to get a European framework project proposal prepared. We have seen a range of figures. Anything from £15,000 up to £45,000 is a typical investment to get the project off the ground. This is a competitive environment, and the chances of proceeding with those are small. Therefore, a high degree of investment is required from what is essentially a small-business economy. There is an opportunity there for assistance from government to help those companies to overcome the burden of getting engaged in those programmes.
782. I can give an example of the grant for the research and development programme that is run by Invest Northern Ireland. It provides a very small amount of money to companies that have research concepts that will apply to their competitiveness. It provides a very small amount of money to get those projects off the ground, to get them scoped out, to undertake some validation of the technology and to develop a full project proposal. Therefore, that is grant assistance to get them to the point where the project can start in earnest. That is something that we found very welcome, and it provides more opportunities for collaboration with the universities.
783. I could go on for hours, but it is probably best that I do not.
784. **The Chairperson:** Thank you very much, Mr Brundle. What you have said is very interesting. I would like to expand a little on the relationship between the university and Invest Northern Ireland, because you seem to have emphasised that in your written and oral submissions. No matter how good the relationship is, it can always be improved. How good is it, and in what way can it be enhanced?
785. **Mr Brundle:** It works on a number of levels. If you take the example of foreign direct investment, foreign direct investors typically target Northern Ireland because of the quality of the skills here. In looking at that, they are essentially looking for the quality of graduates. When they look at the graduates, they are looking for their availability and their depth of knowledge, as well as for quality and price points. Therefore, as Invest Northern Ireland promotes inward investment to Northern Ireland, we have an active dialogue about our course content and outputs from the university. As Invest Northern Ireland increasingly targets more knowledge-based projects internationally, we find that there is a higher degree of research activity within those projects. Therefore, those companies are looking to the universities to identify the depth of research capability in the university and the specificity of that research to the requirements of those companies, and we are continually involved in that dialogue.
786. That is happening on one level, which is a good thing. Secondly, as company expansions are ongoing across Northern Ireland, where the expansion is based on new technologies or research work, that is something that the universities are commonly engaged in, so we will often be a collaborating partner with companies that are experiencing that level of expansion.
787. On a third level, Invest Northern Ireland provides finance to assist our commercialisation efforts. That is the outflow of our research into the economy in Northern Ireland. To give an example, one scheme that it operates is the proof of concept scheme, which provides a financial contribution to academics who have ideas that may have commercial potential. That helps to de-risk the projects and validate the scalability of the technology arising from the research. It helps us to engage with the marketplace and ensure that the

- emerging technology is industrially relevant. That scheme has been very effective. Invest Northern Ireland also makes a contribution to the Higher Education Innovation Fund administered by the Department for Employment and Learning. Those are all areas that are beneficial and things that are working well.
788. **The Chairperson:** You also identified the 16% drop in the Higher Education Innovation Fund for research. That was also mentioned by Queen's. That is a local decision.
789. **Mr Brundle:** It is.
790. **The Chairperson:** You would also characterise that as not a very positive way of dealing with what we need to be doing now, which is to try to enhance our research capability. I just want that on the record.
791. There was also a very useful reference in your submission — you did not refer to it in your oral presentation — to the role of venture capital in development here, including business development, industrial development and research. How important is that? It does not seem to be given much prominence. There does not seem to be the same level of venture capital being used here in Northern Ireland as in other parts of Europe.
792. **Mr Brundle:** No, indeed. Venture capital is incredibly important as a tool to help exploit the economic value of research. If we are to start companies on the back of our research and engage with early-stage, high-technology, knowledge-based companies, those companies have a reliance on private equity, whether that be seed capital, angel investment or venture capital. Scaling those companies and making those opportunities so as to make that research pay for Northern Ireland requires those sources of capital, and venture capital is one. We certainly need an awful lot more venture capital in Northern Ireland.
793. **The Chairperson:** Can I just stop you there? I am sure you are absolutely right in that, but it seems to be almost
- an alien concept to a lot of people in business here. That may be reflective of our risk-averse approach to business and other matters of public policy. How do you attract more venture capital and encourage companies to take up opportunities that there might be for venture capital?
794. **Mr Brundle:** I will answer that in two ways. Belfast hosted the annual Irish venture capital conference yesterday, led by InterTradeIreland. At that conference, the sense that the attendees got was that there has never been more demand for venture capital, more need for venture capital or more interest in venture capital, and there has never been so little money available. So, the levels of competitiveness are increasing massively among those companies.
795. From the university's perspective, we rely on a number of sources of funds to get ideas into the marketplace. We rely on research funds, as you will be aware, and we rely on innovation funds, such as the Higher Education Innovation Fund, to translate that research from the laboratory into an enterprise. One of the comments made earlier was about risk. These are very risky ventures; when they come off, they come off big, and they have a huge economic impact. We need to be doing a lot more of that. However, those kinds of companies are not bankable. They require private equity; they require angel investors, who can give their time, expertise and funds; and they require venture capital. We, as a university, operate our own seed fund; a small venture capital fund from which we have provided some money to our companies to get them started off. That is a private fund, which we created out of necessity, not for any financial return. We did that because there was market failure in that area. We then sought venture capital money all around the world, to try to get those companies scaled. Take the deals that we have done over the past year; we have done around 12 venture capital deals over the past 12 months. Of those, I believe that nine have leveraged venture capital or angel money from outside Northern

- Ireland, and six have leveraged venture capital money from the United States, most specifically from Silicon Valley.
796. **Ms J McCann:** You are very welcome to the Committee. Can I just pick up on the role of Invest NI? It was mentioned earlier that you are on the board of Invest NI, so you are probably well placed to answer some questions. The paper says that Invest NI is not actively bringing research opportunities to the university —
797. **Mr Brundle:** Yes.
798. **Ms J McCann:** — and that it could do more to identify sources of match funding. It goes on to say that there needs to be a closer connection between Invest and the universities to develop that shared understanding. In some of the presentations that we have received — you will have heard me mention this earlier — it is very clear that people are saying that there needs to be one place, if you like, where support and all that can filter through. I know that the draft economic strategy calls for an innovation council. Do we need to have a fresh look at this? Do we need some sort of structure for the business organisations that are interested in research and development, the universities, the regional colleges and SMEs? Do you feel that there is now a need for that to happen? Would that be placed, for instance, in Invest NI, to replace whatever is there at the moment? Do you sense that that would be a good way of going forward on that?
799. **Mr Brundle:** Invest has an active European team that is brokering links between companies and universities in Northern Ireland and elsewhere in Europe. That is something, certainly, to be welcomed. The point for the universities is that we go out and win our own business, whether that is with companies that Invest is promoting, with which we will go and seek research partnerships, research council money or European framework money. It is the research institute directors and their teams in universities who are the most active in pursuing that activity. Tony can come in on that in a moment.
800. I think that a one-stop shop is a very interesting idea, not only to bring together the market intelligence about research opportunities that exist, which might be principally in Europe but could be elsewhere, but to have those collected. It would also provide practical assistance in helping people access that money and remove the many barriers that exist between the applicants and the funds. There are a number of roles that such a thing could play.
801. To go back to the innovation council idea, we are big fans of MATRIX and the work it has done to plot a technological progression of Northern Ireland and identify opportunities there. It is not a scientific advisor to the Assembly or the Executive. That is something that I do not feel we are sufficiently providing for. Tony, do you want to say something on that?
802. **Professor Tony Bjourson (University of Ulster):** I agree with Tim when he said that one of the failures was implementation. He mentioned MATRIX, and I was part of its life and health sciences horizon panel, where there was a very strong commitment and buy-in from the major stakeholders involved in the various sectors, whether in ICT, life and health sciences, etc. In the life and health sciences sector, the first report of MATRIX was in 2008, I believe, and this is 2012. I am still waiting to see its implementation, quite honestly. I think that an innovation council is a great idea, but it cannot be another talking shop. There have to be clear, dynamic, time-limited deliverables for achievement and roll-out of recommendations.
803. The life and health sciences MATRIX panel recommended home-based care and personalised medicine as two of its priorities for the next five to 10 years for Northern Ireland. We are four years into the 10 years. We are rolling out personalised medicine, but we are, essentially, doing it ourselves, for example, at the Clinical Translational

- Research and Innovation Centre (C-TRIC) in Altnagelvin. That was a recognition that you need to bring all of the stakeholders to the party. You need clinicians who use drugs and devices, you need the researchers like us, who develop them, and you need commercial companies, because, as university researchers, we can come up with the best drugs or the best diagnostics in the world, but, unless they are commercialised, quite frankly, there is going to be no benefit for any patients. If you think about it, how many times have you gone to a hospital or clinic and been given a drug or prescribed a product that did not have a company brand name of some sort on it? That is because there have to be all the regulations associated with that.
804. There is gap between discovery at the laboratory bench and clinical utility. The office of innovation at Innovation Ulster has a series of gates, which I commend. One of the weaknesses that we saw was in bringing the stakeholders together. For the majority of clinicians, their day job is treating people. They do not really get paid to be businessmen. The majority of them give freely of their time. Similarly, my day job is doing research and teaching. I am not, first and foremost, a businessman. I do that through our office of innovation. Creating a stakeholder forum was required, so I suppose C-TRIC was a relatively low-cost initiative that brought in the clinicians; businessmen, in the form of drug companies or diagnostics companies; and, the most important component, the patients, because you must have representation from all of the stakeholders. So, although I recognise that an innovation council would be an excellent idea, I urge that time-limited delivery is key.
805. **Ms J McCann:** Whose responsibility is that commercialisation of the product now? It is obviously not happening. How do you think it could happen in a future structure?
806. **Professor Bjourson:** I would hate to create the impression that commercialisation is not happening.
807. **Ms J McCann:** But it is not happening at the level that it should.
808. **Professor Bjourson:** Yes. The other issue is that it is probably not a good idea to copy people, because you will only end up being second best. We had huge problems establishing the Clinical Translational Research and Innovation Centre. People said, "There are no examples of it elsewhere. Do you expect us to take a risk and put funding into that sort of initiative?" We said that we have to be creative and innovative, but we did not have an exemplar model to point to. Academics, by nature, are risk takers. Research is a risky business, and whether it is facilitated by Invest Northern Ireland or government, academics will endeavour to achieve their objectives. I think that the policy pursued by the University of Ulster, in the form of establishing the Ulster Innovation Fund, addresses that in many ways at a university level, with the board of the company calling in academics for their expertise. I think that people are sometimes very hesitant to put their hands up and say, "I am not the best person to answer that question. We maybe need to take advice on that". I think that we do pretty well at providing that in the office of innovation.
809. **Mr Brundle:** From a commercialisation perspective, our role is to de-risk a project and to make it as attractive as possible in order to get industry to take the lead. We want companies, ideally local ones, leading those types of projects. However, in many cases, they are not going to take raw data and research out of the laboratory, because that requires investment, be it through proof of concept or venture capital.
810. **Mrs Overend:** Thank you very much for your presentation. You are obviously passionate about the subject. You mentioned that there seems to have been an increase in R&D in recent times. Can you provide statistical evidence of that? There are more links with small and medium-sized enterprises (SMEs) than I had first anticipated, or maybe it is just a case of my knowledge being increased. Is there something that

- we can do to promote how successful such links are? Surely we should use that as an opportunity to get the message out so that more SMEs engage in R&D.
811. **Mr Brundle:** I agree completely. We have a number of data sources that we will be able to share. One of the data sources we use is an annual survey, the 'Higher Education — Business and Community Interaction Survey', which each university in the UK is required to complete. It is very detailed and sets the levels of business and community engagement. We can provide the raw materials and benchmarks for that to the Committee.
812. **Mrs Overend:** What I am saying is that we are so busy getting on with the work when we should be using the opportunity to promote what we do and to get the message out about what opportunities are there.
813. **Mr Brundle:** I agree completely.
814. **Mr Dunne:** Thank you very much for your presentation. We were impressed by your enthusiasm and knowledge of the subject. I think that you had the benefit of listening in on our previous questions. We were intending to run along similar lines for both parties, but we will maybe have to change that plan slightly. My points relate to funding. We have found that there is great frustration, especially among manufacturers and those carrying out research, because of the problems in accessing European funding. You said that the university has 25 framework projects. Do they relate to European funding?
815. **Mr Brundle:** Yes.
816. **Mr Dunne:** They do? Solely? So, you have gone through that pain barrier and have been able to access the funding. Why do you think you have succeeded where others have failed?
817. **Mr Brundle:** First, I do not think that we have gone through the pain barrier. We are still in pain. *[Laughter.]*
818. **Professor Bjourson:** With European framework programmes, it is critical to have the appropriate networks in place. I have been involved in all types of research funding.
819. **Mr Dunne:** Mainly the pharmaceutical type?
820. **Professor Bjourson:** I was involved in the yeast genome sequencing programme in Belfast years ago. They are fundamentally different projects, and the different types of funding are quite different. The UK-based research council funding is, primarily, individual principal investigator-led. Historically, research councils have focused funding primarily on basic research that does not or would not in the past have commercial exploitation as the primary objective. It is where a single lab or a single researcher applies for a research programme of £300,000, £400,000 or £500,000. That is critical as well, because that basic-discovery, curiosity-driven research, which, when you analyse it, may not have any obvious commercial exploitation potential, is still the bedrock that, eventually, is the foundation of applied research. It is a balanced portfolio, which includes funding for basic research and intermediate research.
821. The EU framework programmes in particular involve multiple partners.
822. **Mr Dunne:** That is where small firms find it frustrating.
823. **Professor Bjourson:** It must be extremely difficult.
824. **Mr Dunne:** It is.
825. **Professor Bjourson:** Never mind the European framework programmes, a lot of the funding bodies require bureaucracy, administration, filling in time sheets and auditing. My personal view is that it is extremely difficult for small companies in particular.
826. **Mr Brundle:** There is a role for government — directly or by sponsoring — in finding a solution to take a lot of that administrative pain away from all

- of us. We are a large university, and we have a very skilled team of research administrators, but those programmes are still difficult for us, never mind how difficult they must be for a start-up company or an SME.
827. **Professor Bjourson:** An academic mentor being costed into the proposal is a possible solution.
828. **Mr Brundle:** We have seen some examples, elsewhere in Europe, where there are consulting companies and parts of government that provide administrative resource, drafting resources and financial planning resources to help companies into framework programmes. We have not been terribly active on that here.
829. **Mr Dunne:** We visited a large pharmaceutical company that does a lot of R&D work. It has some reservations about the support that it gets from Invest. That day, the emphasis was on more money being required from government for the sort of development work that it does. It works on pharmaceutical R&D, and the benefits that flow from that are great and would be good for the health service and the economy.
830. **Professor Bjourson:** As a university, not through any government directives, we have gone out to industry and asked local companies in Northern Ireland, such as Randox, Almac, Norbrook and Warner Chilcott, and companies in the Republic of Ireland a simple question, which is, "how can we help?" That does not mean that we are a charitable organisation; we have to cover our costs as well. There are ways in which you can help each other for mutual benefit. For example, if we are appointing new members of staff for taught programme delivery and we happen to know that a particular pharmaceutical company has an interest in a particular disease area or a particular drug, we can write that into the job specification of the person who we are recruiting anyway. Once that person is appointed you have an immediate alignment between the university department and the commercial company, and nobody has spent an extra pound. That is the strategy that we are embarking on.
831. We are basically asking the companies how we can better align our business objectives as a university research organisation or higher education institute with them as a commercial company so that it is a win-win situation for both parties. We are not being driven to do that. We see that as an absolute requirement. Rather than going to companies, as universities may have done historically, and saying that they should be doing this or that, we are basically asking what they need from a product development perspective but also from the taught programme provision perspective. We ask them whether the graduates or postgraduates that we, as a university, are generating are fit for purpose for their workforce. We have invited industrial representatives onto our course validation advisory teams, for example. They have ownership of it. If the courses are not fit for purpose, we know. We have tailored and altered our taught programmes to better align and provide a highly skilled workforce, not just for our current indigenous companies.
832. Tim and I were talking about, and some of you might be aware of, the Global Pharmaceutical Centre of Excellence that came to Northern Ireland looking to locate here. It was a good example where there was a better connect between the stakeholders, including the university, politicians and the regional council. In talking to those foreign direct investors, what is important for them is not only the availability of a skilled research institution, either Queen's University or the University of Ulster, but a ready supply of a highly skilled workforce — we can provide that information for them — and also the quality of life, because if teams are moving from other countries to here and bringing their families, they want to know what the quality of life is, whether the education system is good and whether there are nice beaches. We talk about better connections, but that connection

- between the whole package, from an Invest Northern Ireland perspective, is quite important. It is not my job to act as a tour guide. Everybody has their remit, but I would suggest that joining up that circle and describing and presenting the entire package is very important for foreign direct investment.
833. **Mr Brundle:** He is not a bad tour guide. *[Laughter.]* I read the evidence from the visit to Almac with great interest.
834. **Mr Dunne:** That is what we were hinting at earlier.
835. **Mr Brundle:** An issue for a company like that, which is highly innovative, with a high degree of economic impact, will be the amount of money and the amount of time it takes to get something from the laboratory to the market place. You are talking about seven to 12 years. We are facing exactly the same issues. Taking research from Tony's research institute into the marketplace might take four years of development activity before we even get outside the university, after which there could be another six or 10 years of development. That is a lot of time and costs an awful lot of money. We do not have the money available to do that in Northern Ireland at the moment. If it is research in the life sciences, which is an area in which we have some of the most skilled research and some of the most valuable intellectual property — it is a real jewel in our crown — we cannot take that right through to the marketplace because of the limitation of funds. So, what will tend to happen is that the university will invest in that and undertake some early-stage development work in Northern Ireland. Then, the onward benefits will be exploited elsewhere in the world. The fact that they are out there and will reach the bedside is a good thing. Benefits will flow back into the universities or the companies on the back of that, but we are only seeing a small proportion of the economic value that we could accrue if we had the investment funds available to us.
836. **Mr Dunne:** Is there a real role there for Invest to move up to the next stage in support of R&D? It is a high-risk area, and government probably does not see that as where it wants to go. It is maybe difficult for you to answer that. Your enthusiasm has come through today. We perhaps need to look at that issue more, because somebody will have to move forward on it.
837. **Professor Bjourson:** There was a strategic decision in the Republic of Ireland to focus on the pharmaceutical sector, and it has representation from every major pharmaceutical company in the world.
838. **Mr Dunne:** Manufacturing?
839. **Professor Bjourson:** Manufacturing and research. The pharmaceutical sector and the type of jobs that it provides are highly paid and highly skilled and are protected, to some degree, from an economic downturn. People get sick, probably sicker, in an economic downturn. So, government may want to take strategic decisions at a higher level to ensure that there is top-level support for the ecosystem and for developing, for example, the pharmaceutical sector in Northern Ireland. Northern Ireland is limited in its size, so I do not think that it is feasible to do it in isolation from the UK and the Republic of Ireland. However, we can strategically target a sector such as that and provide the soft landing for foreign direct investors in the form of friendly tour guides. *[Laughter.]*
840. **Mr Dunne:** From the universities. Thank you very much.
841. **The Chairperson:** We have come to the end of our questions. Once again, I thank you for your oral and written submissions. They were very interesting and very helpful to us in our inquiry.

15 March 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Daithí McKay (Deputy Chairperson)
 Mr Gordon Dunne
 Mr Phil Flanagan
 Mr Paul Frew
 Ms Jennifer McCann
 Mr Stephen Moutray

Witnesses:

Dr Norman Apsley *Northern Ireland Science Park*
 Mr Frank Hewitt
 Dr Alan Watts

842. **The Chairperson:** Briefing the Committee today are Dr Norman Apsley, chief executive officer, and Mr Frank Hewitt, chairperson, of the Northern Ireland Science Park and Dr Alan Watts, director of Halo Business Angel Network (HBAN).

843. First, you are very welcome to our Committee today. I just want to formally thank you for the use of your premises. I think that it is very appropriate that we meet here in the Science Park. This is part of our inquiry into research and development. It is very appropriate that we are here. Thank you for your very detailed written response to the inquiry. We look forward to hearing what you have to say. There will be questions after you make an opening presentation. I hand over to you, Mr Hewitt.

844. **Mr Frank Hewitt (Northern Ireland Science Park):** Chairman, thank you very much. I extend to you a very warm welcome to the Northern Ireland Science Park (NISIP). I know that some members have visited us in the past. Those of you who are coming here for the first time are very welcome indeed. We are absolutely delighted that you have chosen to have your meeting here for a number of reasons. One of those is that we believe that the Northern Ireland Science Park has played, and will

continue to play, a very important role in the development of an enterprise- and innovation-based economy in Northern Ireland. It is also very timely that you should visit us now, because this is a very important stage in the development of the Northern Ireland Science Park; we may touch on that later in our presentation.

845. The Northern Ireland Science Park was established in 1999 as a not-for-profit foundation by the then Department of Economic Development, which is now the Department of Enterprise, Trade and Investment. Our mission is for the Northern Ireland Science Park to become a networked, self-supporting, internationally recognised science park that is a commercially and research-driven centre for knowledge-based industries, serving all of Northern Ireland.

846. We started work for real on the site in mid-2002 on what was a near-derelict 25-acre site at the north end of Queen's Island. When you take a tour of our campus later today, you will see five large Science Park buildings. The UK's pre-eminent centre for secure IT is the Institute of Electronics, Communications and Information Technology (ECIT) building. You will also see the historic Pump House, which was brought back from virtual dereliction and is now off the buildings at risk register. We are delighted to be able to say that all our buildings are completely let. That includes the new 50,000 square feet Concourse II building that you will see on your tour this afternoon.

847. By the end of this year, approximately 2,000 people will be employed on this site. The vast majority of those will have first degrees, and a large minority will have master's degrees and PhDs. I am also delighted to say that they will receive salaries appropriate to the qualifications that they hold. There are

- approximately 110 companies on the site. The livings from transactions outside Northern Ireland benefit the Northern Ireland economy to the extent of approximately £80 million a year. In other words, every year, £80 million goes into the local economy from wages and salaries paid to the employees of the companies that are located on the site.
848. We estimate that we will attract around 50,000 paying visitors to the campus as part of their interest in the Titanic enterprise. Among those visitors, and to my mind one of the most important groups, will be over 100 school outings. They are children who we invite to come to the Northern Ireland Science Park, not only to enjoy the heritage of engineering and science that exists in Northern Ireland but to see what the future might hold for the Northern Ireland economy and for them. To keep everyone involved, we created, with Facebook's help and sponsorship, a social network. It is for the generation of innovation for the most likely to succeed young people and to keep them informed about and inspired by the role models who work here and the case studies of the companies that have grown and developed on the site. Our hope is that those young people, as they grow and gain experience and knowledge, may either return to Northern Ireland or remain here and add to the gross value added (GVA) of the economy.
849. Returning to the matter of the day, economic commentators recognise four key elements in a vibrant knowledge economy, ripe with the commercialisation of research, which is the object, I understand, of your current study. First is the creation of knowledge itself; the second prerequisite is risk capital; the third prerequisite is the involvement of and exposure to a range of business support activities, for example the activities of lawyers, accountants, bankers, etc; and the fourth is the provision of a particular kind of property offering. We believe that all of those elements are available in the Northern Ireland Science Park today.
850. I will deal first with the creation of knowledge itself. Northern Ireland researchers, particularly in areas such as IT security, are well respected internationally, but we still fail to earn our just rewards from national and supranational funds. We need to engage more at earlier stages to help set agendas and benefit financially from both national and EU funding. The second prerequisite is, as I have said, risk capital. We have some good beginnings to tell you about, such as our Halo project, and Dr Watts will talk to you about that in a second. However, we have to recognise that we are still far behind areas such as Scotland and the Republic of Ireland. The Republic of Ireland, in particular, has a large and growing risk capital fund, which, at the moment, approaches something in the order of €750 million. Those two elements alone are not going to generate what we wish to see as a knowledge-based economy. Sufficiency in this area also comes from the inclusion in the mix of the business professionals: executives, lawyers, accountants, bankers, etc, and people known and respected across those disparate boundaries who are prepared to act as trusted emissaries and go-betweens. In other words, we need to engage the wider business community here in helping to encourage entrepreneurialism and knowledge development. That latter element is a key role in the range of facilities offered by the Northern Ireland Science Park. The final element is the provision of accommodation. As you will see, we have bespoke buildings, which offer a very high degree of flexibility and, thereby, make the location attractive for a wide range of science-based activities.
851. NISP CONNECT is the organisation that we founded on the San Diego model, which, as you probably know, was studied and recommended by such as Michael Porter in his study of that city's rise from Cold War bust to 21st century knowledge boom. For those who do not know the San Diego area, it became a strongly vibrant area in the 1970s and 1980s, based mainly on the US defence

- industry. As that industry contracted, jobs were lost, industries disappeared and San Diego, effectively, had to reinvent itself. The model that they adopted in San Diego is very largely the one that we are currently emulating in the Northern Ireland Science Park.
852. We feel that we found a particular edge in developing CONNECT in the identification and recruitment of Steve Orr, who happens to be a Northern Ireland entrepreneur who went to the United States, was very successful and then returned to Northern Ireland to bring his own knowledge and experience to benefit young people in Northern Ireland who wished to set up and develop their own businesses. It is not a case of Steve giving academic advice as to how they might do it, Steve is in a position to tell developing entrepreneurs how they can do it. To help him in that task, he has enlisted something in the order of 1,000 experienced business people in Northern Ireland who are prepared to provide help, support, advice and expertise on a pro bono basis to help those young, developing companies take their place in the world economy.
853. In everything that we do, the focus is on the entrepreneurial scientist and technologist and helping them to take their ideas to market, whether as the founder of a new business or as part of a global corporation. We believe that if we are to exploit our research to advantage in our own economy, both routes are essential. Indeed, it has been our experience that one very often mutates into the other.
854. To sum up, we believe that, through the Northern Ireland Science Park, we have created what we like to call an innovation ecosystem and an atmosphere where young companies can come along, grow, develop and build their expertise at very little cost to themselves. We will go into that in some greater detail. We also provide what we like to call a soft landing for international science-based companies that wish to look at Northern Ireland as a possible investment location. We offer them the opportunity to land in the Northern Ireland Science Park and to explore and develop their links with the local Northern Ireland economy, and, if they wish, they can then relocate to bigger premises elsewhere. Our experience has been that, once they come here, they rather like to stay, and we have found that science-based companies, in particular, like the atmosphere here and like the fact that there is an environment and a network in which they can interact with other science-based companies and young, talented people.
855. I have been chair of the Northern Ireland Science Park for just over four years. It is, without question, one of the most exciting things that I have done in my entire career. To come to this part of Belfast and see the development of young, dynamic companies is not only encouraging but is a great indication of what Northern Ireland can become.
856. **The Chairperson:** Thank you very much, Mr Hewitt. Your colleagues are very welcome to contribute to this discussion. I have been here before, and it is a very exciting place to visit. It is striking that, 10 years ago, this area was derelict, but the site has now not only been built on but has attracted high-quality scientific research and development. That is the really exciting part. It continues to prosper and expand, and, therefore, as I said previously, it is appropriate for us to come here and learn from you. I will ask a question first, and my colleagues will come in in due course. Could you expand a little bit on the CONNECT programme and on the Halo Business Angel Network?
857. **Dr Norman Apsley (Northern Ireland Science Park):** I will do CONNECT and Alan will do Halo. I apologise on behalf of Steve Orr; he would have been here but he is otherwise engaged in Derry. The essence of CONNECT is that it understands implicitly that the researchers with whom you are dealing are bright and often at the top of their game in their area. For example, ECIT, across the road, will have some of the top engineers in Europe in that environment, and they can earn a decent

- salary just by doing more research. If the research here stops, they can go anywhere in the world. They can get Green Cards, and they can get invitations to visit China. They can get whatever they need. CONNECT starts from the premise that those are people who do not need a leg up but who need encouragement and, almost, seduction into the world of business. As I said as we started, they often do not know the world of business, even to the extent of not knowing the name of their own banker or their own lawyer — usually, they do not have one — and, if you are going to do business, you need to meet those people.
858. The word “CONNECT” was picked by Mary Walshok, the founder, whom some of you have met, deliberately to bridge those silos. It also recognised that everyone in their own silo was busy. A silo does not form because you want it to be there but because you want to be efficient in what you do. Therefore, you have to find ways of making people want to cross silos, and that is what we have a series of engagements on. From memory, we have about six styles of engagement in which various people come together with the research base. They are doing such things as selecting the winners of a £25K award, but, actually, what they are doing is learning to trust each other and respect each other, so that, when they need capital and business support, people know who are good, who are not good and who needs it. That is the key to CONNECT.
859. The engagements are carefully worked out, sometimes not even knowingly, if you like, by us. We follow Mary’s position, but we have tuned them to our environment. For example, we can fill this room in particular 20 times a year with workshops, which we call Frameworks. There is not a soul in here other than new entrepreneurs. We do not let anyone else in, so they can feel free to ask silly questions. They are not briefed by me or Steve or Alan or any paid official on such things as intellectual property or the founding of a board; they are briefed by proper lawyers and accountants, and they meet up to four people who have done it before. That is the kind of room that we can provide, and it does not cost us anything. The room is paid for by the sponsors and so on. That is the nature of CONNECT.
860. **The Chairperson:** If you have an idea and want to develop it, CONNECT is the way to go, and you will be given the basic assistance that you need to enter the marketplace and become more commercial in your approach?
861. **Dr Apsley:** Yes, except that it is tough love. You will also be stopped very quickly if it does not work.
862. **The Chairperson:** If it does not work, it does not work.
863. **Dr Apsley:** That saves you time, and it saves us time. The two things go together, and, fundamentally, you are absolutely right.
864. **The Chairperson:** How many do not work?
865. **Dr Apsley:** We do not really keep count. We deliberately do not keep a memory, if you like, so that people come back again. We believe in the Californian model that trying is the best thing and failing is not a bad thing. Failing through fraud or through lying is a bad thing. That will go around our community like wildfire, and those people will never reappear. However, there is no shame in trying and failing.
866. If you have time, I can give you one example that I like and in which I was personally involved. A couple of physicists from Queen’s University thought that they had a business idea. We held a meeting of our Springboard type and introduced them to experts in the field that they had chosen to try to get into, and they discovered that their idea would not work because they had not realised that, sitting across here in Channel Commercial Park, is a Japanese company that is expert in what they had thought they would be expert in. The experts that they were introduced to also told them what the real problem

- was, and they were able to go back to the university and bid for research money to try to solve the real problem, which, in this case, was ground-source heat pumps for houses. The company asked whether there was any way of telling whether it would work before drilling the hole, which was the biggest problem. They are still thinking about it. That is the kind of thing that we do, and that was a good failure.
867. **The Chairperson:** Thank you very much, Dr Apsley.
868. **Dr Alan Watts (Northern Ireland Science Park):** First, I will add to what Norman said about the CONNECT programme, because I was involved in mentoring companies through the programme before I came onto the staff of the Science Park. I will give you a slightly alternative way of looking at it. Let us face it, Northern Ireland has a very long history. It is 100 years since the Titanic, and, in its day, Northern Ireland had state-of-the-art ideas, and I do not need to tell you the long litany of good ideas. However, when people have come up with great ideas, we have been very bad, historically, at translating those into commercial success. The ideas tend to come from very bright people who are not necessarily the most commercial. As the name implies, CONNECT connects them with people who have experience. There is no money involved, but they work with them and introduce them to other people.
869. As Norman said, part of it is about killing ideas quickly or not. Assuming that it is a good idea, it is, then, a question of telling them what they do not already know. They do not know that they do not know it, because they do not understand how to build a business or a board — all of the commercial stuff. Therefore, in my mind, CONNECT is the vital missing link, which, if we are honest, we have largely been missing for a very long time in this Province. It is taking good ideas, of which we have plenty, and converting them into commercial success. That early link to get them to point where an organisation like mine could put money into them — where they are investor-ready, to use the jargon — is missing. I really think that that is what CONNECT is about. I hope that that is helpful.
870. **The Chairperson:** It is very helpful indeed.
871. What about the Halo Business Angel Network? What does that do?
872. **Dr Watts:** The first thing that everybody says is that it is a 'Dragons' Den' for Northern Ireland. That programme is helpful in the sense that it raises people's awareness of what angel investing is about. I have to tell you that real life is nothing like the programme. It is actually a nice experience, not an entertainment process. It is a group of well over 100, mostly Northern Ireland-experienced, business people who have some money. Although they are interested in making money, they are more interested in putting something back. We take a number of companies every year, prepare them, put them in front of that audience and offer the business people the chance to get involved. Effectively, we are a dating agency. We get them together. If they like each other, ultimately, the business people will invest. Often, the companies are start-up companies, but not necessarily.
873. I will give you some figures. Since we started the network in 2009, our angels have invested well over £3 million of their own private money in local companies. No public money is involved at all. I hope that, by the end of our third year, I will be able to say that they have invested £4 million in three years.
874. On the face of it, it is a success story. In our second year of operation, the British Business Angels' Association voted us the top angel network in the UK. Therefore, we are doing some things right. On the other hand, when you look at it and benchmark it against other areas, you see that Scotland is actually one of the leading areas in the world for angel investing. Most people think that it is America. They are correct in thinking that America is one of the leaders. However, oddly enough, Scotland is doing a lot better than, say, England. In

- Scotland, angel investors invest over four times more per head of population than they do in England. Of course, England includes London, so that is quite surprising.
875. They have been at it for 20 years; we have been at it for a few years. There are a lot of structural issues, such as improving the angels and training them. There are a lot of things that we need to do. We believe that, given time, we can increase the amount of angel investing by an order of magnitude. Fundamentally, it is, largely, local, high-net-worth people who are putting their money into companies in Northern Ireland. The companies should share one characteristic, which is high growth potential.
876. I also want to add two points of detail. We are unique among UK angel networks in that we make use of an online private video site, which means that any angels who are unable to get to a meeting will watch online. By the way, normally, around 50 come along. Therefore, it is very unlike the TV programme, in which there are five people. You pitch to 50 people. Another 20 watch online. Think of your odds. Around seven companies pitch to around 70 people. You can see that the dynamics of the odds have changed compared with those of the TV programme. It also means that we have angels who are based, for example, in England. I do not mean ex-pats; I mean that there are people there who believe that the deal flow in Northern Ireland is good enough that they pay to join Halo and watch via the video site. They do invest. Again, it is, perhaps, not what you would think.
877. I will mention something that I know is close to your hearts. You will all have seen 'The Shore' receive its Oscar recently. You may not be aware that funding for that came through Halo. The film-makers pitched here. Because they were unable to do it at a meeting due to timing, they put up a pitch on the private video site. I sent an email to all of the angels, which was headed, rather cheekily, "Your chance to be at the Oscars". The rest, as they say, is history.
878. **The Chairperson:** Very good. It is a great success. I have a couple of other questions. We have been looking at access to European funding for research and development. Of course, we have come across the situation in which many companies in Northern Ireland will not apply for funding simply because the process is so difficult, particularly for framework programme 7. I know that the European Commission is aware of that and will try to remedy it and make it more accessible and user-friendly with Horizon 2020. However, your submission pointed out other European funding. You talked about the Eurostars programme, and we discussed that a few months ago in Brussels. What is your experience of European funding?
879. **Dr Apsley:** My personal experience is slightly outdated. I led a framework 2 programme, which tells you how long ago it was. My general point about Eurostars in particular is that we do not take advantage. Building confidence with Europe is just like we talked about in CONNECT with our own silos. The people have to be known. I call it building the esteem of our researchers, their research and the outputs of what they do. That is what you do through Eurostars and other programmes. You have to start early to get your people known, because they will then be invited onto committees.
880. A number from the public sector have that reputation and esteem but are not eligible because they are public sector. So, we have wasted some of that. However, there is only one way to start building it, and that is to do everything we can to get people onto the appropriate registers. I am also a great believer in learned societies. If you are able to be in a learned society, you ought to be there and take part in it. That is a philosophy we operate in the Science Park. So, it is a case of getting your personal esteem up and to bring up the esteem of the nation, and that will have its reward.

881. There are more ordinary bread-and-butter things. I happen to be aware from yesterday's MATRIX meeting that the Government intends to fund professional go-betweens who will help to interpret some of the Europeanese in those documents, and that is very welcome. That will undoubtedly help us to make a better fist of it than we do at the moment.
882. **The Chairperson:** Your submission states that one big problem in Northern Ireland is the lack of venture capital. It goes on to say that that is reflected in the 2011 'Knowledge economy index baseline report 2011'. The report is very interesting and made comparisons with the San Diego model. Will you expand on that statement about the lack of venture capital?
883. **Dr Apsley:** With your permission, Alan is our expert.
884. **Dr Watts:** Just so that we are speaking in the same language, people talk about venture capital and get a little bit confused between seed capital and capital given by venture capital companies. For simplicity, we tend to say venture capital. However, the two are separate and distinct because you will appreciate that a company at the very early, risky stages is when it needs seed capital. It is generally acknowledged that whenever there are seed funds, and there are seed funds all around Britain and the world, the best they will ever do is return about 85% of their money. In other words, it is a loss-making proposition but there are good reasons for doing it.
885. Venture capital is generally done by the venture capital industry — some of the big names you will have read about — and that is where the business has developed. It has probably got revenue and the venture capital comes in to grow the business. So, you are in business and, with that extra money, instead of growing 10 times in five years, you grow 10 times in two years. So, I make a distinction between the two.
886. We have one seed fund in Northern Ireland. It is government money and is administered by an organisation called E-Synergy. In broad terms, it has £5 million to invest in five years. There are also two £1 million funds for investing in universities, and there is some proof of concept funding, which is very early stage funding. One could argue about the figures, but you may say that there is less than £10 million, and that is fair. If you compare that with Southern Ireland, they were very clever at the time of rescuing their banks, and one of the conditions for the banks was that they put money into seed funds. There has been €124 million of seed funding from the banks and about the same again from the South's innovation fund. Therefore, there is an order of magnitude difference in seed funding between Northern Ireland and the South. The level of angel investing is in and around those levels, but it tends to come alongside seed funding. The amount of angel money that is available in Northern Ireland and in Southern Ireland is roughly what you would expect from the different populations. There is not a big difference in that area, but there are some improvements that we can make.
887. However, we have a problem with the venture capital (VC) industry here. Northern Ireland is sub-scale and too small, and there are currently no Northern Ireland venture capital companies that can invest in new ventures. One company has taken on a welcome £7 million fund from Invest Northern Ireland to co-invest with angels, and that fund will be used to bulk up angel money. It is based on the Scottish model; it is a good thing, and I very much approve of it. However, in effect, it has taken that company out of the VC market. One company, Crescent Capital, has won a tender and is producing a £30 million fund of which £10 million has been subvented from government. It sort of takes second place in the pecking order, and, common to other VC companies, it is struggling to raise the remaining £20 million of that fund. For the past two years, there have been

- no VC funds locally. The good news is that some Dublin funds and one or two London-based funds have come across and invested in what they believe to be exceptional ventures. Those investments have proven to be very good for them, but you will appreciate that the number of those investments is very small.
888. Therefore, we have too little seed funding on an order of magnitude and almost no VC money. Any comparison that you care to make with other regions shows that we have a serious problem. The innovation report shows that if we do not fix that problem, it will be the number one constraint to growing the types of company in the knowledge economy that we talked about.
889. **Mr Hewitt:** I want to give a supplementary answer to your question about the interaction with the EU and the complexity of applying for grants. One of our strategic ambitions is to develop other science parks at remote locations. That ambition includes the development of a science park on the Fort George site in Derry/Londonderry. In order to take that project forward, we have submitted an application through the Special EU Programmes Body (SEUPB) to the EU for approximately £14 million in funding. We recognise the fact that all Departments, whether national, regional or Europe-wide, have a responsibility to appraise projects carefully. However, it is probably true to say that the speed at which the appraisal of that project has proceeded has been disappointing. We are not a large organisation, but we have access to considerable expertise. We have had to draw on that expertise to pursue the application, and small organisations that do not have that access would find it difficult and daunting to make such applications. I would welcome any moves by the Committee or the Assembly to make the process of applying for European funding a simpler and more user-friendly process. It tends to be reiterative and people find themselves answering the same questions in slightly different formats.
890. Where our ambition for Derry is concerned, our proposal is predicated on being able to get up and get into business within a certain timescale. We have not always been convinced that the SEUPB and other bodies are totally aware of the timescale within which we have to operate. That is not a criticism in any way. It is an observation of the process that I think they have to go through. Anything that can streamline the process would be beneficial not only to us — that would be a very selfish observation — but to other organisations in Northern Ireland that are seeking funding. The funding bodies have to realise that business opportunities present themselves in certain timescales and that if people cannot respond to those timescales, the opportunity will very often slip away.
891. **The Chairperson:** Thank you very much, Mr Hewitt. That reflects what a number of organisations said in evidence to the Committee. I am grateful to you for reiterating that.
892. Dr Watts, what can be done to improve the situation on venture capital? Is it just something that the market develops?
893. **Dr Watts:** Quite a lot can be done. The Science Park is already doing something, in that we run a VC forum. Through the forum, we deliberately reach out to venture capital companies in Dublin and London, get to know them and build up a relationship. Once a year, we invite them over here to see, on the back of a major event, about six of our best companies. So we are bringing them over to shoot fish in a barrel — that is the expression that we use. The companies are already lined up, so it is made really easy for them. They see the best, and generally they are very impressed. To be honest, when they came across at the beginning, they said, “We felt that we ought to come over, but we did not really think that we would see very much”, and then they were blown away with the quality. It is about building relationships, because those companies have not yet invested. That is one thing that can be done.

894. A new €30 million life sciences fund was announced in Southern Ireland today. The Government there have taken some more money of the type to which I referred, set it to one side and made it available in a creative deal with a San Francisco VC. That VC will then move to Ireland, set up an office and invest some of its money, along with some of that semi-government money. So the Government have been very proactive. They have also used the Irish–American angle, and rightly so. So a number of things can be done.
895. Geographically, we will never be strong enough on our own to have very large native venture capital companies. However, we could have offices here for some of the best ones and make very good use of the fact that Dublin is only an hour away. A lot of companies are looking to set up in Dublin, but they could set up here and effectively cover both.
896. Let me explain why there is a problem in the South as well. The South has a massive amount of seed money. However, all the companies running along this road are heading towards a cliff because, although there is a lot more VC money down there than there is here, there is not nearly enough. It is a runway, and people will be heading towards a cliff unless they get the next piece in place. It is like a series of elevators. However, as I say, quite a lot of things can be done.
897. **Dr Apsley:** I want to add to the point about the venture forum. I think that the venture forum is, by a long shot, the best joint venture that we have with the universities. The shopping list is determined by Alan and Steve, along with a key individual from each university. They go off to firms in Dublin, London and, hopefully in the future when we have a little more travel money, New York, where they beard the dragon in his den and find out what they want. They then come back and report to the private secretary here, who helps us to determine which fish will go into the barrel. It is done entirely with private secretary input, which is crucial. As Alan says, venture money comes from firms, which have boards and dealmakers. So it has to be made very efficient for them. The very first thing that I learned when we started thinking about a science park is that dealmakers do not get out of bed for anything other than a large sum of money. It has to be made as efficient as possible for them to do that, which is what we do.
898. The second issue that I want to mention, which is nearly as good as venture money, is early customer. The other form of money, which I do not think that we use enough but which I know we have new plans to try, is called the small business research initiative (SBRI). It was not invented by me. It is about neither small business nor research, so it is the worst-named initiative in the world, and people usually just refer to it by its initials. It was invented by the Americans. As you may know, it was born because, under the general agreement on trade and tariffs (GATT), Governments are not allowed to be the giver of the only contract that sustains a firm. That would be illegal under state aid rules. However, one exception was made for early products or first customers. The Americans pioneered it, and Europe followed. We are quite laggardly in our use of it. It would allow government to procure something for use as real procurement but in a way that was very early, so you could share and measure the benefits of using it before you went into a real procurement. The kind of thing that could have been done, and which we have done here but in a different way, was the Wrightbus, which was flying up and down the road there accessing our antennas for radio and then measuring that to show that you could do a video stream of the bus. In my opinion, that could have been procured and working for a year under SBRI and then made available in that way to Las Vegas and wherever else it was being sold. We could develop SBRI. I know that, in recent times, DETI has an aspiration to grow £50 million with SBRI, and I think that there are ways of pushing that forward.

899. **Mr McKay:** Obviously, much of the success and potential success is based on connectivity and networking. In a previous life as a member of the Committee for Finance and Personnel, we looked at the issue of academia, business and government and how they interrelate. At that time, some of the witnesses — I think that it was Victor Hewitt and John Simpson — flagged up a concern about departmental officials and civil servants and the culture here in the North, in comparison with London and Dublin. For example, you would have had seminars with academics from Queen's University and the equivalent, and there would always have been departmental officials there with a listening ear. However, that does not seem to happen here. Is that a concern, or do we need to address the cultural issue as regards government and the silos that Departments have formed into over the years?

900. **Mr Hewitt:** I will answer that from a strategic point of view, and I will ask Norman to answer from an operational point of view. There are a couple of dimensions. First, the two universities have been involved in the project virtually from the start. They are, effectively, stakeholders in the Northern Ireland Science Park Foundation, which is our top company, as it were. The two vice chancellors sit on the board of the foundation, and university representatives sit on some of the subsidiary companies, because we have a property company, holding companies, and so on.

901. As chairman of the foundation, the input from my university colleagues is exemplary. They are hugely supportive of what we do. As well as giving us vocal support, they are huge contributors to the strategic development of the park and have remained so. I want to record the fact that I value the input from the universities very highly.

902. If I may, I want to touch on the relationships with Departments and officials. It is largely due to the foresight of the Department of Enterprise, Trade and Investment that we have the

Science Park here, and it was something of an entrepreneurial decision in itself by the civil servants of the day to invest such a significant amount of money in the park at the start. Since then, the relationship with the Department of Enterprise, Trade and Investment has largely been light touch. Obviously, the Department cannot walk away totally, because, had it not been for its £23 million, we would not be here. Therefore, it has a responsibility to ensure that we continue to operate effectively and professionally. However, it is probably true to say that it has decided on a light-touch relationship, and I assume that is because it believes that, effectively, we are doing what it originally wanted us to do. We get almost no interference from the Department on the day-to-day operations. That said, officials are always on the other end of the phone if we need advice or support. I certainly get that advice and support from both the permanent secretary and Minister Foster, so it is important to record that at this stage.

903. From a strategic point of view, we have an increasingly productive relationship with Invest NI, which has realised over the past three to four years that the Northern Ireland Science Park is a highly valuable component part of the Northern Ireland offering. If you were to speak to our property director, for example, he would say that a large number of the visits to the park have been stimulated by Invest NI. It has been hugely supportive of our proposal to develop on the Fort George site in the north-west. So, I think that the relationship is pretty near the balance that we would like to strike.

904. I hesitate to say this as a former civil servant, but I would not want too much departmental interference in the way in which the Northern Ireland Science Park operates. Although we are a not-for-profit organisation, we are a commercially minded and commercially driven organisation. So, we are a not-for-profit organisation, but we are also a not-for-loss organisation, and I find that the relationship that we have at the moment is at just about the right balance. I

- could not honestly say that I get any difficult or challenging interference from Departments in what we do, and, when we ask for help and support, someone is normally prepared to talk to us.
905. **Dr Apsley:** I could maybe offer a different cut on your question. All that Frank says is absolutely true, but I wonder whether your question is asking whether government uses the experts that it has in its universities. I certainly do not think that that is the case. I think that there is a great fear that the universities are partisan. We need to work around that, because the US beats us hands down as any government Department can go to any university on any topic and know that it will pay for a report and get the unsullied truth. We have an expectation that consultants will somehow do that, but I have to admit that I am sceptical about that. I would rather depend on a good university department that publishes its work and exposes it to the scrutiny of its peers to give us the truth in particular areas. So, if that is what you meant by your question, I do not think that there is nearly enough of that.
906. However, having said that, there are a number of fora where the two or three silos that you are talking about come together. The Science Park is one, as Frank said, and MATRIX is another where all three are there all the time. At a lecture that John McKay and I gave at Queen's a week or two ago, the introduction was made by David Sterling. The chief executive club at Queen's has a good number of civil servant chief executives, as well as business ones. So, there are fora where they all meet, but that does not extend far enough into the operational day-to-day level, which it could do to great value.
907. **Mr McKay:** In the response, you raised some issues about businesses, particularly SMEs, which I am concerned about. They need mentoring, role play workshops, ice breaking, programmed engagements, and so on. Certainly, part of the problem with SMEs is cultural, and there is a fear factor and a lack of mentoring. Who will do what you flagged
- up as needing to be done? Should it be government or InterTradeIreland? Who will tackle that piece of work?
908. **Dr Apsley:** I suspect that government will pay for it, but I suggest that the successful parties of the recent past are the people to do it. As I said, I met Cherry Pipes, which we have no involvement with, at a European meeting that I was asked to chair and again in London when it won the award. There are other parties. We did not flag existing companies using the fruits of research, and one of the best schemes in the whole world was the scheme originally called the Teaching Company Scheme, which is now called the Knowledge Transfer Partnerships. Northern Ireland invested very heavily in that, and it is very successful.
909. Some of those, and Cherry Pipes is one, went on to develop from the local knowledge technology partnership into being the leader of a European programme. So, I think that the Cherry family and their associates would be good mentors for anyone wanting to do that. I do not know them well, you understand, but that is where I would go to find them.
910. However, I think that government need to fund it. As Frank said, we are not-for-profit, but we do not want to make a loss. Those companies are for profit, and the family has invested heavily. They cannot put money into doing that work for others. They need help, but I am sure they would be willing to do it.
911. We were talking to one of our own companies, which you will meet at lunchtime, about how it might help with e-exports. Some of the people, chairmen and board members, and behind me where Bob and Barbara are sitting, are a retinue of such mentors. Those are the people to do it, but I think that government will have to pay a little bit of the bill, if not all of it.
912. **Dr Watts:** We talked a lot about Connect earlier. Mr McKay is quite right to highlight mentoring. It is vital, and there is a cultural issue with

- SMEs. When you produce, if you like, a grouping — “community” is the best word — such as Connect and they come to meetings in a non-threatening situation and they gradually get to know other entrepreneurs and start to link in with experienced people who have knowledge that they do not, the process of mentoring becomes more natural. We suggest that part of the answer, although not the complete answer, is already beginning to grow here in the Science Park.
913. **Mr McKay:** Are schemes such as Connect being flagged up to communities and councils at grass roots level?
914. **Dr Apsley:** I think so, but there is an awful hurdle for facilitation, because it is not the direct doer. The outcome that you want is not a direct consequence of the facilitation. Facilitation is needed, but it is the other parties who do or who get the measure who might get the result. It is very hard to get that appraised successfully. That is one of the problems that we have had and one of the problems that Connect had in getting funded. If it had not been for the fact that I had hangover from Belfast City Council, which came originally from Invest in Belfast, and a leg-up in a slightly underhand way from the Department, we could not have got started.
915. I do not think that anyone else will get started. Even now, it is hard for people to see how it works and the way that they report the return. One benefit of our relationship with the Department is that it is quite soft on us. However, the hard bit for us is that we will have to find other funding for it in a couple of years’ time. We may need the help of everyone around this table ere long. I hope that that is helpful.
916. **Ms J McCann:** Thanks very much for a very interesting presentation. You spoke about developing the knowledge-based economy and how R&D and innovation are clearly essential to building the economy. You said that sometimes people may have an idea but that that does not necessarily become a commercial business. You also elaborated on your connection with the universities.
917. The creative industries are a new field that people are going into, and their knowledge and skills are not necessarily university based. How would young people access, for instance, the Connect programme, the business angel network or venture capital? What is the first port of call for young people who have the knowledge and skills? From when they are totes, kids now are much more hi-tech than the rest of us. What would be their first port of call in developing those skills and getting help? It may be a risk, but would that facility be there through those two programmes for young people to do that?
918. **Dr Apsley:** There is no barrier or block to either programme in dealing with the creative industries. As we said, ‘The Shore’ got its Halo funding through that, and on site here is also one of the top gaming companies for Northern Ireland. The issue is simply that there just would not be the resource.
919. There are resources that we work with on that. I cannot remember the names of all the hubs, but certainly in the city there is a creative industries officer who is a regular visitor. We link through him, and he will filter. Some of the young people may need the kind of help you get from, say, the FE college up the road, where they teach a lot of the basics on how you do that, and, as they filter up, they may then need access to this. We need help in making that selection, otherwise we would be swamped. However, there is no barrier other than resource.
920. **Dr Watts:** I would like to go back the point about Halo. I talked about ‘The Shore’. However, more recently, an organisation came through and has funding from Halo for a cartoon character set that is a little bit like ‘Mr Men’. As it happens, we have a Halo meeting next week at which a very well-known entertainer will be looking to franchise out what he does across Britain and Europe. We are starting to

get creative industries coming to us, and it is really a matter of us having to reach out. People are beginning to become aware of the issue, and 'The Shore' has helped a lot. Angel investing is not just about engineering companies and things like that. Also, the work that Mark Nagurski is doing up in Derry is connected to the City of Culture. He is involved in the Digital Derry stuff.

921. **Ms J McCann:** What was that name, please?
922. **Dr Watts:** Mark Nagurski. He is developing a lot and is working effectively with a lot of media and art-based companies trying to bring them through. Some of those companies will come to us.
923. **Dr Apsley:** Can I make a suggestion to the Committee about the answer to that question? We are the host to an Invest NI collaborative network called Digital Northern Ireland 2020. That is basically a programme that the community asked us to set up after our Kelvin event to show basically what happens if you have low latency, high bandwidth connectivity of Northern Ireland in a number of sites, such as Derry and some of the county towns. Sinclair Stockman returned from France, where he now lives, and he runs that for us. However, there are a number of players such as Greg Maguire, who is the creative engine behind one of the companies that produced 'Avatar'.
924. **Ms J McCann:** 'Avatar', yes. I was at that workshop where he spoke.
925. **Dr Apsley:** Greg came through our networks and is now a professor at the University of Ulster. Anyway, for all the reasons that you said, the point is that there is a subset of Sinclair's group looking at that. It is a different dynamic.
926. The universities are involved more than you might think, and there is more of a connection than you might think, but you are absolutely right. People such as Darryl Collins recognise that you can take kids directly, as it were, from school and use their creativity and train it into doing useful work in that way for all concerned. It is not my area of

expertise, but I suggest that you invite Sinclair to bring a small group to your Committee at some stage in the future and prepare for it with that question. Then I think you will get a useful answer.

927. **Mr Hewitt:** Can I just answer Ms McCann's question in another way? There is an important dimension to retaining the character of a science park, which is that the industries that locate here are fundamentally science based. That is the basic concept here, and that is what makes a park such as the Northern Ireland Science Park attractive to international companies such as Dow Chemical and Microsoft and so on. It is the fact that science is done here that makes it attractive.
928. The creative industries are increasingly becoming science based. The whole question of digitisation and so on is now an increasingly important part of the creative industries. So, although there are some aspects of the creative industries that do not necessarily fit well in the panoply of companies that we have here, we very strongly welcome other areas of that industry. I believe that one of the advantages that we have is our proximity to the Paint Hall film studios, which you passed on your way in and which are currently being developed. So, there is enormous capacity for co-operation between ourselves and those organisations and industries in the creative sector. However, it is important to stress that only certain aspects of that industry would fit well in the Science Park environment.
929. The other thing that we did not say at the start was that we have quite strict tenancy criteria that we apply to companies coming here. It is not that we do not want to fill our space or make companies welcome, but part of the uniqueness of the Northern Ireland Science Park lies in the fact that most of our industries here are, in one way or another, based on science of one kind or another. It is very important that we retain that characteristic, otherwise we could just become a business park. We are not a business park; we are a

- science park, and it is very important that we retain that distinctive character. I hope that I, in no way, have provided a negative response to your question; I was just trying to define the areas of that sector that could profitably locate here.
930. **The Chairperson:** I think that it is very useful to make that distinction between a science park and a business park.
931. **Mr Hewitt:** Exactly.
932. **Mr Frew:** Gentlemen, thank you for your presentation. I want to take you back to the funding of research and development from the various bodies and layers of government right up to Brussels. It was put to us last week that government bodies and funding groups do not fund failure. That is a big issue for them. You said that a bedrock and foundation of research and creating something is in the failures that you have first, and those failures can be useful and are not necessarily bad. How do you see the funding groups in Brussels, Westminster and Northern Ireland evolving to suit innovation, so that there is not such a stigma around failure and it is possible to realise the benefits of funding projects that have not worked but which could lead to something successful? Do you see that as a gap? If so, how should that be filled?
933. **Mr Hewitt:** I will deal with that at a high level and then hand over to Norman, who is much more knowledgeable about the practical side of that. One of the most interesting companies that I have dealt with in my career is Seagate in Derry. I was fortunate enough to be part of the team that worked to get Seagate to locate there. I recall conversations with Al Shugart, the chairman of Seagate at that time. To my recollection, he had failed on a number of occasions to set up a company before he finally succeeded in establishing Seagate, which remains one of the premier manufacturers of hard disks in the world. That highlighted to me exactly the point that you made. In other parts of the world, it is possible for people who have had failures, sometime multiple failures, to progress and to build businesses.
934. In the United States there is limited government funding, so people have to raise funding from friends and relations in the first place and then from entrepreneurial banks and venture capital companies and so on. As Alan indicated, that structure simply does not yet exist in Northern Ireland. The other aspect that one has to bear in mind is that, very often, the first port of call for small and large companies in Northern Ireland will be a government agency of one kind or another. Currently, that is Invest NI. In my view, Invest NI is much more entrepreneurial than some of its predecessors. However, that said, there is an understandable wariness on the part of government agencies to take risks with public money, and that is a very responsible attitude. Nevertheless, government, and, with respect, that includes all of you, have to realise that business success is never guaranteed. If we are going to expand this economy, we have to be prepared to accept the fact that there will be failures as far as investment is concerned and that judgements have to be made more on a portfolio basis. That is the way venture capital companies make their assessment, by working on the assumption that a certain number of their investments will fail and a certain number will be successful. Again, with all due respect to former colleagues, the Public Accounts Committee looms large in the minds of public servants and I think there has to be a change of attitude and an acceptance that risk is part of doing business. If you are involved in business, as Invest NI is, there is a risk attached. Overall, where government is concerned — government remains the biggest funder of industrial development in Northern Ireland — there has to be greater acceptance that business involves risk, and that as long as the appropriate steps are taken to mitigate those risks, you have to accept that as part of doing business.
935. **Dr Apsley:** That is all absolutely right, but I will look at it from a different angle.

- Most of the national and supranational funding is for science or technology, and as long as you say that that is what you are going to do, there is no risk of failure, because you are going to improve knowledge even if the experiment you are offering does not work. That is one way to get around that and to use all that money.
936. To give a slightly specious or funny example from way back, my friend was a chemical engineer and got money from government for writing papers on topics such as the behaviour of spheroid objects in viscous media. Spillers was his sponsor, and it had just given him the latest machine that made Mars bars. He was putting nuts into something like a Mars bar, which is what Spillers paid for, and was very rich as a result, but all his academic work was on the behaviour of spheroid objects in viscous media. That is really the difference that we have to identify: who does what? In that case, Spillers was doing what it should do, because that was in the private sector for its gain, but the world was learning about his work. You have to cleverly use the two sides all the time. His papers did not say that he was doing this research so he could build a machine to make Snickers bars; he did the research to understand the science. That is one point.
937. People here think of DeLorean as great. There was nothing wrong with a stainless steel car at the time — stainless steel was the way manufacturing seemed to be going, because working with aluminium was too difficult — so technically, although DeLorean may have been a crook or may have been something else, I do not know, there was nothing wrong with attempting to build a stainless steel car with the technology at the time. Northern Ireland and DeLorean, even, were not to know that steels were being improved to the point where you could make thinner and thinner ordinary steel that would not rust, and also that others were using aluminum. That is just the way the world works. If he had said that he wanted to research stainless steel cars and got money for that, we would never have seen anything wrong with that. How you chose what to fund is part of how you calculate that risk.
938. The other current example I want to highlight is Nortel, which grew up from what started in the 1990s as a simple cable manufacturer. It grew because it put \$3 billion of turnover into research. One of our board members at the time was the technical director. It has fallen back to \$1 billion, but that is still pretty big. It would not have been here otherwise. Not only that, every research team that I know that was there is back here in Northern Ireland.
939. One of the most important units in Weavers Court is Intune Networks; there are three of them here in the science park, in Bytemobile and a couple of other companies. One of them was called Intelliden and is now part of IBM, which has now acquired another company in Belfast, so IBM corporate is growing in Belfast. Was that a failure? Was anything that we gave to Nortel a failure? It has regrown now as three global companies and several that may well turn into global companies. There was an announcement that Hermann Hauser, one of the biggest technical investors in the world, has just become a board member of Intune Networks. When you call something a failure, you often put that label on too early; you have to wait and take the bigger picture. That is the other dimension that we need to get round.
940. **Mr Frew:** I have one further question; I will try to be brief. Some of our SMEs would tell us that they are just so busy doing what they do on a daily basis that they cannot develop the R&D side of things, nor can they pursue funding, because, for them, it means hiring a new employee or a team of employees to do that. Is there a danger that small companies could sell their soul to try to get money, and, in so doing, lose sight of what they are trying to produce? Is that something that we should be aware of and concerned about?

941. **Dr Apsley:** I am not sure that I know enough to answer that precisely, but you are absolutely right: a small company — even a small science park — spends much of its life trying to stay alive. There is no doubt that that is what dominates. A company will only take a risk on R&D if it perceives a bigger risk of losing the whole company as a result of something else. The Cherry family's company took a risk by turning a concrete pipe maker into a recycled plastic pipe maker. They are balancing those risks all the time, but what they are telling you is that, in normal daily life, just staying alive is the dominant thing. Then, of course, there are trade associations and bigger groupings whom we could listen to and work with, and so could the universities.

942. As I also said, we do have really good schemes, such as the knowledge transfer partnership. However, there is another thing that we could do. We tend to put publicity into the scheme and say, "Do this and do that and you will get 50%". Not one single piece of publicity was created out of the success of Cherry Pipes, for example. The year before, a knowledge transfer partnership in Ulster was the country's best; it had no publicity, to the extent that I do not even know which company won the award, I just know that because Vince Cable said it when he made the announcement. We could report the success of all the projects so that others can learn from that, and it can help them to balance risks.

943. **Mr Frew:** Yes, I understand.

944. **Dr Apsley:** We are trying to do it by barracking at them and telling them that they are not doing enough R&D, but they are working really hard to stay alive. You have to give them a bit of inducement the other way.

945. **Mr Dunne:** Thank you very much, gentlemen, for your presentation. I apologise for being late. I want to make a couple of points, although they have mostly been covered in other members' questions. How do you market your products and services in Northern Ireland? I am relatively new to

this Committee and to the Assembly, and I was not very aware of the good work that you are doing. It is important that you go out and sell yourselves a bit more, especially to the larger manufacturers and to the SMEs that we have talked about, telling them about the services that are available and the opportunities that are there.

946. We are all impressed by what we have seen and heard from you today.; your professionalism has come through. You talked about having 2,000 staff and 110 companies. How is that managed? Are they going in and out of those companies? I understand that the companies are located here. Can you clarify that for me?

947. **Mr Hewitt:** I will kick off, if I may. I will put my hands up now and say that we probably have not marketed ourselves as aggressively as we should. At the moment, we are putting together a programme that will substantially raise our profile. In the start-up phase of the science park we were focusing on building, so we were not achieving the levels of success that we are currently enjoying. In the last two to three years, we have had such a level of interest shown by companies coming here, as evidenced by the fact that we are full at the moment, that we have not had a need to market ourselves with the objective of filling space.

948. The marketing challenge for us is really a Northern Ireland marketing challenge. It is being part of the product offering and part of what Northern Ireland has to sell to international companies. We have worked quite closely with Invest NI to ensure that, where it is talking to science-based companies, the Northern Ireland Science Park is part of what it markets. I will give you an example of that. Just after the initiative of Secretary of State Clinton and her envoy Declan Kelly, a number of US companies came across to Northern Ireland. The First Minister and deputy First Minister hosted a number of those at Stormont. As a direct result of that, Dow Chemical came along to us and said that it would

- like to locate in the Northern Ireland Science Park, and it is still here.
949. We are still slightly disappointed — I am certainly disappointed — that we have not got the awareness through to public representatives like yourselves at the level that I would like to see. That said, there are very few Ministers in the Executive who have not been here on a number of occasions. The ones with whom we work closely, such as Minister Foster, are here regularly. We have also had visits by the junior Ministers in the Office of the First Minister and deputy First Minister. We have embarked on a programme that, hopefully, within a matter of months, will mean that there will be very few of your Executive colleagues who do not know a little bit about the Northern Ireland Science Park.
950. We are a very small organisation with very limited funds. You are looking at about half of the team beside me here. We do not have a big team. We are in the process of recruiting a new public relations and communications agency. You will undoubtedly see a lot more publicity on the Northern Ireland Science Park in the coming months and year.
951. It is a difficult concept to explain. I hope you will have got to understand a bit more about it this morning, but, if you had not been here and seen it, touched it and felt it for yourselves, it would have been difficult for you to understand exactly what the Northern Ireland Science Park is about. It is difficult for us to convey that. Although we have articles in newspapers and so on, and we always make sure that visits to the park are highlighted in the media — no doubt you will find pictures of yourselves in the papers in the next few days — it is still a very difficult thing to get across. The last thing I will say — I have to be careful about how I say this, for obvious reasons — is that I feel that the media does the Northern Ireland Science Park, and, indeed, the Northern Ireland economy, a disservice.
952. **Mr Dunne:** And the Assembly.
953. **Mr Hewitt:** I could not possibly comment on that. My feeling is that — I know this from other positions that I have been involved in — it is very difficult to get the Northern Ireland media interested in the positive aspects of what is happening here. If a company closes you can bet that there will be a reporter from UTV or BBC standing outside the company announcing the fact that there have been 200 job losses or whatever. To try to persuade the media to cover positive stories remains a serious challenge for us. If it is complicated, as the Northern Ireland Science Park is, that makes it even more difficult for us to interest them. That said, we have noted more interest from the media in what is going on. I think there is an intrigue factor: there are things happening here that they probably were not aware of.
954. **The Chairperson:** I am just thinking of the headline:
“DETI Committee visits science park on the ides of March without incident”.
955. **Mr Hewitt:** It could be even worse if you were photographed standing alongside the Thompson Dock.
956. **Dr Apsley:** Can I comment on the 2,000 staff? They all belong to their own companies, and you are going to meet some of them. What Frank said is absolutely true, but, at the same time, the lion’s share of credit goes to those companies that are all in growth. That is the other wee bit of the balancing act that we try to do when it comes to the media. You are going to see SAP later, and SAP will show you the future of the internet. To be honest, that has been available for the press to come and see for some time. I am disappointed in the fact that we do not have a technical press that would try to make stories out of that or out of any of the other good news stories that are around, because that would all help and add grist to the mill. We have to be conscious of the resource, as Frank said, and that is the one thing that is maxed out. We have not got a single desk that we could let at the minute.
957. **Mr Dunne:** That is good.

958. **Dr Apsley:** No, it is not good. That is not how a science park should be; it should always have something empty to make way for expansion. That is part of the rule book.

959. **Mr Dunne:** You need to extend.

960. **Dr Apsley:** We cannot get the finance to do that.

961. **The Chairperson:** Is that in the sense that you want people to be moving on and more people coming in?

962. **Dr Apsley:** There is a lot of churn. The science parks were representative of the fact that the world changed. When the concept started in California in the 1950s, it was because science-based companies were anathema to the property industry of the day, because they had dirty, nasty things, they needed a lot of power and they involved chemicals and so on. Therefore, the university had to take a handle of that and build something that could cope with it. However, it also had to cope with the fact that they were volatile and that they grew quickly or they died quickly. Therefore, they were like gypsies in the sense that some stayed and some did not want to know. That is where the concept came from, and it is still valid. Just before we came here, I signed a lease for a small but exciting company. However, they may be gone next week or another one may be replaced. The big companies are the ones that sign, but even then they sign for five to 10 years, not the 25 years that would be wanted in the centre of town. There are differences like that.

963. **The Chairperson:** That brings our questions to an end. Thank you very much for a very interesting session. We are delighted to be here, and we will look around the science park after the meeting has ended.

22 March 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Daithí McKay (Deputy Chairperson)
 Mr Gordon Dunne
 Mr Paul Frew
 Ms Jennifer McCann
 Mr Stephen Moutray
 Mrs Sandra Overend

Witnesses:

Dr Mike Camlin *Agri-Food and*
 Professor John Davis *Biosciences Institute*
 Mr Joel Ferguson
 Professor Seamus
 Kennedy

964. **The Chairperson:** I welcome all of our witnesses to the Committee meeting. We will be briefed by Professor Seamus Kennedy, the chief executive officer of the Agri-Food and Biosciences Institute (AFBI); Dr Mike Camlin, the deputy chief executive officer; Professor John Davis; and Mr Joel Ferguson, the acting head of corporate services. I thank you for the paper that you have given us in response to the Committee's request for evidence. It is a very useful document. We look forward to hearing from you this morning. Would you like to start by making an opening statement? Thank you very much, Professor Kennedy.

965. **Professor Seamus Kennedy (Agri-Food and Biosciences Institute):** Chairman and members of the Committee, thank you for the opportunity to speak to you today. I was going to introduce my colleagues. However, you have already, very aptly, done so. AFBI is a non-departmental public body (NDPB) sponsored by the Department of Agriculture and Rural Development. The institute was created in April 2006 from an amalgamation of the existing DARD science service and the Agricultural Research Institute of Northern Ireland, which was based at Hillsborough. Therefore, we are a relatively young NDPB.

966. The institute provides research and development, statutory, analytical and specialist advice services to DARD and other Departments, including the Department of Culture, Arts and Leisure (DCAL) and the Department of the Environment (DOE), and the Food Standards Agency. We have a wide range of local, national and even international public sector and private sector customers. Our work is mainly carried out in the areas of animal and plant health, animal welfare, crop production, marine and freshwater fisheries and ecosystems, the environment, food safety and innovation, and agrifood and rural economics. Therefore, we are a broad church with regard to the scientific disciplines that we cover.

967. As recognised in the Northern Ireland Executive's recently announced Programme for Government 2011-15 and associated economic strategy, the agrifood industry is currently one of the bright spots in the local economy, with significant potential for export-led growth. The sector currently has a value of over £3 billion per annum and sustains approximately 90,000 people in employment, which represents about 20% of total private sector employment in Northern Ireland. Growth of the sector will undoubtedly require innovation to develop more value-added products. If the industry is to compete in international markets, it must try to increase the number of value-added products that it sells, as opposed to commodity products.

968. AFBI's scientific work supports the sector in enhancing its competitiveness and helping to protect it from animal, plant health and environmental threats. We particularly welcome the setting up of the DETI/DARD Food Strategy Board and hope that it will help to shape the future of the R&D innovation agenda for the sector. We also support the work of MATRIX in helping to promote agrifood

- research and innovation and the Invest NI-funded development of an agrifood competence centre. That is not yet out of the traps, but it is in development.
969. AFBI's total revenue in 2010-11 was approximately £54 million. Approximately 25% of our income is derived from outside our grant-in-aid from the Department, and we have been growing that non-DARD funding substantially since our formation. The institute primarily serves the local industry and DARD. However, we have also developed collaborative links with a number of institutes in various countries, including those as far away as China and India. Closer to home, we are working with Queen's University and the University of Ulster and discussing how we can increase the level of collaboration between AFBI and the two universities.
970. Examples of the types of work that we carry out for the Department of Agriculture and Rural Development in support of the agrifood sector include statutory testing for BSE, bovine tuberculosis, brucellosis and salmonella. We also carry out testing of veterinary drug residues, pesticide analysis of food and plant health testing. The provision of an effective local emergency response to threats to the food chain, animal and plant health, and the environment is an important function of AFBI. Examples of that type of work include the response to the 2001 foot-and-mouth disease outbreaks, when a local testing facility was set up in our veterinary sciences division, and that resulted in Northern Ireland gaining entry to export markets eight months ahead of Great Britain. Another example came in 2008, when the bluetongue virus was inadvertently introduced to a farm in north Antrim. AFBI investigated and developed scientific data that resulted in the European Commission changing its policy on animal movements. Other examples include the dioxin feed-contamination incident in 2008 and surveillance for avian and H1N1 pandemic influenza viruses. We are currently preparing for testing for the Schmallenberg virus, which is the latest animal disease threat to emerge in Europe.
971. A large proportion of our statutory work is accredited to ISO 17025 standards, which is the international standard for testing laboratories. All our research projects are carried out to ISO 9001 standards.
972. The reason that I mentioned the emergency response was mainly to make the link with R&D. The ability of AFBI to carry out an effective emergency response is dependent on participation in R&D projects in, as it were, peacetime to develop the required state-of-the-art skills and technologies. AFBI adds value to DARD's AFBI-directed research programme by winning additional complementary research funding from organisations such as the Department for Environment, Food and Rural Affairs (DEFRA); the Department of Agriculture, Food and the Marine in the Republic of Ireland; the European Union; the Food Standards Agency; AgriSearch, the local farmers levy body; the Biotechnology and Biological Sciences Research Council (BBSRC) — we are not directly eligible for BBSRC funding, but we are eligible as a subcontractor to an eligible organisation; a range of commercial companies; and DARD's industry-led research challenge fund.
973. I think that it is true to say that AFBI is less well known as a research organisation than the two local universities. However, we are a significant research contractor. As an example of research activity, AFBI has had 13 successful European Union framework and INTERREG applications, six unsuccessful applications and 10 pending applications since 2008. The total value to AFBI of confirmed and pending EU projects is £4.8 million since 2008. In line with the Executive's Programme for Government and the aims of the Barroso task force, AFBI is aiming to increase its drawdown of European R&D funding by placing additional staff in our R&D support office, developing links with other scientific institutes at home and abroad,

- and increasing the institute's profile in Brussels with assistance from Invest NI and the Executive's Brussels office. AFBI's R&D tends to be applied in nature and directed to solving practical problems faced by the industry and government policymakers. We also work closely with the College of Agriculture, Food and Rural Enterprise (CAFRE) to ensure that the results of our R&D are transferred to the agrifood industry. In fact, we have participated in almost 2,000 knowledge and technology transfer events since the formation of AFBI in April 2006.
974. The UK Department for Business, Innovation and Skills sixth annual survey of public sector research establishments (PSREs) found that they filed fewer patents than universities but had a higher income from licensing intellectual property (IP), despite employing fewer staff in commercialisation offices. In fact, AFBI's current royalty income stream from licensing IP is around £4 million per annum, albeit from a small number of products. One of the disadvantages of being an NDPB in the research innovation community is that AFBI is not eligible for several research and innovation support programmes such as the Higher Education Innovation Fund, which are open to universities, the BBSRC and other UK research councils, and the US-Ireland R&D Partnership Programme.
975. In summary, we believe that AFBI has the scientific expertise and facilities to carry out its core functions for the Agriculture Department and other Departments and agencies and to contribute significantly to further development of the knowledge-based bioeconomy of Northern Ireland, which we all seek to develop. AFBI can also play a major role in the Executive's aim of increasing the level of drawdown from European R&D funding — there is a target of £64 million to be drawn down over the next four years — and assisting in the general increase in the level of R&D and innovation in Northern Ireland. With that, my colleagues and I would be happy to answer your questions, as far as we can.
976. **The Chairperson:** Thank you very much, Professor Kennedy. The paper and this morning's presentation are very interesting. I am trying to understand AFBI. It is not an academic institution in the same sense as a university, but it is a research institute. That is an advantage and a disadvantage in respect of accessing the funding that higher education attracts. Is there any way that you can get round that? Do you get round it already? Can you act as a subcontractor or something like that?
977. **Professor S Kennedy:** In respect of UK research council funding, we can act as a subcontractor, although the subcontracts are normally for relatively small amounts of money. We are not eligible for the Higher Education Innovation Fund at the moment, but we hope that —
978. **The Chairperson:** Is that a UK fund?
979. **Professor S Kennedy:** It is primarily a Northern Ireland fund. We hope that we can gain recognition for that funding.
980. **The Chairperson:** Can I just stop you there? I do not mean to interrupt you, but is there any way that that could be done? It seems to me to be an obvious thing to permit.
981. **Professor S Kennedy:** We would like to discuss that with DETI and Invest NI. Your earlier remarks were absolutely right; I suppose we are an unusual beast in the sense that we are not a university. We provide a service primarily to government, but, at the same time, we want to maximise the use of our assets to stimulate and help protect the economy more widely.
982. In recent years, we have developed very good relationships with Invest NI, and it has come to recognise that AFBI has a role to play in supporting innovation in Northern Ireland, particularly in the agrifood sector. Invest has opened some of its programmes to us; for example, proof of concept. We have several grants from Invest NI to do that. It has been

- very supportive of visits to establish research collaborations and so on, and we are also eligible for its wider grant programme. In the past few years, there has been very good recognition of the role that AFBI can play and support from Invest NI. We would like to develop that further.
983. **The Chairperson:** You are fairly complimentary about the work that Invest NI is doing to encourage research and development, and your relationship with it is a good and productive one. Is there any way that can be improved? I am not suggesting that you be critical of Invest Northern Ireland, but is there any way that it could be improved?
984. **Professor S Kennedy:** The issues that we have come up against are largely practical; for example, Invest NI has to operate within state-aid rules, Audit Office rules and so on. Practicalities, such as the amount of overheads that are eligible for inclusion in grants, are an issue for us. AFBI does not have a budget of its own as such, so we have to cover our costs. The rules around state aid and the complexity of the levels of overheads that can be funded through various grants are real, practical issues for us. We are working with the Department of Agriculture in particular, as our sponsor branch, to try to overcome some of these issues. We know what we have to do to draw down more money, but a lot of it comes down to practical issues such as overheads. The complexity of the application process for European funding can demotivate staff, so we need to think better about how we put in support mechanisms —
985. **The Chairperson:** Can we enlarge on that a little bit? It is an observation that you have made in your submission about the burdensome nature of EU applications; you referred to framework 7 in particular. Do you have any comment to make on that? Is there any way in which government could better assist with those applications? It is a common complaint; it is not a complaint that just comes from your good selves. It is a common complaint, particularly among the private sector and smaller businesses, that it is a labyrinthine process, very difficult to navigate and very difficult to arrive at a successful conclusion in a timely fashion. Do you have any comments on that?
986. **Professor S Kennedy:** My colleagues may want to come in and comment on this as well. Potentially having a one-stop shop in Northern Ireland to which, not just the universities and AFBI, but our small and medium-sized enterprises (SMEs) in particular, who also find it difficult to navigate the European R&D process, could come, may be worth considering. By “one-stop shop”, I mean an organisation or a unit within an existing organisation that could carry out some of the intelligence, find out what calls are coming up and what is of particular interest to the European Commission, and get that information out to all the players, both the public sector research communities, including the universities, and private sector companies that may be interested. It could carry out that market intelligence, find what is available and also provide support by guiding them through the process. That is a key to success basically.
987. **The Chairperson:** So, in that one-stop shop, you would need a team of experts in different fields to help you and to guide you through the difficult processes. Where would you put that one-stop shop? For example, would you put it in Invest Northern Ireland?
988. **Professor S Kennedy:** Invest has certainly done a lot of work on that. I am also mindful that we have a very active innovation community in the form of the Northern Ireland Science Park (NISP), and it should also be considered. In the science park, businesses tend to work very fast, and they are in touch with the private sector. In the public sector, we are sometimes a wee bit slower than we normally should be. Consideration should possibly be given to the NISP as a base for such a role.
989. **The Chairperson:** Do you have any comment on Horizon 2020 and what

- you might expect from that? Hopefully, it will be much better than framework programme 7, with less bureaucracy and fewer of the difficulties that have been adverted to.
990. **Professor S Kennedy:** The very fact that the Committee is discussing R&D and innovation today indicates the importance that the Executive place on R&D and innovation. This Committee's role will raise the profile of that. I believe that all Departments are inputting into the Barroso task force, and that helps to raise the profile. We know where we need to go with the strategy, but it really boils down to the practical details of how we draw down funding. Compare that with the situation in the Republic of Ireland, where Enterprise Ireland, I understand, provides support to SMEs and public sector organisations in drawing down European funding and has been very successful in doing so. We could potentially study how it has been done elsewhere.
991. **The Chairperson:** That is a good example of the successful application of, for want of a better term, a one-stop-shop type of help to industry and perhaps even to the universities.
992. **Professor S Kennedy:** We also need to recognise that, in Horizon 2020, the R&D funding that is potentially available is somewhere in the order of £80 billion, which clearly makes any Northern Ireland Executive research funding appear small. All Departments, when developing our research agenda, have to be mindful of the bigger European agenda out there and make sure that the R&D that we want to promote internally fits in with the European research agenda.
993. **Dr Mike Camlin (Agri-Food and Biosciences Institute):** You mentioned Enterprise Ireland. Over the years, our scientific colleagues in the Republic have had a much closer understanding of the systems in Europe because of their closeness to the Departments and because of the Departments' closeness to the European systems. That needs to be worked on a little bit harder here to put us in the position where our networking is better and where we can get into Europe and find out how the thing works. We could look at mentoring from scientists who have been successful and bring them into the bodies that we are talking about to help those who are making applications. That is all quite important.
994. **Mr Joel Ferguson (Agri-Food and Biosciences Institute):** In the Republic, they benefit from having a body of national contact points that are very closely integrated into Europe through the funding programmes and through the different thematic areas, whereas, here, we basically share with the other regions in the UK, and that obviously dilutes the amount of contact that we have with them. There are some good examples of organisations in Europe and locally that have helped draw down certain types of European funding. Locally, we have NI-CO, which, as a company owned by Invest Northern Ireland, basically focuses on the international development funding. That is a good example of a company that is set up to focus on the administrative burden of making applications, make that easier for the experts and support the project management once a project has got off the ground.
995. There are other examples in other parts of Europe of similar types of organisations that have been established to make the bids and manage the projects once they have been established. It takes away that learning curve that everyone new coming to European applications has to undertake when they are starting to pull together a bid and then when they have to deliver that project. There are good examples that are worth having a look at.
996. **Mr Moutray:** Thank you for presenting to us this morning. Reference has been made to the administrative burden on the private sector. How does the administrative burden impact on AFBI and the resources that you have?
997. **Professor S Kennedy:** It impacts on us as well. I suppose we have the advantage in that a number of our

scientists have good experience in applying for R&D projects, not only in Europe but in a variety of areas, whereas businesses, particularly SMEs, are busy trying to keep their head above water and make a profit at the end of the year. That is their daily business, and, for many of them, to actually lift their heads from the daily challenges to consider R&D is a big issue in itself. When you add in the administrative burden, I think it makes it impossible for a lot of them. They really do need support, probably more so than the likes of AFBI.

998. **Ms J McCann:** Thank you very much for your presentation. It is very interesting that you offer some practical examples of where it is working in other places. From what we are hearing from other people who have presented to us, and as you mentioned in your opening remarks, the development of the agrifood sector will provide a huge boost to the economy here in terms of the export-led growth that is needed in that sector. I want to concentrate on an area, notwithstanding the European funding and the difficulties. You did say that it is a huge amount of money, and we need that sort of expertise to be delivered to our SMEs and the people who want to draw that down, because otherwise we are not going to get it. The match funding is another difficulty. In terms of the commercialisation of the R&D, you go from having a good idea and a sense of how we can grow and develop the sector through export growth and international markets. We are hearing from the other organisations that there seems to be a bit of a difficulty in taking that practical step to turn an idea into something that is viable and could be marketed. Are there ways in which you think that part of it could be improved?

999. **Professor S Kennedy:** I mentioned AFBI's royalty stream, which came from a small number of animal vaccines. The initial work predated AFBI and was carried out in DARD's science service a number of years ago, but then it was linked with commercial companies — the companies involved in that case were multinational companies —

and they developed the product to a commercial product and took it through the licensing process required to place a product on the market. They also look after the marketing side of that. AFBI, as part of the agreement with them, takes in a royalty stream. That particular model has worked very well. A model that we are currently investigating is the possibility of AFBI forming a joint venture with a commercial company to take forward another piece of technology. We have a proposal with the Department of Agriculture and Rural Development, and hopefully that will receive DARD and Department of Finance and Personnel (DFP) approval. That is a very exciting example of how the public sector can work very closely with the private sector to bring the results of R&D right through the commercialisation phase to result in products on the market.

1000. **Ms J McCann:** In terms of developing the SME sector in what you are doing, you are talking about more collaboration and Departments working together. You mentioned a one-stop shop, but have you any ideas on how we can develop that to work more strategically in order to draw down the European funding that is there and also to ensure that we have a marketable product at the end of it?

1001. **Professor S Kennedy:** The public sector at all levels should recognise that R&D and innovation are not luxuries to be added on to the day job. There is a tendency for policy makers in particular to be concerned about the issues in their in-tray on any particular day. That is correct: there is the day job essentially. However, we need to integrate R&D and innovation into the day job of the public sector at all levels so that they are not seen as optional extras. They have to become embedded in our work.

1002. We talk about developing a knowledge-based bioeconomy. By that, we mean that we cannot compete with cheaper-labour countries on wage levels alone. We can succeed and develop our economy only through the knowledge and intellectual capacity of our people, which is considerable. We need to recognise across all Civil Service

- Departments and the public sector that the only future for Northern Ireland is through developing that knowledge and intellectual capital and placing R&D and innovation at the centre of the agenda of every Department, not at just the top but down through all official levels. Maybe that is not a very detailed answer, but that is an important issue.
1003. The other issue is that we have a clunky bureaucracy in Northern Ireland and are very cautious and risk-averse in the public sector. We need to look at that culture and realise that, if we are to compete internationally, we maybe need to become not a little more reckless in our approach to risk but to take a more enlightened approach to it and not allow our concern about the Public Accounts Committee and the Northern Ireland Audit Office's requirements to police public spending to stifle innovation and stop us taking any chances in investing and developing our economy.
1004. **Ms J McCann:** OK, thank you.
1005. **Mrs Overend:** Thank you very much for a very interesting presentation. I take what you say about research and development in that we do not have to know the answers before we start. That is what we tend to do and play it safe. Do you feel it would be beneficial to promote more the work that you can do? You talked about promoting innovation in Departments, but is there more we could do to promote research and innovation throughout the private sector as well, and how could we do that? Obviously, you want to reach out to the private sector as well.
1006. **Professor S Kennedy:** Yes, it is, absolutely. AFBI has considerable contacts with private sector companies. The Invest NI voucher scheme has been very useful for SMEs, and we have worked with a number of companies through that. However, a lot needs to be done. Potentially, we could have a conference in Northern Ireland, bringing in the public sector and SMEs, to hear from the SMEs what practical issues they have and why they do not become engaged in R&D and innovation and to look at their needs. It is a very difficult question to answer.
1007. **Mrs Overend:** It is. Do you think they would come to a conference? Most of them are just getting on with their work. It is very difficult to engage with them.
1008. **Professor S Kennedy:** It is. Obviously, the smaller number of big companies realise that they need R&D and innovation to survive and grow but that smaller level is the issue.
1009. **Mrs Overend:** Are there other organisations in the UK that are similar to AFBI that you could learn from, or are you ahead of the game?
1010. **Professor S Kennedy:** There are no probably no organisations in the UK directly comparable with AFBI with regard to the range of work we do. We carry out statutory work for government with R&D specialist advice, diagnostics and surveillance work. We are aware of many organisations in the UK. We have been in touch with the Moredun Research Institute in Scotland, for example, and we have looked very carefully at its business model. We have also looked at the Scottish Agricultural College. We are trying to learn from them and see how they can innovate. There are some common lessons. They need to have very good basic internal management processes, particularly around finance, in place. They also have very strong links with the industry.
1011. Again, in the overall culture, the whole of government support has to be aimed at fostering innovation and allowing public sector bodies, such as ourselves, more freedom to carry out more work for the private sector. I mentioned the joint venture that we proposed, which is just a small example, but we hope it will be a pathfinder that will indicate to government that public sector bodies such as AFBI can leverage the considerable asset that they have for the benefit of the wider economy.
1012. **Dr Camlin:** I will take up the point that Seamus made about statutory work. One of AFBI's strengths is its good contacts with the industry, from producers right

- across the food sector. The other thing is that we have a solid body of science that is there for statutory support to DARD, which leads on to special advice and putting out R&D to the industry. There is a strength there in that our scientists all have good contacts with the different industry sectors. If we can build on that, there is a chance of the sectors becoming more enlightened about the need for R&D and for them to support R&D and further it. The solid science that we have, because of our statutory work, gives us a considerable advantage in this whole thing.
1013. **Mrs Overend:** Absolutely.
1014. **Mr Ferguson:** I want to make a couple of points in support of what Seamus said. In specific programmes, some work well and, in others, there is room to improve or to help us. With regard to the likes of the competence centre initiative with Invest Northern Ireland, we are working on two: one with the agrifood sector and the other with the renewable energy sector. Those are both very good forums and structures for bringing together the industry and getting it to take a lead to drive forward early stage R&D in their areas. They are also very good forums for listening to the industry and hearing what it needs in R&D support. So, from our perspective, they are both very important initiatives and we hope to see them get off the ground soon.
1015. There are a couple of other programmes as well. On the commercialisation side of things, we are trying to find partners to take forward commercial opportunities. In the past, in some cases, we have had to look internationally for commercial partners to license technologies because locally we have not had the relationships or the companies have not been here. The likes of the CONNECT programme at the science park is doing a lot of work to try to bring together entrepreneurs and build teams around opportunities. For us, the venture that we are looking at now, which Seamus referred to, is very much something that has been born out of the CONNECT programme and the contacts that that has helped to build.
1016. Invest NI ran a pilot programme in the US for the life and health sciences sector, in which AFBI participated. Essentially, consultants in the US helped to make commercial links. AFBI also participated in a trade mission to the east coast of the US. As a result, it created relationships and made contacts that opened up a lot of doors. That kind of programme is very helpful. On the back of that, we are now looking to put a person in the Northern Ireland Bureau in Washington to help develop those contacts further.
1017. I have one last point, which is about HEIF. Research spend in AFBI probably amounts to something like £10 million a year overall. Other public sector organisations, such as the Health Department, also have a substantial research spend. When you add those together, we are probably up there with the universities in our total amount of spend. The universities, the Department for Employment and Learning (DEL) and the Department of Enterprise, Trade and Investment (DETI) see the importance of HEIF to help bridge the gap between R&D and commercialisation and innovation, and that gap is well filled by HEIF. However, as Seamus said, that is an area where AFBI and other areas, such as health, are not supported. So, there is definitely room for some kind of review to see whether that kind of support can be provided to organisations such as ours.
1018. **Professor John Davis (Agri-Food and Biosciences Institute):** From the research provider's perspective, one of the difficulties that we face is that the level of R&D appreciation and activity in the private sector in Northern Ireland is quite thin. We have only a few relatively large companies, such as Bombardier and Norbrook, which actively engage in R&D. That creates difficulties in that we lack critical mass of R&D in the private sector. Taking the wider view, we need to attract more research and development-intensive companies into Northern Ireland's private sector. To my mind, the relative lack of activity in R&D is holding back productivity. We are a relatively low-

- productivity region. We need to close the productivity gap with the rest of the UK.
1019. I do not have answers to this issue. R&D tax credits may be one option that could be considered. The Economic Research Institute of Northern Ireland did a study on this some time ago. It is a slow-burning fuse; it can improve the R&D intensity, but it may be 10 years before that can be converted into new economic activity, fresh employment and additional employment. So, there is a structural problem in R&D in Northern Ireland that has to be addressed strategically. The culture needs to change.
1020. **Mr McKay:** I apologise for being late for the presentation. The debate is interesting. Agrifood is always quoted as one of the green shoots in this difficult economic time locally. We need to look at R&D to ensure that we are ahead of the curve going forward. As Professor Davis said, it is about culture — we are a risk-averse people. Risks that are taken have to be accounted for through the Civil Service, etc, and investing in R&D is viewed as a possible waste of money. We need to address that cultural view, which people in parts of the economy still hold. It is an interesting debate, and we need to be more forward-looking in the way that other leaders in this field are in the international economy.
1021. Are you finding that, as other sectors of the economy take a dip into R&D, people with certain skill sets are looking towards taking their skills to agrifood and maybe tourism? Has that been of benefit to the agrifood sector? How does that fit in with R&D?
1022. **Professor S Kennedy:** The availability of skills in the industry as a whole is becoming a constraint. Particularly in food production, food technologists are thin on the ground. CAFRE's courses are full. Queen's University's agrifood courses are full, and that is the same throughout the British Isles. Agrifood has come into a good position as a career prospect for school leavers and so on. We are definitely reaching the stage — I hear this from companies
- in the sector — of finding it difficult to recruit people with appropriate skills.
1023. **Mr McKay:** Are there many skill sets in other sectors that are directly applicable to agrifood?
1024. For example, when we visited the college in Newtownards, staff there said that there were people who had worked in construction for years, are now out of work but have skill sets that would slot perfectly into the renewables sector. Is there any equivalent to that?
1025. **Professor S Kennedy:** The diversification of agriculture into renewable energy is a good example. That is definitely a case where the engineering and technical skills of people in the construction industry could be diverted, although the renewable energy industry is still relatively undeveloped at this stage. However, it has enormous potential.
1026. **Professor Davis:** We are doing some research on the constraints of the current skill sets available to the agrifood sector, particular the food processing sector, and to see to what extent the skills available match the development needs of food processing companies, particularly in penetrating the very sophisticated European market that we have on our doorstep, which presents significant opportunities for adding value to basic farm commodities. I will hold my fire because we do not know the exact findings. However, the results should be available later this year.
1027. **Mr McKay:** In relation to the export and international markets and our level of R&D development, are there many countries in the same boat as us with regard to our approach to R&D, or are most of our competitors ahead at the curve? I am trying to think ahead about the danger of being left behind if we do not address this cultural averseness to R&D.
1028. **Professor Davis:** Quite a lot of research is taking place on the links between R&D and innovation and productivity. The big message is that there has been a withdrawal of public sector support for R&D with regard to agrifood in the Western World in the past 20 years, and

- that has tended to be linked to lower productivity growth. So, that underscores the importance of maintaining the level of R&D to support productivity growth and diversification in the industry.
1029. **Mr Frew:** You link R&D with productivity, especially in the agrifood sector. Import bans have been lifted Europe-wide and all round the world, including America. How big a challenge is the lifting of import bans to Northern Ireland? We can also see the BRIC countries on the horizon, and Brazil is probably the most prominent with regard to meat imports. How big a challenge is that for agrifood companies, and how can advancing R&D help to combat that and help us compete against those massive importers?
1030. **Professor Davis:** You are right: it does intensify the global competitiveness. The penetration of the European market by South American supplies, for example, is a big challenge for the local industry. It underscores the importance of us becoming more competitive. We cannot sit back; we have to respond to that. We are R&D providers, and we think that R&D is rather important. However, there is lots of literature to suggest that the effort to improve the competitiveness of the local sector is highly dependent on the knowledge that comes from the R&D sector, provided it is transmitted into the industry in an accessible and relevant way.
1031. **Professor S Kennedy:** I am not an expert in the economics of it, but I think that it is generally considered less of a threat than it might have been five or 10 years ago because of the development of markets in Asia and even in South America and Brazil. Those markets will take a lot of the product that might formerly have been imported to Europe from South America, for example. Brazil is consuming a lot more of its own beef production, and it is opening markets in Asia. I will not say that it is not a threat, as John has said, but it may be less of a threat than it used to be.
1032. The basic point is that we need to innovate. If we look at the dairy sector, we see that global milk production has increased substantially over the past year, and it is predicted to increase even more. New Zealand is producing vast quantities. If Northern Ireland is to compete, we have to go for innovation and value-added products, because I do not think that we can compete simply on a commodity basis.
1033. **Dr Camlin:** My colleague made the exact point that I was going to make. It is not about commodities; it is about value-added and the research input into value-added. Making that work is the way in which the industry here will be competitive. Commodities will not work for a little place such as Northern Ireland.
1034. **The Chairperson:** But if you have high-quality commodities, which I think we have, it helps to add value.
1035. **Dr Camlin:** Yes, absolutely.
1036. **The Chairperson:** You need research and development to stimulate innovation and create added value. Is that really what you are saying?
1037. **Dr Camlin:** Yes. What we are really saying, as Seamus just said, is that we will not compete with other places on milk and meat as bare commodities on the supermarket shelf. Where we will compete is if we can add value to those commodities, make them innovative and add value to the whole process. R&D can do that.
1038. **Mr Frew:** We have a really good product to sell. The fact that they eat grass is the first thing. We have linked R&D to production. How big a link is there between R&D and food security, and how big a concern do you have about it? Is there a link, and should we be concerned about it?
1039. **Professor S Kennedy:** There is definitely a risk. We talked earlier about the increasing markets for food throughout the world. We know that the population is projected to increase to nine billion by 2050; that is only a median estimate, so it could be higher or lower. Climate change comes into it. Parts of the world will not be able to produce as much food

- as they have in the past. Food security definitely becomes a big issue, and innovation very much has to play into that.
1040. **Professor Davis:** Absolutely. The other dimension of food security is to intensify in a sustainable way. We must produce more food but in an environmentally neutral fashion.
1041. **Professor S Kennedy:** The indications from the CAP reform are that sustainability and the environment are still very high on the European agenda. Therefore, as John said, we have to produce more value-added products but do it in a sustainable manner. All that requires R&D and innovation.
1042. **Mr Frew:** I have another wee question, because you have hit on a point about the CAP reform and the research and development side of it. I can understand why the environmental measures in the new CAP have been implanted, but what I hear from the environmentalist lobby is that they will have the opposite effect and could create monoculture rather than crop diversification. How big a concern does AFBI have about the new CAP?
1043. **Professor S Kennedy:** On your first comment: the European Commission appears to be approaching it from the point of view that one size fits all. We look around Northern Ireland and see that the farming community's environmental stewardship is excellent. You only have to look at the hedgerows and green fields to see that. We have certain issues with water pollution, but those are being tackled.
1044. Maybe John could respond to your question.
1045. **Professor Davis:** Do you mean that the issue is the greening of pillar 1?
1046. **Mr Frew:** Yes, the greening of pillar 1 and the environmentalist-type policy in it. We might not necessarily agree with the measures, but we understand why they have been put in. The point I am making is that even the environmentalist lobby in Northern Ireland is saying that we should be very concerned because the measures could well have the opposite effect to greening because they are so stringent and restrictive. The three-crop diversification rule, ecological areas, and how we even measure that as a paying agency could move farming away from food production and, I suppose, arable production. If you are made to grow three crops at various scales, the producer will just say, "This is not worth it." That could create a monoculture of suckler cows — dairy, rather than a broad mix.
1047. **Professor Davis:** Yes; I take your point. I think that there are difficulties with that, considering the relatively small-scale farming that we have in Northern Ireland. There is a lot of debate going on, and I do not know exactly how this will all turn out. I think there is a possibility that there will be some regionalisation to take account of the structure of farming in different regions. It is really designed to try to get away from a monoculture of large cereal-growing areas where landscapes can become completely dominated by single crops.
1048. **Mr Frew:** Maize.
1049. **Professor Davis:** Here in Northern Ireland, a farmer may be growing 10 acres of barley to feed some cattle. He is not going to want to diversify that; it is just not practical. There is a lot of debate going on in the Commission about how that will work out in practice.
1050. **The Chairperson:** You will realise, gentlemen, that Mr Frew is Chair of the Agriculture Committee. *[Laughter.]* We talked a lot about Europe, and we talked a little bit about the USA. Could we be doing more in relation to the USA? This morning, we have seen reports about the US relaxing bans on imports and so on. Leaving aside agrifood as such — I know this is a wee bit outside your remit — is there more we could be doing on other exports and encouraging research and development so that we can increase our exports to the United States? Maybe that is beyond your remit.
1051. **Professor S Kennedy:** I think the answer is yes. I know of a small example from County Armagh, where a small company

- is shipping apple juice to the United States to test the market. Obviously, there is a vast market in the United States of 250 million people but they have a very well-developed agriculture industry themselves so, if we are to compete, I think we have to go back to the clean, green, wholesome image of Northern Ireland produce and sell it on that basis, plus value-added.
1052. **The Chairperson:** You seem to have a working relationship with the science park. Is it a fairly close one?
1053. **Professor S Kennedy:** It is a very close one. AFBI, with the two local universities and commercial companies, sponsors the annual £25K awards. We have found that process very beneficial to our own scientists because, formerly, our scientists might have done R&D, produced scientific papers, and left it at that. Participation in that competition has given them very good training in how to actually bring R&D to the next stage of innovation, commercialisation, and producing a business plan. We have very good links with the science park in that direction. As I said earlier, we are very impressed with the innovative community there, and we think that culture can add value to AFBI's R&D activities.
1054. **The Chairperson:** We were there last week; it was very interesting and very impressive.
1055. Professor Davis, you mentioned renewable energy. Does that form part of the research that you are doing in AFBI?
1056. **Professor Davis:** We have a renewable energy centre at our facility in Hillsborough.
1057. **The Chairperson:** How significant is that in relation to your overall work?
1058. **Professor S Kennedy:** It is very significant. We have had a programme on producing biomass for many years. Mike knows the details of that. We have been working on how to grow willow in the most efficient manner; how to protect against diseases; and how to grow miscanthus. We have also been experimenting with some other plants, such as elephant grass.
1059. In the past few years, we have succeeded in obtaining money from the Secretary of State's scheme to develop a renewable energy centre at Hillsborough. We have a system for combusting the willow and other biomass products. There is a district heating loop around the farm, in some of the main farm buildings. Over the past two years, we have produced a lot of practical data on the energy inputs, the energy outputs, the costs of the inputs and the costs of the outputs. That information is very relevant to farmers in Northern Ireland who are interested in going down the renewable energy route.
1060. We also have an anaerobic digester, which, first, looked at the economics of digesting slurry, and which is now looking at the economics of digesting slurry and grass together. We will extend that to other crops.
1061. **The Chairperson:** That is a combination.
1062. **Professor S Kennedy:** Yes. We have published a lot of the figures, and they are available on our website. We found different results in Germany, for example. That emphasises the importance of carrying out the research locally, in respect of our own products that are available for digestion and the climatic situation.
1063. We have also looked at the quality of the digestate as a fertiliser and shown that the availability of the main nutrients in the digestate is better than in the raw manure. It is a demonstration project for the industry, and it is producing a lot of very important data.
1064. **The Chairperson:** If that was commercially viable, it could transform local economies, I would have thought.
1065. **Professor S Kennedy:** Absolutely. With the recent changes in the renewables obligation certificates, it makes the whole process a lot more attractive to farmers.

1066. **Dr Camlin:** I want to mention one of the interesting areas in which we have been very successful recently. In an INTERREG proposal, we have been successful with a proposal for bioremediation. We are using municipal waste and farm waste to feed into the agriculture sector to feed the willow biomass, and that completes the loop. We are, in fact, adding municipal waste to willow and back into renewable energy. That is another useful area we are working with. We also have links with the east coast of the US in that area. It is quite an interesting and exciting area for us, and it links the agriculture sector with the municipal end.
1067. **The Chairperson:** It is quite exciting.
1068. **Mr Frew:** I will follow up on that. I know that this area is something that the farming community can diversify into, and there will be a lot of positives with it. However, is there a concern that we could shift the emphasis from food production to fuel?
1069. **Dr Camlin:** Food versus fuel; it is quite a debate.
1070. **Mr Frew:** In some areas, there could be potential for an imbalance. Is that something that concerns you?
1071. **Dr Camlin:** Look at what is happening in the States: so much corn is being grown for energy rather than for food. It is something that has to be kept in balance; you are absolutely right. We have not got an enormous amount of land available to us in Northern Ireland, so growing willows on high-quality land that could be used for other things might not be the right thing to do. We have to be very careful about that; I think you are right.
1072. **The Chairperson:** If you are dealing with agricultural waste —
1073. **Mr Frew:** Chicken litter.
1074. **The Chairperson:** If you are using waste from agricultural production, it gets round the problem that Mr Frew identified.
1075. **Dr Camlin:** We have problems with municipal waste and farm waste. If we can help deal with those problems, maybe there is an answer to that. I agree that we have to keep the food versus fuel balance in mind.
1076. **Mrs Overend:** I thought that was very interesting. When plans are submitted for schemes such as anaerobic digestion, people are very set against them. Surely, because you are linked with government, your research could be fed back for its use. Will you work towards Government Departments using more renewables, using the results of your research to find good ways of using renewables and try to change the public's perception and convince them that renewables are a good way to go and that anaerobic digestion systems, etc, are acceptable?
1077. **Professor S Kennedy:** That is true. We give our data to DARD, which is very interested in using it for policy development. As well as that, we have a considerable number of visitors to the renewable energy centre and the anaerobic digester. There is no smell or nuisance from it; it is a very clean technology.
1078. **Mrs Overend:** I appreciate that you are talking to DARD, but it is really important to talk to the other Departments and educate them about what you are doing. Everybody can say, "There are the farmers, at it again" —
1079. **Mr Frew:** Do you mean the DOE?
1080. **Mrs Overend:** Every Department. Departments could have a link with the agriculture sector to create energy. The emphasis needs to be on getting that information out to all Departments.
1081. **Professor S Kennedy:** I agree; there is probably more that we could do along those lines.
1082. **Mrs Overend:** Thank you very much.
1083. **The Chairperson:** Mrs Overend makes a very good point: this is something for the Government to take on board, not simply one Department. I suppose that is a self-evident proposition.

1084. There was a point Mr Ferguson raised about centres of competence. What does that mean? Those are not established yet, are they?
1085. **Mr Ferguson:** They are in the process of being established. Invest NI, after looking at other regions in Europe, has identified that as a model for bringing together industry and companies, large and small, to work together in specific areas. The basic model is that Invest NI would provide a substantial amount of funding over a fairly substantial period of up to five years for the centres to carry out early-stage R&D. The model is that the companies get together, work together and identify the research that they want to carry out, so it is very much industry led.
1086. AFBI, Queen's and the University of Ulster worked together in the early stages with the companies to bring them together to get a centre formed on agrifood. We are working very closely with the QUESTOR Centre at Queen's and with the University of Ulster to do the same thing in renewable energies. Essentially, there are bodies of companies that are working with Invest NI to get those centres up and running. They are at the stage where they are preparing business cases and plans for Invest NI to consider and, hopefully, approve for funding.
1087. **The Chairperson:** You talked about attracting or securing in the region of £14 million per annum, outside DARD grant-in-aid. Are those moneys raised through commercial work with private companies?
1088. **Professor S Kennedy:** It is done through a range of work, essentially commercial work for private companies. There is also some government funding, and we are including our European funding. It is all our income outside the set grant-in-aid.
1089. **The Chairperson:** I am just trying to figure out how much is coming from the pure private sector as opposed to any other government or semi-government organisations.
1090. **Professor S Kennedy:** Probably about £4 million.
1091. **The Chairperson:** The rest is made up of European funding and some indirect government funding?
1092. **Professor S Kennedy:** Yes, and we have a royalty stream, which I referred to earlier, that comes from private companies. That is about £4 million.
1093. **The Chairperson:** Is that in addition to the £4 million that you identified?
1094. **Professor S Kennedy:** It is in addition to the commercial contracts that we carry out for commercial companies.
1095. **The Chairperson:** Are the royalties included in that £14 million?
1096. **Professor S Kennedy:** They are.
1097. **The Chairperson:** OK. I think that that is everything. Thank you very much. It was a very interesting and very useful presentation and discussion.
1098. **Professor S Kennedy:** Thank you very much.
1099. **The Chairperson:** Thank you for coming. If there are any further questions, may we write to you?
1100. **Professor S Kennedy:** Certainly. If there is any more information that you would like, please contact us.
1101. **The Chairperson:** Thank you very much.

22 March 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Daithí McKay (Deputy Chairperson)
 Mr Gordon Dunne
 Mr Paul Frew
 Ms Jennifer McCann
 Mrs Sandra Overend

Witnesses:

Mr Graeme Hutchinson	<i>Department of</i>
Mr Ciaran McGarrity	<i>Enterprise, Trade and</i>
Mr Bernard McKeown	<i>Investment</i>

1102. **The Chairperson:** I welcome Mr Graeme Hutchinson, head of the Department's economic policy division; Mr Ciaran McGarrity, the principal officer in the innovation policy unit; and Mr Bernard McKeown, the principal officer of the foresight and horizon scanning unit. You can explain to me what that means later on.

1103. Thank you very much for coming along. We are disappointed that we did not get your written documentation in a timely fashion; we received it only yesterday. A number of Committee members have commented on the lateness of the document. I emphasise again to the Department the need for the timely production of documentation. It is simply not acceptable. This matter was raised at the Chairpersons' Liaison Group, and there is a general discontent and a feeling among Chairpersons, who reflect the views of the Committees, that this is not acceptable. I would like you to convey that to the Department.

1104. Nonetheless, we have received the document, so I invite you to make an opening statement, after which we will ask questions.

1105. **Mr Graeme Hutchinson (Department of Enterprise, Trade and Investment):** We are delighted to be here to participate in what we consider a very important inquiry for the Department and, indeed,

for the economy as a whole. I apologise for the lateness of the evidence to the Committee. I will go through some of the material that we cover in our written evidence, if that would be helpful.

1106. **The Chairperson:** Thank you very much, Mr Hutchinson.

1107. **Mr Hutchinson:** We welcome the inquiry for two reasons. First, innovation and R&D, as it is in the economic strategy, is our top priority to drive growth at the regional level. Any material that helps to progress our activities in innovation and R&D can only help. Secondly, we welcome the timing of the inquiry. The economic strategy highlights the fact that we are involved in producing an innovation strategy in 2012 as the successor to the regional innovation action plan, which the Committee considered last year and, indeed, broadly endorsed.

1108. As part of my opening remarks, I will briefly focus on the content of the inquiry on innovation and R&D and what the Department has been doing to date on prioritising action on that, and then I will give you a flavour of the innovation strategy work that we are undertaking in 2012.

1109. The publication of the economic strategy last week was an important milestone for the Executive. It marked the end of the work that began with the independent review of economic policy that Minister Foster launched, and which was reported on in September 2009. Given the heavy emphasis that the Barnett review placed on innovation and R&D, it is worth pausing to say that the Department has learned lessons from the Barnett review recommendations, such as the need to prioritise exports and value-added foreign direct investment (FDI) at the regional level.

1110. One of the key recommendations in the Barnett review was that R&D and

- innovation should be considered the most important long-term driver of regional economic growth. That is why it is cited as our top driver in the economic strategy. The emphasis on flexibility with Invest NI was a key issue in the Barnett review, and we have raised delegated limits so that Invest now has more autonomy to operate in innovation and R&D. The delegated limits for innovation and R&D were £2 million and are now £6 million. That gives Invest NI more flexibility and freedom to operate and to support innovation and R&D.
1111. The two priorities of the framework for growth, which Minister Foster launched in January last year, are rebalancing the economy over the longer term and rebuilding it in the short to medium term, given the impact of the recession on the labour market. That was very much informed by the independent review of economic policy (IREP). Under rebalancing, we have five priorities, and the first, intentionally, is to stimulate innovation, R&D and creativity. It is top of the stack, and, for a regional economy, it is imperative that that is recognised as the top driver for growth. Obviously, that must be supported by the other priorities, not least improving the relevance and use of skills to support that R&D agenda.
1112. In the framework document that was launched last year, we highlighted the fact that, over the previous Programme for Government period, spend on economic development had far outstripped overall growth, certainly in respect of current expenditure. Between 2007 and 2010, spending on economic development increased by 30%, compared with an increase in overall expenditure by the Executive of just shy of 13%. One of the key points in that document was that the biggest increase in the priorities was in stimulating innovation, R&D and creativity. Over that 2007 to 2010 period, that increased by 80%, so, as we move to populate an innovation strategy, we are not starting from scratch. Over the previous Programme for Government period, there was significant growth in spend on innovation and R&D, but we live in a competitive world, and other UK regions and global competitors are equally carrying out the same prioritisation and investment.
1113. That framework was then embedded into the economic strategy. As members will know, it is included in section 4 of the strategy, which was launched last week. The strategy includes an evidence pack, which was launched on the strategy's website. I trust that it articulated our recent success in innovation and R&D, including the largest increase in total R&D spend since 2008, a 40% increase between 2008 and 2009, and a further 8% between 2009 and 2010. That reflects some of the progress that has been made in that area, but we recognise that much more needs to be done. The UK in itself may not be a good comparator. As our evidence pack highlights, its spend relative to the overall economy's output is much less, compared with other countries such as Sweden, Finland and Israel.
1114. On the matter of firms that are engaged in innovation, we have one or two that the statistics classify as "innovative active", but it is only one or two. Our UK competitors and more global competitors have much in excess of that.
1115. On the strategy's priorities for innovation and R&D, the Department has led on the MATRIX work, from which we have identified the priority areas of telecoms and ICT; life and health sciences; agrifood; advanced materials; and advanced engineering. Those are our priority sectors. That is not to exclude other sectors, but those are identified by business as the areas that are really lifting the big burdens in exports and R&D. Companies that are active in those areas account for over three quarters of the spend on R&D already in Northern Ireland, so clearly there is a lot that we can do to accelerate and make progress in those areas. That makes the obvious and important point that R&D and innovation is not an end in itself, but is about encouraging companies to export. For them to go into the global markets,

- they must be more innovative and R&D intensive.
1116. The Committee will have gone through the strategy in detail. The key highlights in the area of innovation and R&D include supporting £300 million of investment in R&D, with at least 20% — a fifth — coming from small and medium-sized enterprises (SMEs). Another is for 500 businesses to undertake R&D for the first time. Having gone through your evidence about the importance of cradle-to-grave support for companies engaging in R&D, we are very much seized of that. Obviously, it is not only a DETI strategy but an Executive strategy, so it includes actions on agrifood, the creative industries and other areas, all to support the overarching objective of the strategy to promote 25,000 jobs and to increase manufacturing exports by 20%. It is also worth remembering that the Department is involved with DFP and OFMDFM in rebalancing the economy with the UK and the Treasury. We believe that corporation tax will have a material impact on innovation and R&D, stimulating growth in the business base with value-added businesses coming in and strengthening supply chains with local companies.
1117. The economic strategy identifies the sectors that we might be able to increase more significantly with access to that policy lever. Those areas include technical and R&D centres, fund management, private equity within financial services and within life and health sciences. You have already received evidence from Almac and others in the bioscience and pharma sectors, but we think we can scale and grow those areas, with access to a lever that attracts companies not for cost, but for profit. Going forward, R&D and innovation is about improving the profitability of companies.
1118. As I said, we also welcome the Committee's inquiry on the grounds of its timing. This year, I have lead responsibility for producing the innovation strategy that is signalled in the economic strategy. We have recruited Mike Kitson from the University of Cambridge. He was very helpful in building our evidence base for the economic strategy. We have brought him in to help frame the key priorities as far as the innovation strategy is concerned. I will be very happy to come back to the Committee when that strategy is in sharper focus. However, some of the key areas that we are looking at include the need for greater collaboration. You will have heard before in evidence from the universities about the Triple Helix — the linkage between business, academia and government — and how best that can be done. We already have programmes in that area in respect of innovation vouchers and knowledge transfer partnerships, but the economic and innovation strategies have highlighted the need to explore with the science park how it can evolve into a more open innovation centre. I know that you have heard evidence from the science park, but that is a key priority, we believe, in strengthening the collaboration between those actors in innovation and R&D.
1119. Access to finance will be a critical issue. That is not to say that we should divorce it from Invest NI's wider access to capital strategy. It has interventions, and I am happy to speak at more length on that later in respect of debt finance and equity finance. It is about giving help to companies that are finding it difficult to access finance. That will more likely be the case in innovation and R&D than in other support packages. Therefore, Invest NI's access to capital is over £100 million, which is levered through public and private sources. It is about matching that with what we will do under innovation and R&D.
1120. In respect of the concept of internationalisation of R&D and innovation, it is about reaching out to our global competitors to work in partnership with them. Framework programme 7 has been a very big issue for the Committee, and we are seized of that. Ciaran is leading on the review of the support structures that we have had to support and maximise drawdown on

- the framework. We will be able to speak at length on the more specific things that we have already actioned about having people to co-ordinate and bring together the key players to maximise drawdown. Therefore, that will be a key priority.
1121. With regard to prioritisation, as you will know, with the emphasis on smart specialisation, Horizon 2020 states that there are certain areas that will be able to secure support. That is how we have sought to maximise that alignment between our priority sectors in the economic and innovation strategies with what we will have, going forward, in maximising drawdown.
1122. My final point is about leadership. We welcome the Committee's emphasis on that area, because it is a key top driver of growth. The economic strategy suggests and highlights the potential of having an innovation council that would be not only Government led, but harnessed at a high level with universities and businesses to drive forward growth.
1123. We have carried out an extensive review of best practice globally, including Finland, Singapore, and down to areas such as Estonia and the ROI. They have all been prioritising at that high level the tripartite arrangements between business, academia and government. We will see that and have some actions as part of that in our innovation strategy. Needless to say, we will have targets as part of that innovation strategy, and we will seek to balance the ambitious nature of those against a degree of realism as to where we are coming from in trying to grow the knowledge-based economy in Northern Ireland.
1124. Chair, that is probably enough from me in respect of my opening remarks. I have given you a flavour of our submission, and I reiterate our apologies for the lateness of the submission to the inquiry.
1125. **The Chairperson:** Thank you very much, Mr Hutchinson. I think one of the most interesting comments during the previous session with the Agri-Food and Biosciences Institute (AFBI) was made by Professor Davis, who said that there was a lack of critical mass in R&D in Northern Ireland. He felt that some of the barriers to increasing R&D were structural or cultural. I am not sure whether he is right, but I suspect he is. How do you view it? There seems to be a problem in that, outside of a few major companies, we cannot get a spread of R&D across a wider range of companies in different sectors.
1126. **Mr Hutchinson:** I think that there is a systemic problem within the business base. We talk about a small or medium-sized enterprise based economy, but it is more micro-based, with companies that employ fewer than 10 people. To them, innovation and R&D must be considered a cost; they do not really recognise that, although it might initially be a cost, it brings long-term benefits. We have referenced some points in section 2 of the economic strategy on those long-standing structural issues; not just about the preponderance of small-company economy, but the lack of large companies. That goes back to my earlier point about corporation tax. What policy lever could we access that would attract large companies to locate here, not for cost reasons, but to access the skills base? We believe that corporation tax needs to be seen in the context of your inquiry on innovation and R&D. It is about large companies setting up and the evidence that we have from ROI about the spillover effect of knowledge.
1127. **The Chairperson:** If I could usefully stop you there, you are going back really to the Barnett review, which is the basic approach to plugging that productivity gap, giving Invest Northern Ireland more flexibility, putting emphasis on exports in respect of industry and business, and attracting high-value jobs. I think what you are really saying — I do not want to put words into your mouth — is that the microbusiness base of much of our private sector is really not a sufficient basis for developing R&D to the level that we should have.
1128. **Mr Hutchinson:** There are actions in the Programme for Government and the

- economic strategy about having 20% of R&D coming from SMEs, but to reach our overarching goal of converging with living standards in other competitive countries on the basis solely of investing in micro-based companies in R&D, we do not think that would be sufficient.
1129. **The Chairperson:** That is unrealistic.
1130. **Mr Hutchinson:** It is. It is necessary to continue to invest in those companies and to skill them so that they see and are seized of the need and opportunities in innovation and R&D, but it is not sufficient, certainly not in the context of converging with living standards elsewhere.
1131. **Mr Ciaran McGarrity (Department of Enterprise, Trade and Investment):** The key challenge in dealing with microbusinesses, as Graeme was outlining, is to get more companies to be innovative. R&D is a subset of innovation. Innovation drives productivity; the evidence is clear from the UK and other parts of the world. The National Endowment for Science, Technology and the Arts (NESTA) estimates that 18% of innovation activity is R&D. R&D is not for everybody, although it is a key driver of exports. If we can get more microbusinesses to be innovative through skills, leadership and management, that is one way to make progress. We must look at the broader concept of innovation. Then, when companies, through MATRIX and other vehicles, see where opportunities are in the future, we can encourage innovative companies to move into those sectors and markets. Through initiatives such as Invest NI and other delivery bodies, we can encourage greater collaboration between the knowledge base in academia, and those companies. However, companies need to be innovative. Graeme has already outlined our level of innovative capacity. We need to move up that scale. That is one of the targets that we have set.
1132. **The Chairperson:** I do not want to be pedantic about it, but there is a difference between innovation and research and development.
1133. **Mr McGarrity:** Absolutely. Innovation is about change. It is about adding value from a new product, process or system. R&D can be used to deliver that. So, too, can skills, design and creativity.
1134. **Mr Hutchinson:** It is worth emphasising, Chair, that our support packages through Invest NI differ depending on what the company needs. Therefore, R&D will receive different types of support, such as early-stage research and development, through to wider capability advice from innovation advisers. That is an important point to stress. Yes; they are different, so, in recognising that, our support packages also need to be different.
1135. **The Chairperson:** You referred to the total expenditure on research and development in Northern Ireland in 2010. It was £521.4 million, which was an increase of £36.6 million, or 8%, on the 2009 figure. My understanding is that the largest chunk of that comes from the top companies here. That reinforces the point that you have been making. I suppose that, if we really want to see a significant increase in actual research and development, the only solution, going back to what you said originally, is to attract high-quality companies to Northern Ireland.
1136. **Mr Hutchinson:** Yes, and aligning them to our skills. The danger is in attracting value-added FDI that sits in splendid isolation from other companies in the local business space. The lesson that we learned from other countries is that you must align your pitch for FDI to sectors where we already have strengths, albeit in small companies that are active in those sectors. Then, you seek to ensure that there are supply chain linkages, particularly if they are in manufacturing. If they are in tradable services, we have other forms that can link them to large companies. Evidence shows that that is the way to ensure the biggest impact on productivity and export performance.
1137. **The Chairperson:** That is the five markets that have been identified under MATRIX?

1138. **Mr Hutchinson:** Yes. Again, the emphasis is that they are defined by business. It is not government saying that those are the areas; it is business. We have worked with business through that MATRIX work, which Bernard was leading. You referred to his rather elongated title earlier, Chair. It really asks whether they will be the sectors for ever and a day, and the answer is no. We need to keep refreshing, and that is where foresight and horizon scanning come in. As I said earlier, those areas already account for three quarters of our R&D and export performance. MATRIX has already started to look at the green economy and sustainable energy to see what global market opportunities exist in that sector for local businesses.
1139. **The Chairperson:** I have one final point on European funding. Our drawdown under framework programme 7 does not seem to have been very successful. I know that you are doing work on Horizon 2020. Are you confident that you can increase the drawdown? I suppose that it depends on an awful lot of factors, including the responsiveness of the European Commission to reform the Horizon 2020 funding processes. How do you view it at the moment? Are you optimistic or pessimistic about change?
1140. **Mr Hutchinson:** For my team, I always try to retain a positive and optimistic outlook on these things.
1141. **The Chairperson:** Just like myself. That is why I am in politics. *[Laughter.]*
1142. **Mr Hutchinson:** I am not sure whether I should rejoin by saying that that is similar in the Civil Service. *[Laughter.]* The key issue is that the building blocks are there to ensure that we maximise a greater level of drawdown than we have to date. There is work with the Horizon 2020 co-ordinator and the strategy to establish thematic leads under those priority areas. We now have people in Brussels through Invest NI and the Barroso task force working in those areas on a two-way level: to the Commission, to emphasise that we are open to maximise or increase our drawdown; and also locally through Invest NI, with executives working with companies that are already in receipt of R&D and are more likely to make applications to framework 7.
1143. We certainly have actions in place to ensure improved and maximised drawdown. However, it goes back to the challenges of an SME-based economy. It is a costly and elongated exercise for many companies to engage with framework 7. The challenges are recognised.
1144. **Mr McGarrity:** Can we do better? Yes.
1145. **The Chairperson:** That is the question, I suppose.
1146. **Mr McGarrity:** Yes, absolutely, but, as Graeme outlined, we recognise that. That is why we went through the process and the Committee saw the conclusions of the cross-sectoral group. It was not government saying this, but business, academia and government working together on the opportunities that do exist and the actions that we need to take to improve our participation. However, government does not draw down on the framework — we have to encourage, support and cajole.
1147. We can improve. However, going back to the point that we made at the start, R&D is relevant or applicable to only a number of companies here. It is about the broader concept of innovation. Indeed, Horizon 2020 goes beyond R&D, in recognition of that point. There is recognition that we can improve, but in the context of growth in the wider economy, we can also take other actions closer to home. We should not lose sight of that.
1148. **Mr McKay:** One respondent raised the issue of increasing funding drawdown from Europe, and recognised that Invest NI is very supportive. However, it is completely different from Enterprise Ireland, which is much more supportive and advanced in that area. Is that something we could look at? Is there co-operation with Enterprise Ireland on this or opportunities there to up our game?
1149. **Mr Hutchinson:** The challenge is that it is a different economy in the ROI. It

- has more academic institutions and more value-added companies, given the policy lever it has had for many years of low corporation tax. We have had discussions with them and they themselves recognise the challenges that even they have in maximising drawdown. Comparing them with where we are at the moment, however, is slightly unfair because of the nature of our business base here and the fact that, traditionally, with academia, we are talking about two higher education establishments in the North.
1150. We certainly continue through Invest at a policy level to work with not only Enterprise Ireland and others, but we have meetings with the Technology Strategy Board in GB because this is a systemic problem across all countries.
1151. **Mr McKay:** We know that Bombardier or Shorts have linkages with the University of Galway. Universities across the island are already involved in R&D, so you need to look at where that is available, as well as across the water.
1152. **Mr Hutchinson:** We consider innovation vouchers a very effective mechanism on the innovation side. There is scope to access providers who can work and collaborate through innovation vouchers on a North/South basis. We recognise that. I suppose my only point is with regard to the Chair's point about how ambitious we can be, going forward. You may consider this a defensive point, but the NI business base has not changed materially. It is still micro-based and many companies in many sectors consider R&D to be something that they have not embraced before, so it is a matter of overcoming that challenge.
1153. **Mr McKay:** Some of the respondents that we have already heard from have criticised not only the culture in the business community but the culture across the public sector. There is responsibility for R&D in OFMDFM, and respondents have raised the issue of the Public Accounts Committee (PAC), and so on. How is the Department looking at and raising that issue cross-departmentally to try to address it? I recognise what you said about bringing in Mike Kitson from the University of Cambridge. However, historically, government has not used local universities as much as they could; it has steered more towards using consultants than universities. Can we change that, and are we changing that?
1154. **Mr Hutchinson:** On your second point about Mike Kitson from the University of Cambridge and other academics, in our research programme we have been more academic focused than consultancy based. That is by dint of the fact that the output is and has been more value added.
1155. On your previous point about what we are doing, the Department set up a steering group to review the support structures that we have — I mentioned this in my opening remarks — for maximising drawdown. The steering group was cross-departmental and also included members of the CBI and the science park. It was set up with a view to saying that things are clearly not working as well as they should, and asking what we need to improve.
1156. One of the key things that came out in that review, which Ciaran led, is the need to have someone to co-ordinate across businesses and academia the potential for companies and academia in framework programmes. We will appoint a person shortly to fulfil that role. As part of that exercise, we also saw the Commission place an emphasis — in the context of Horizon 2020 and, to a lesser extent, on framework 7 — on smart specialisation. Earlier this year, someone was appointed from within the Department specifically to work on smart specialisation. They will develop that strategy, which will be part and parcel of the programme. They will identify the key areas that we will prioritise and how we ensure that there are greater linkages between the different people to support and maximise drawdown. Have you any points to add, Ciaran?
1157. **Mr McGarrity:** On the comparative analysis, the Republic of Ireland is a

- member state of the EU. That is why its regional contact points in the network, for example Enterprise Ireland, have direct access to Brussels. We are a region of a member state, and the UK has similar support network of contact points. So, in that sense, we are not comparing like with like. The point is that, in moving forward, we can improve the co-ordination across government, as Graeme outlined. For example, we now have DHSSPS, DOE and DARD taking a more proactive approach to the whole concept of recognising the framework. That is because constituents and stakeholders of theirs will or could be key participants in the framework programme. That is starting to move forward, and the Committee has seen the recommendations that emerged from that framework group.
1158. To reiterate what Graeme said, DETI's commitment includes putting resources in place now to bring all of that together to identify where additional resources are, such as thematic leads or advice on how we bring universities and business closer together in the framework. Universities are the key driver in this.
1159. **Mr McKay:** Chair, I have a quick point about an issue that we raised before this session. This is not the first time that the Committee has had papers arrive late. I think all members expressed their disappointment at that, and we certainly accept your apology. What was the reason for that lateness?
1160. **Mr Hutchinson:** We have had a really busy period because of work on the economic strategy, corporation tax and regional aid issues. I can only reiterate my personal apology for getting the evidence to you at such late notice. I will take back and reflect to the relevant people that you have indicated that this is a wider issue.
1161. **Mr McKay:** My concern is that the Department and you, as civil servants, also deal with businesses and FDI opportunities. If this is happening not only to us but to other parties that you deal with, that is a serious concern. The fact is that this is happening across Departments and the Assembly, and it is simply not good enough at this level of governance.
1162. **Mr Frew:** Gentlemen, thank you for your presentation and your answers so far. I want to explore an area that came up every time we received a presentation during this inquiry. That is the need to have a change of attitude to the tolerance of risk. I had 20 years in the private sector, and I also declare an interest as a former member of the PAC. I understand that everyone on that Committee has a job to do, and I took it as seriously as anybody else, if not more so. We have a job to do in scrutinising how we do things, our performance and the decisions that we take. However, sometimes, as I sat on that Committee, I would have loved an official from a Department or a government body to have said, "You know something, we took a risk, and this time it did not work out." I wanted to hear them being that bullish. As a government, we have to take risks. In the private sector, those businesses that do not take risks every day are the businesses that do not grow and the businesses that die. If we want our economy to grow in the way that we say we do, we have to look more like and be more like the private sector. If the witnesses to this inquiry have not made outright criticisms, they have acknowledged that it needs to change. What would you say to that? How would you counter it?
1163. **Mr Hutchinson:** Having gone through the evidence, I know that the science park and other contributors were very clear in articulating their view of the need to be more tolerant to risk. As a civil servant, the obvious point to make is that, although you cannot de-risk projects, you can put mechanisms in place to manage that risk. That is a point that IREI, or the Barnett review, made. I was secretary to the panel that carried out the review, and it was clear on the need for Invest NI — it is, as the panel put it, the "tip-of-the-spear" of the support from government and the Executive — to have a mechanism to support more projects, and especially innovation

- and R&D projects that are traditionally riskier.
1164. Within the powers that we have, we have taken some steps towards that. For example, we have given Invest NI more autonomy, although it still has to operate within the usual green book mechanisms of approving and appraising projects. Another recommendation that IREP made was that we should look at how we evaluate and assess innovation and R&D projects. We did that, and that led to a change in Invest NI's appraisal mechanisms, not for the purposes of risk avoidance but to see how that risk can be managed and, more importantly, how we can capture the non-specific and wider benefits from innovation and R&D projects that will spill out from companies to the region and beyond.
1165. In summary, Paul, as far as we can, we have taken steps to address the issue. It is a wider issue than just saying that the Department needs to embrace DFP, the Audit Office and even the PAC, as you mentioned. MATRIX also highlighted that as an issue and recommended that we should have a portfolio approach to risk. That would mean that, as you said, some projects would fail; however, if we have a basket of projects that, overall, positively add value to the economy, those would get the green tick.
1166. **Mr Bernard McKeown (Department of Enterprise, Trade and Investment):** I will to add to that and take a step back to the earlier point about encouraging smaller companies to engage in R&D and innovation. One of the priority areas that MATRIX identified was that of collaboration and encouraging companies, universities, FE colleges and other institutions to work together towards identified market opportunities. In itself, that brings an additional tier of concern about how risk is managed as there are so many partners involved. MATRIX continues to look at what it has described as a "first stop shop" to help to navigate through the various support mechanisms that are available. What is needed in such a context is not so much a single point of entry but someone who knows how to get through the various support programmes and the various advice and guidance on entering the services available. That would then allow the system to work more efficiently. It does not mean changing anything. It simply means putting a management structure in place that can oversee and overarch a number of sectors and a number of ways of doing things.
1167. I think that the need to further build on some of the MATRIX work has been touched on in what has been described as open innovation, which is encouraging more partners to work together in order to bring to the table a greater degree of capability and to build more critical mass into the process, as the Chairman said at the start. A number of support programmes in Invest NI could be agglomerated, because they would behave much more effectively together than they do apart. Likewise, there are other players outside government in universities, colleges and businesses' research bases where things could be done better together. Collaboration would help to deal with some of those risk issues as well.
1168. **Mr Hutchinson:** In summary, we recognise that it is an issue. If that point were made in Europe, via the report, we would certainly see that as helpful, because, as I said, we are only one part of the bigger picture. There is a building consensus, through MATRIX, IREP and the Committee, that this is a key issue. A knowledge-based economy will bring more risk than one not based on knowledge, because it requires investment in areas where future streams of revenue are uncertain. However, you are still dealing with government money, so there is a balance between putting in mechanisms to manage the risk and, at the same time, running the risk of a risk, as you indicated in your question.
1169. **Mr Frew:** I want to take that a stage further. What I say might be controversial, but I say it with a private sector hat on. Is there an acknowledgement that we are ready to invest in failure in order to gain knowledge? That is maybe hard to get

- your head round. Are we there yet? Do you see signs that we could move to that position? This is a societal thing; it is not just government. The media and everybody else will latch onto something that fails and beat it until it is black and blue. Then, they will leave it and move on to beat something else. However, out of that, there could be growth in indirect ways that nobody will ever foresee. Hindsight is a wonderful thing; it is great. I suppose that PAC has lumps of that, as does the Comptroller and Auditor General. Are we in a position where it would be acceptable to invest in failure in order to gain knowledge?
1170. **Mr Hutchinson:** I do not think that we are there at all. However, I think that we are in a better place than we were in 2008 following IREP, which was academic-driven, with some private sector people on the panel, such as John Wright, ex-chief executive of Northern Bank. We are certainly giving that message very clearly. As I said earlier, that led to Invest NI having increased autonomy and relooking at its appraisal mechanisms. Some changes have been made. However, I do not think that we could have gone as far as you indicated in your remarks, because we are still custodians of public money and need to make sure that we abide by all the rigours that are there for good reason, in respect of governance and ensuring spend is put in the right place at the right time.
1171. **The Chairperson:** Arising out of what Mr McKeown said to Mr Frew in relation to a one-stop shop, I take it that you mean that in respect of assisting people who are trying to access research funding either from Europe or from other bodies, but principally Europe?
1172. **Mr McKeown:** Not principally Europe; by whatever means are available. It is certainly an area that we have looked at since the MATRIX report identified it. We conducted a series of mapping exercises to identify the sorts of innovation and R&D support that are available across the region. There are many, and many are complementary. The challenge that we are looking at in the next step of that is how we put in place a system of management that makes it seamless to tie those support programmes together and put in place a team or series of individuals who are capable of understanding the full plethora of what is available, not just — it is important to say — what is available from government and from public funds but what businesses bring to the table. It is not always funding that is the issue. Sometimes it is advice, knowledge, mentoring, association with other businesses and working into supply chains. Without wishing to labour the jargon, it is touching on an open innovation model, in which companies, academia, government and all the institutions that play a part in the system are working with one other. MATRIX identified that they could do that by working with business to identify main market opportunities, which touches on Graeme's point about smart specialisation, identifying what the region does particularly well and where the future global markets are going to be, which we know we will have the capability to move towards. That kind of model is being looked at for collaborations.
1173. **The Chairperson:** You referred to a mapping exercise. I would be interested in that if it is available. Where would you put the one-stop shop? Would it be in the Department, in Invest Northern Ireland or outside any of those?
1174. **Mr McKeown:** It would need to be what Mike Kitson, in the work he has done for us to date, described as boundary spanning, which means that close association with one sector, one discipline and one organisation would probably not be where it should ideally be associated. It should have the ability to work on an equal footing and in an objective way with business, government and academia. I suspect that it would also require people with remarkable skills — they do exist — who can work in those three environments and be comfortable in them, and who also have the ability to identify market opportunities and understand the needs

of the participants. I suppose that, if our thoughts are leading anywhere, they are leading towards seeing the science park as an ideal host.

1175. **The Chairperson:** That is interesting.

1176. **Ms J McCann:** Thanks very much for your presentation. It is very interesting listening to you answering some of the questions. You are basically saying that there are two levels. There are the smaller and medium-sized microbusinesses and innovation that is going to make them grow, create employment opportunities and market whatever product they are going to do, and then there is the wider knowledge-based skills base that you can sell either to those companies coming in or to the international market to export your expertise. I am just thinking about what you were saying there. I was going to ask a different question, but you were talking about the collaboration and that. Even in some of the smaller businesses, for instance, if it is a knowledge-based product they are going to market — I am looking at the life and health sciences, for instance, maybe some sort of research on drugs or that type of pharmaceutical small business — it is about trying to drawdown the funding for some of those smaller businesses. Maybe the expertise that they have could be exported to other markets if there was some more help through the like of Invest NI or whatever.

1177. It is not just about financial help all the time. It is about support and encouragement. I worked in funding for a while in the community sector, and sometimes you can fit an application into the funding criteria, as opposed to the other way around. I am just wondering about something like that one-stop shop that you talked about, for instance, so that people could go and access information on how they go about that. I agree with you that, for a lot of smaller businesses, it will be about innovation, not research and development. I think that you could work collaboratively with some of the regional colleges, for instance. We were up at the South Eastern Regional College

(SERC), which seemed to work very well on renewable energies. There are some ways of looking at it. Could that be put in place? From what the other group was saying, there seems to be a lot of funding there from Europe, but it is just trying to draw it down. If that type of small group of people could be put somewhere where people could go and talk that all through, and, as I said, fit your application into what the criteria are, would that be an option?

1178. **Mr Hutchinson:** Absolutely. As part of the innovation strategy, these guys have been harping on about the issue of a map. MATRIX may have done it, but the Department leads on this innovation strategy. In some senses, the innovation and R&D market is chaotic, and there are so many actors and players involved in giving financial and non-financial support. So, at the very least, at one level, the innovation strategy can articulate externally what is needed by whom and where you go for that support. That will be done as part of that innovation strategy. Secondly, as Bernard has indicated, one of the actions in the economic strategy is to explore open innovation with NISP, and Mike Kitson has been involved in giving companies advice to develop their capabilities. We certainly see that that could be a role that the science park could perform, because it is not necessarily about giving finance, as you said, Jennifer.

1179. **Ms J McCann:** You mentioned some of the emerging economies, such as Brazil, Russia, India and China. There is not a lot of knowledge about that, particularly among smaller businesses. Again, it is about showing people the way for the future, because it will not be the same old same old if we are to grow the economy in the way it needs to be grown, particularly if we are to create employment for people. We need to map out that role and path for people, and we need to look beyond at what the future will be.

1180. **Mrs Overend:** Thank you very much for your presentation. Some of my points have already been covered. We

- are talking about the barriers to R&D, and in your paper you did not include lack of awareness, information and understanding of opportunities. That is really what we have been talking about. That seems to be a major thing. I visited my local further education college and the InnoTech Centre in Cookstown, and the work that it is doing with very small businesses sounds absolutely fantastic. Those businesses get to know about that through word of mouth. I do not know how that is being promoted. They just find out from somebody else who was successful. We need to build on that. We also need to keep contact with those companies and further develop them. You talked earlier about networks, and it is very important to continue contact with those.
1181. **Mr Hutchinson:** We talk about the triple helix; it is about academia, business and government working together. Given the make-up of companies in NI, they may be, and traditionally have been, more likely to link to the colleges but not necessarily to HE. It is not either/or; it is both. As you say, rightly, it is about trying to articulate what is happening and what more could happen to facilitate that collaboration. Every road seems to lead back to improving knowledge of what is available and to collaborate to ensure that we are all — in government and outside of it, in academia — working to a shared objective, which we hope to articulate clearly in the innovation strategy.
1182. **Mrs Overend:** What they are doing should be collected by government because we need to concentrate on and build upon the skills. We need better communication.
1183. **Mr Dunne:** I welcome the panel. Thank you very much for your contribution; it has been very informative. We have had several sessions on this, and a lot of evidence has been gathered. We are all very aware that an awful lot of genuine facilitators are trying to do very much the same job. I know that you have touched on that, but I have written a note saying that something needs to be done to, perhaps, bring them all together and to make sure that there is not duplication and that industry and commerce are fully aware of what is going on and what is available. We have all been impressed by what we have been shown and advised on, and new members especially are very much impressed by the commitment to do something about trying to move the whole economy forward.
1184. Is there a risk that, with so many different players doing their own thing, no one is looking at the overall strategy and how it is delivered?
1185. You mentioned innovation, and you said that very few firms are innovation active. Graeme, will you elaborate a bit more on that? I think that you said that one or two of the big players were at that stage. The other points have been well covered. What strikes us is the poor pick-up by firms. We were at a large pharmaceutical company; you will know which one I am talking about from the evidence. We were surprised that it was not accessing European funding, and we wondered why it never bothered or never got round to it. We all have our own feelings. It has other sources of funding because of the work that it does for other players. I felt that it put the onus back on us a bit to try to put more pressure on Invest NI to take more risks, as my colleague talked about earlier. There is a belief that Invest NI will go so far but not far enough in relation to getting involved in the larger areas of risk and trying to move the whole thing forward.
1186. We have heard an awful lot of evidence about SMEs and how difficult it is for them. They are busy doing the day job, which they have to do to succeed. They do not want to get diverted and take risks that they feel are not worth taking. So many companies are unwilling to get involved because there is a risk of a transfer of knowledge. If they work on design or innovation, there could be leakage. Those issues need to be addressed as well to give people assurances. I always remember the issue of trying to get partners in Europe for SMEs. That is most difficult for

- small firms throughout Northern Ireland. It seems to be very difficult, and we certainly received evidence that it was.
1187. My last point is about Horizon 2020. What can we all do to make sure that it is smarter and more accessible to all the various players? Sorry about that; I have rambled on, but there were a number of points.
1188. **Mr Hutchinson:** I will respond in no particular order. So many individuals and organisations are involved in stimulating innovation, R&D and creativity, as the economic strategy has outlined that, if we do not have an innovation strategy that articulates who does what and when, and how companies can access support and communicate what support, financial and otherwise, is out there, that risk would very much materialise.
1189. If SMEs or any companies collaborate with one another in sectors in which they could potentially be competitors, especially in innovation and R&D, in which intellectual property (IP) becomes an issue, there is always a risk with open innovation concepts about how you manage. Innovation centres are being opened in Finland, Sweden and Israel. Any knowledge-based economy will have them to a large degree. The risks need to be managed rather than sidestepped or avoided. They can be managed. With MATRIX, we have seen companies coming together and collaborating when they see the global market opportunities that are presented to them. They overcome the concern or risk that they have with each other when they see the potential for growth through exports and the global engagements.
1190. On Horizon 2020, we have actions in place to ensure that we are in a better place to maximise drawdown. The EU Commissioner for R&D has been over, and Minister Foster really stressed the need to simplify that procedure for SMEs in particular. We understand that she will be making a subsequent visit later this year, and those points will be made again to ensure, as best we can, that we can make it as easy as possible for SMEs to engage in the framework collectively to get drawdown of this programme for NI.
1191. **Mr Dunne:** There was a point about the larger companies not getting involved. Is there a risk that, rather than going for European funding or going after Invest NI, which is, perhaps, more accessible and more customer-focused —
1192. **Mr Hutchinson:** It is more local.
1193. **Mr Dunne:** That is right; it puts the onus back on us to make sure that Invest NI is as flexible as possible. I gathered that and thought that it was an issue.
1194. **Mr Hutchinson:** That is coming up in our discussions; it is certainly very much an issue with framework 7 funding.
1195. **Mr McGarrity:** There is a key point, and I made it at the start. We can put all the support that we can in place, but it is firms and universities that make the applications. It depends on what stage a firm is at in a project life cycle, as to whether it will go to framework. Framework 7 funding is not immediate cash flow. You have heard the evidence. There is a lot of time involved; there could be 18 months between submitting an application and seeing a drawdown of finance. For an SME, that is out, but a larger firm might not need it.
1196. There are many good examples of firms in Northern Ireland that invest in framework projects. It is about collaboration with partners throughout Europe and about new expertise and new knowledge. The firms you mentioned may not need it at that point in time. How do we get them to do it? It comes back to visibility and culture, which we mentioned at the start, and it comes back to collaboration. We need more Northern Ireland companies collaborating with firms outside Northern Ireland, whether that is through a framework programme or through separate trade agreements. It is about sharing knowledge and learning from experience. That is what we need to do. If the Committee's inquiry is going in the direction of looking at what can be done, it is about visibility and the need to lift our heads above the

- parapet and exploring ways to make new connections.
1197. I want to pick up on your point about how SMEs find partners. On a practical level, Invest NI runs the Enterprise Europe Network, which we will tell you more about next week. It exists specifically to help and support SMEs in finding partners across the European Union. The support is there; the issue is visibility. They work very hard at trying to engage with companies and in helping companies to identify potential partners. The partner might not be there, but it helps companies in trying to identify potential partners in academia and businesses across Europe. There is support; the issue is about getting companies in and wanting to access it and letting them see how to access it.
1198. **The Chairperson:** I think one of the points in relation to the company mentioned by Mr Dunne is, or was, the elongation of the application and the practical outcome with regard to the commercialisation of whatever was being produced. In addition to that, there was the subject area, because the European Union has certain subject areas, and I think it did not quite fit into the subject area.
1199. There are no further questions from members, but I would like to know your views on venture capital. We have heard that there is insufficient venture capital. It is does not feature very highly in what you have submitted to us, but I presume you will agree that there is a need for venture capital here, but there is not enough. Can anything be done about it? How important is it with regard to R&D?
1200. **Mr Hutchinson:** Venture capital is critical, as is, more widely, risk capital with equity investment. Through its access to capital strategy, Invest NI has the growth fund. It is debt financing for small projects. There is also the co-investment fund, which was recently launched. Minister Foster announced it a few weeks ago. That is about stimulating non-banking sources for access to finance for business expansion. It cannot be seen in isolation from innovation, R&D or Invest NI's support packages. Maybe it is an issue for us to ensure that we articulate that it is about innovation, R&D and creativity, alongside access to capital, which Invest NI is supporting through its various initiatives. Companies that might not be able to avail themselves of traditional sources of financing can go there, nonetheless. Obviously, it is a question of scale, and Invest NI can only do so much with the finances that it has and that it can lever through the private sector. However, we have the NISPO funds, the co-investment fund and the growth loan fund. In excess of £100 million is going, or at least potentially going, into the private sector for companies to avail themselves of in these areas.
1201. **The Chairperson:** In its submission, AFBI said that European funding was very difficult to find and that companies were not drawing down funds. However, they also mentioned the UK Technology Strategy Board, and the fact that there was not as big a take-up of whatever funding it might have available. Do you agree with that?
1202. **Mr Hutchinson:** We work through Invest NI with the Technology Strategy Board on initiatives and knowledge transfer. The chief executive of the Technology Strategy Board hopes to be here in April.
1203. **The Chairperson:** AFBI raised that issue, and, perhaps, you could ask him about that. There does not seem to be sufficient interest or enough successful applications from Northern Ireland firms. That is something that might be looked at. I understand the position about European funding, but this should be an easier route, and I am not sure why that situation exists.
1204. My final point is about the centres of competence. Are they up and running yet?
1205. **Mr Hutchinson:** We have an action in the comprehensive action plan to establish four competence centres in —
1206. **The Chairperson:** Yes, I noticed that. Is that a work in progress?

1207. **Mr Hutchinson:** Yes, it is a work in progress.
1208. **The Chairperson:** OK. Thank you very much. This has been a very useful conversation. If we have any further questions, we will write to you, and I am sure that you will give us a response.

29 March 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Steven Agnew
 Mr Gordon Dunne
 Mr Paul Frew
 Mr Paul Givan
 Ms Jennifer McCann
 Mrs Sandra Overend

Witnesses:

Dr Joanne Coyle *Invest NI*
 Ms Carol Keery

1209. **The Chairperson:** Briefing the Committee today are Carol Keery, director of innovation, research and technology at Invest Northern Ireland, and Dr Joanne Coyle of the collaborative R&D support service. I welcome you both here this morning; I am delighted that you could attend. We have received written material from you, with which we were very pleased. Would you like to make an opening statement, after which we can ask questions? Thank you very much.

1210. **Ms Carol Keery (Invest NI):** Thank you for the opportunity to come along today. As you have said, my name is Carol Keery, and I am director of innovation, research and technology at Invest NI. I am accompanied by my colleague Dr Joanne Coyle, who heads up the collaborative R&D support service. I know that we are coming to you at the end of a long list of providers of evidence.

1211. **The Chairperson:** Yes; we have kept the good wine for last.

1212. **Ms Keery:** That is exactly what I was going to say. If you will bear with us, I would like to present the evidence from Invest NI.

1213. I will start by outlining our remit. We operate as a non-departmental public body and as Northern Ireland's economic development agency. In effect, we are

the operating arm of the Department of Enterprise, Trade and Investment (DETI). We provide comprehensive support for businesses by effectively delivering the government's economic development strategies, making the most efficient use of available resources and providing high-quality services and programmes, support and expert advice. Principally, we support businesses in the manufacturing and tradable services sector.

1214. In the context of the Northern Ireland Executive's Programme for Government and the associated economic strategy, our corporate plan sets out how we will contribute to the rebalancing and rebuilding of our local economy to increase the overall standard of living by driving up productivity growth and employment.

1215. A key objective of Invest NI is to promote enhanced levels of R&D as a source of new technologies, products and processes and as a key driver of productivity growth and, ultimately, economic growth. Through the range of interventions at our disposal, Invest NI is committed to driving market-led innovation in the Northern Ireland business base. We are also committed to increasing the scale, quality and speed of R&D from the initial concept through to full commercial application. To that end, we provide support from cradle to grave.

1216. A key indicator of R&D activity is business expenditure in R&D (BERD). I am afraid that we are, probably, heavily loaded with acronyms; hopefully you will bear with us. Despite recent record growth in levels of BERD in Northern Ireland, where it rose by 95% between 2005 and 2010 — in financial terms, that is from £176 million to £344 million in that period — the rationale for government intervention to incentivise R&D spend remains strong. That

- rationale is linked to the consistently small number of companies that do R&D — or, at least, those that recognise that they do R&D, as that is an issue — and the concentration of BERD in the 10 biggest-spending companies, which accounted for 59% of the total spend in 2010. In addition, externally owned companies accounted for 68% of the total BERD.
1217. Therefore, although there has been much to applaud, there remain a number of systemic weaknesses in the business base that would need to be addressed if we are to achieve the desired and necessary levels of economic growth. In recognition of R&D as a key driver of economic growth, Invest NI has allocated a growing proportion of its budget to incentivising R&D activity. In the period 2008-2011, which was our last corporate plan period, the budget that was available to support R&D alone increased from £19 million per annum to £46 million, which represented 28% of the total Invest NI budget.
1218. In the four years of the current corporate plan, which covers the period 2011-15, the R&D budget is projected to average £31 million per annum. Of that budget, around 80% will go directly to businesses with the remainder allocated to the research base in pursuit of higher levels of research, commercialisation and knowledge exchange. One of the main facilitators of that increased budget for R&D is its easy alignment to European regional development fund (ERDF) criteria. Currently, 80% of the annual budget that I hold is ERDF funded, making that a very efficient way of maximising the drawdown of EU structural funds into Northern Ireland. In total, Invest NI will draw down £245 million of ERDF money in the period from 2007 to 2013 to fund R&D support. Anyone who has experience of ERDF funds will know that that is not without its difficulties. ERDF, if I may say so, is a very unforgiving fund and one that can cause a number of burdens with regard to how it is managed.
1219. As a result of that increase in budget and subsequent increase in the number of projects that are supported, Northern Ireland experienced the second largest percentage increase of all UK regions in the total R&D spend in 2010. In 2010, BERD grew from 0.6% of GVA to 1.2%, placing Northern Ireland sixth of the 12 UK regions in relation to BERD, just below the UK average. That is a significant achievement but, nonetheless, there needs to be some realism about what we can achieve going forward. BERD will be required to at least double in quantum if Northern Ireland is to meet the European target of 3% GVA by 2020. That will be very challenging, given the systemic weaknesses in the economy and the business base, which I already alluded to. For all the stakeholders in the R&D ecosystem, but particularly for Invest Northern Ireland, there remains a significant challenge in mobilising individuals and firms, particularly small- and medium-sized enterprises (SMEs), to increase their capacity and capability to innovate either on their own or, more increasingly, through collaboration, by entering into collaborative research programmes that bring benefits to a wider spectrum of businesses in the economy.
1220. I alluded to the fact that 80% of the R&D budget goes directly to businesses through R&D grants. I believe that we have one of the most flexible R&D programmes in the UK. In 2008, Invest NI was one of the first economic development agencies to embrace the new EU R&D and innovation state aid guidelines. We were second only to the South. The Commission's guidelines sought to reinforce the importance that the Commission placed on incentivising R&D and innovation, and permitted the provision of enhanced levels of support for SMEs and higher risk R&D projects. Through that framework, Invest NI revised its support to maximise its flexibility through the introduction of a single grant: the grant for R&D. Previously, we had over five schemes. A key feature of the grant was the flexibility it brought in responding to the needs of businesses. Although the grant for R&D is now the main

support mechanism, there remain a number of other support mechanisms to facilitate businesses getting into and progressing up the innovation escalator. The progression of businesses up the escalator is not necessarily linear, and businesses can enter at any point in their development. It is for that reason that we have to be very flexible in how we respond to the range of needs that businesses present. We cater for businesses with no history of undertaking R&D and those with sophisticated R&D functions such as Almac, which I know you heard from. We deal with the full range of R&D, from R&D in a bucket — in the food sector, in respect of how to mix the best sauce — right through to the development of the most sophisticated technology that is new to the world, particularly in the health and life sciences sector and the IT industry.

1221. I note that you specifically asked about competence centres during the previous session, when DETI presented to you, and you were advised that they are a work in progress. That is, in fact, the case. The competence centre programme is our latest initiative. It is designed to enhance levels of R&D and to provide collaborating businesses with the opportunity to agree and contract high-risk, long-term research that is currently outside their capability and capacity. The competence centres will be virtual large-scale entities that will require a period of transformational, long-term strategic investment by Invest NI to encourage greater and more efficient interaction between businesses, researchers and the public sector in pursuit of leading-edge R&D. We have five proposals under consideration, which are in the following sectors: agrifood; connected health; sustainable energy; advanced materials; and cloud computing.
1222. The availability of risk capital for innovating businesses was also raised at a previous session. Invest NI's access to capital strategy provides for a suite of equity funds that will provide a continuum of funding from £50,000 through to £2 million, all targeted at SMEs. The establishment of the funds is at various stages, and the total investment in them by Invest NI will be over £100 million. In addition to the financial support for businesses, we also provide a cadre of 16 specialist advisers, offering a wide range of advice, guidance and support in the area of innovation, on such matters as technical issues; product development; intellectual property; lean; design; and collaborative R&D. We work closely with businesses to make them aware of the support available and, if necessary, help them to complete application forms. The Northern Ireland business information portal also provides businesses with a valuable source of self-serve advice and guidance across a range of business areas. The site has over 52,000 visits monthly across a wide range of subject areas.
1223. Other issues raised in evidence have reinforced the need for greater connectivity in the local innovation arena and beyond. For our part, support programmes such as the proof of concept programme and the knowledge transfer partnership programme are targeted at connecting and facilitating a knowledge exchange between the research and the business base for commercial return.
1224. The innovation vouchers scheme has also provided a valuable mechanism to provide businesses with a first step in building a culture of knowledge transfer between the research base and small businesses. We also provide hands-on support for businesses and universities to access EU and national funds for R&D. One example is the Enterprise Europe Network, which I referred to in the briefing, so will not cover again.
1225. I am also aware of the growing interest stimulated by Barosso in the capacity of Northern Ireland to increase its drawdown of EU funding for R&D. In support of enhanced drawdown of framework funds, Invest NI has appointed two NI-based collaborative executives, who have been in post since late 2009. As well as responding to

- queries from Invest NI client companies, the wider business community, universities and other public bodies such as the PSNI, the team proactively targets companies currently in receipt of Invest NI funding for industrial R&D. Those clients would be expected to be the best and most capable of succeeding in applications for framework funds.
1226. More recently, Invest NI's collaborative R&D team, which Joanne heads up, introduced a mentoring scheme that seeks to provide funding to enable applicants to contract hands-on advice from framework programme (FP) 7 experts to overcome the costs and experience issue in developing suitably robust project applications.
1227. Invest NI advises Northern Ireland businesses on applications to the Technology Strategy Board's (TSB) collaborative R&D competition. The collaborative R&D team also hosts TSB events, which directly target NI businesses. The team has also increased awareness of Northern Ireland's capabilities by attending network events with the TSB, the UK-wide Enterprise Europe Network and the UK FP7 national contact points. Most recently, Invest NI was represented on the Department for Business, Innovation and Skills' Horizon 2020 steering group, with a view to ensuring that the views of Northern Ireland are considered in the development of the UK's proposals for the implementation of the Horizon 2020 programme.
1228. In April 2010, the focus of Invest NI on the framework programme was strengthened by the addition of an executive based in Brussels: Farha Brahmi. That executive has been developing relationships and relations with key individuals in EU institutions in order to support Northern Ireland R&D stakeholders and influence EU R&D policies, and is providing a valuable link for Invest NI into the Commission and its policies.
1229. That is a summary of the range of things that we do; we would be happy to take any questions.
1230. **The Chairperson:** Thank you very much for that comprehensive summary. How would you assess R&D in Northern Ireland at this moment in time? Is it good, bad or middling? Where would you put it?
1231. **Ms Keery:** If you were to look at the recent figures that I referred to and the growth, it is burgeoning. The difficulty is that there is a focus on R&D activity in too small a number of companies. Large companies account for the majority of spend and activity. That is not to say that that is a bad thing. In a review we did recently of R&D undertaken by large companies, it is clear that they are producing well in excess of the average rate of productivity gains as a result of that R&D. They are also paying well in excess of the median salaries for the people doing the R&D. So, there is a lot to be gained from the R&D activity that has been undertaken by large firms. However, we would seek to widen its focus.
1232. **The Chairperson:** That is a frank assessment. You are saying that research and development is concentrated too narrowly but productively within a range of companies that would, I suppose, be Barnett-compliant. In other words, if you take the Barnett report and were measuring them against what you want to achieve in Barnett, it is in those types of companies that you are getting higher-value jobs and a higher income level for workers.
1233. **Ms Keery:** Yes, and also very strong spillovers. There is evidence that they are becoming increasingly engaged, on a collaborative basis, with other businesses, so there is that potential as well.
1234. **The Chairperson:** The Committee is constantly saying that there should be opportunities for small and medium-sized enterprises (SMEs) to be involved in R&D. I am not so certain that that can be achieved, because I think that our businesses are too small for that. However, could they benefit from the application of some of the research and development and innovation? I would have thought that bigger businesses

- must attract smaller businesses, through procurement, supply and so on?
1235. **Ms Keery:** There is very strong evidence to suggest that a number of spillovers derive from large companies doing R&D and, as you said, those are in the supply chain and where collaboration and knowledge transfer takes place. Maybe I could take you back: R&D is still very much interpreted as involving white coats and labs. If you were to look at the range of activities that are happening in our business base, very strong seeds of innovation and R&D are taking place in the wider business base. About 78% of our support goes to what you would term SMEs, where there are a range of activities and some very exciting —
1236. **The Chairperson:** What do you mean when you say 70% of support?
1237. **Ms Keery:** The number of offers that we put out.
1238. **The Chairperson:** But not in R&D?
1239. **Ms Keery:** Yes, in R&D.
1240. **The Chairperson:** In R&D, 70% —
1241. **Ms Keery:** Yes; the number of offers. Now, not in value: 78% of the offers that we make are to SMEs.
1242. **The Chairperson:** So that is in terms of the overall quantum of offers being made, but the value of those would be disproportionately less.
1243. **Ms Keery:** That would be around 30% of the total amount going out. That is to be expected; they are doing smaller projects so it is a smaller amount.
1244. **The Chairperson:** Yes. You said that R&D is growing and you would not be satisfied with the present level of R&D, although it has improved to 1.2% of GVA. What is the aim of the Department — sorry, it is not the Department, but is an agency of the Department — what is the agency's aim for the percentage of R&D spend and over what period?
1245. **Ms Keery:** Until 2015, we have said that the target will remain at 1.2% of GVA.
- The reason for that is that GVA has been falling. Therefore, keeping it at that level is still providing us with a challenge.
1246. **The Chairperson:** So you are really standing still?
1247. **Ms Keery:** We are not, because —
1248. **The Chairperson:** You are holding your own.
1249. **Ms Keery:** We are holding our own, because GVA is falling. It is projected to stabilise around 2015, but that is within the context of the corporate plan. We have said that we will be doing well to stabilise around 1.2%.
1250. **The Chairperson:** I have a couple of other points. The Committee has been talking about R&D for quite some time, and there is a sense that there should be an organisation with overall responsibility for driving R&D. What would you say to that?
1251. **Ms Keery:** In driving R&D, it is very important that some central organisation has an overview of what is happening across the R&D arena.
1252. **The Chairperson:** Can I just stop you there? You accept that, but do you think that it should be inside or outside Invest Northern Ireland?
1253. **Ms Keery:** With regard to having an overview, I think that it would be difficult within Invest NI, because you have to have somebody who has a cross-cutting remit.
1254. **The Chairperson:** Yes, true.
1255. **Ms Keery:** Two things are back on the table as part of the economic strategy: the consideration of appointing a chief scientific officer — Northern Ireland is probably one of the few regions not to have such a post; and the suggestion that we should have an innovation council. In the past, Invest NI looked at VINNOVA in Sweden as a model for an innovation council. The strength of that council is that it is not within government but is aligned to it. It is at the heart of working alongside government.

1256. **The Chairperson:** Is that the Swedish model?

1257. **Ms Keery:** Yes. That positioning enables it to have a cross-government remit and a much stronger influence on government, because it is not perceived to come from any one perspective. We would, as we have in the past, value the appointment of a chief scientific officer as somebody who can lobby strongly on behalf of the research that needs to be done to maximise the strengths of the Northern Ireland research base, of which there are many. Such an officer could also identify where we should prioritise our research activities, and that is difficult to do unless you come from an overview position.

1258. **The Chairperson:** That is interesting. Do you have anything to add to that, Dr Coyle?

1259. **Dr Joanne Coyle (Invest NI):** We should look at other regions, such as the South of Ireland, which has policy direction from Forfás. It also has Science Foundation Ireland, but Enterprise Ireland tends to provide grant support to businesses directly for R&D and similar programmes. That is important, because you have a team of account managers and client executives who talk to businesses and understand their needs. R&D is a business need, but there can be different timescales. It may be that a business needs more skills and job support, with R&D planned for the short or long term, so you need an agency like Invest NI talking to business directly all the time to understand when the time will be right for the R&D project to be progressed. Invest NI will ask when the business is looking to raise its game with innovation, to lead it into exports. So, it is part of the cycle, in that we bring in companies through the foreign direct investment (FDI) route, and part of our encouragement to them is our package of support for R&D.

1260. **Mr Agnew:** You mentioned the level and importance of funding from Europe for R&D. We have the problem that, in the European context, some of our SMEs are micro-businesses and few

businesses in Northern Ireland would be considered anything other than a small business. The more I hear about this, the more I think that there are two possible ways to go. It may be both rather than one or the other, I do not know, but we either try to get Europe to take account of the Northern Ireland context, or we try to get Northern Ireland businesses to understand the European context and collaborate, so that they can operate within that context and benefit from it. What direction are we taking? Are we doing both? What successes are we having?

1261. **Dr Coyle:** You are right: there can be many approaches to this. On one hand, we need Northern Ireland's businesses and stakeholders to understand how Europe works. Europe puts forward funding for projects to meet the aims of Europe and to benefit its citizens; it is not just to benefit a particular region. We need to understand what Europe's priority areas are. If we view Europe's guidance to be aligned with Northern Ireland, we need to get on board with its programmes. However, we also need to let Europe know about our particular situation, and we fed that back strongly when Europe launched its consultative Green Paper on Horizon 2020. As well as being heavily represented through the UK's Department for Business, Innovation and Skills, Northern Ireland put in its own paper directly from DETI, emphasising the micro-business economy here. That is recognised in Europe, and the need for simplification of the processes is recognised. It is simplification for the benefit of the participants rather than simplification for the benefit of the European Commission. We felt very strongly about that.

1262. We view the consultation on the Green Paper as a success from the European perspective, because the proposals for Horizon 2020 have something for everyone. In particular, there is an emphasis on innovation, and one of the pillars is about leadership and innovation. That will certainly bring more businesses in. The target set in FP7 of 15% participation by SMEs

was to encourage that, and progress on that is monitored every six months. It has sat roughly at that level, and we have had feedback from our MEPs that the European Commissioner with responsibility for R&D is continually being told by MEPs that even 15% is too low and that we need more participation from SMEs and to take into account the needs of small businesses.

1263. That having been said, it would be irresponsible, from our point of view, to encourage microbusinesses into European projects when they are not ready, and that is why Invest NI has other schemes that might be more suitable for them in building their capability and capacity. We look at our view of an innovation escalator as an appropriate way of working with companies to build up their capabilities.
1264. A lot will come out of Horizon 2020, and we are keeping our ear to the ground. We are involved in a number of BIS working groups that are looking at the rules of participation. One issue that has been raised is the overhead rates, and that is being heavily debated. We are also working closely with our counterparts in the South of Ireland, because SMEs there have participated heavily in the programme, and there is a lot that we can learn from them.
1265. There are many approaches that we need to take. One of the things that I always emphasise is the need to get involved in networks. Northern Ireland, especially through our contact in Brussels, has been much more active in networks. Invest NI hosts the Enterprise Europe Network in Northern Ireland, and Northern Ireland has always performed very well in that network. In evaluations of the old IRC, we were one of the top performing regions in bringing in —
1266. **Mr Agnew:** What was the IRC?
1267. **Dr Coyle:** It was the Innovation Relay Centre. It was combined with the Business Relay Centre to form the Enterprise Europe Network. That has continued to be the case through the technology transfer agreements that

we promote, and that is a very strong network that we are a very strong performer in. Similarly, that is the case with the European Regions Research and Innovation Network (ERRIN), which is a European-wide network. Farha Brahmi sits on the management board of that now and has some influence in directing our activities. One of the key activities has been in developing and getting involved in European innovation platforms (EIPs), which we see as a key way to be more active in Horizon 2020. We are working with our Connected Health colleagues on the active and healthy ageing platform, and we are preparing for green week in May and getting involved in an agriculture EIP as well. We are laying the foundations to be ready for Horizon 2020.

1268. **Mr Dunne:** Thank you very much, ladies, for the very informative presentation that you have made to us. We are impressed with your enthusiasm so far. We have had quite a few of these sessions and taken quite a lot of evidence. You have been talking about the reluctance of SMEs to get involved in drawing down funding through framework programme 7. Can firms go to you to look for funding rather than going down the European route, which is complex and difficult? We get that a bit from some organisations, which put the onus onto us. They say that Invest is not doing enough and is reluctant to take the risk. Is there a process? Obviously you have some sort of system in place whereby firms or organisations have to prove how they are going to manage risk before you will take the risk with funding.
1269. **Ms Keery:** I will start off on that, and maybe Joanne can pick up on the European funding aspect. As Joanne has mentioned, there are horses for courses, and European funding is not suitable for everybody. One of the key things that Invest NI strives to do is build the sophistication of businesses to undertake R&D. We have a range of schemes for the small businesses that actually introduce those businesses to R&D for the first time. We have a target of 500 businesses that are new to R&D,

- and we hand-hold those businesses in the initial stages.
1270. One of the key schemes that we operate is the innovation voucher scheme, which is a very small amount of money that is, very simply, given to businesses that potentially have a business need so that that business need can be met through research. That business need can be anything. I referred to R&D in a bucket, as such, but we deal with everything. I will give you an example. At the moment, we are working with a small business that is making ice cream. It wants to put bubblegum in the ice cream — it sounds disgusting, I know — so we are working with it to see what kind of coating could be put on the bubblegum so that it would not melt. It is a very simple idea, but it is very important for that business. We are trying to start with very small steps to get businesses to engage in product development and then to move up the innovation escalator.
1271. You referred to risk. The risk associated with supporting R&D products has always been an issue. Part of that issue is because the outcomes of R&D are not known. In many instances they are speculative. One of the things that we are very clear about is that an R&D project that does not finish or complete is not a failure. It can be a success, because part of the R&D process is to test concepts to see whether they work or not. If, at the end of the process, you find out that it is not a viable proposition and it does not proceed, that is actually a success. That does not necessarily sit easily with allocating public moneys, so we do have to make some sort of risk assessment as to whether a project will be successful. In the past we have struggled, because, in general, the outcomes of R&D are unknown. In providing a value-for-money statement we are now much more sophisticated in that we have a new economic efficiency model that allows us to quantify the outcomes of R&D much more comprehensively and attach some sort of figure or quantifiable return to R&D outcomes. Previously, we were unable to do that. That gives us almost a scoring mechanism that enables us to say whether one R&D project would, possibly, provide better value for money. We are still involved in supporting high-risk projects; that is why we support R&D. It is about managing and minimising that risk.
1272. **Mr Dunne:** Is there a lot that a firm or organisation has to do to justify getting the money initially? Are there a lot of hoops to go through to get it?
1273. **Ms Keery:** Recently, we introduced the Boosting Business through R&D scheme. We tried to streamline the application form. We have brought it down, as far as possible, to a tick-box process. I have to be honest; we still require information on the finances, the market opportunity and the costs of the input that will be needed to make the R&D project work. We will always require that. That is what enables us to assess whether the R&D project will provide value for public moneys.
1274. **Dr Coyle:** That is why we give companies assistance to develop their project plans. SMEs, in particular, can have some funding to help them. Our innovation advisors talk them through the process and help them to fill out the application form. We recognise that it is a challenge for them and we look at ways to try to help them through that process.
1275. FP7 is difficult for SMEs to get involved in, due to the long lead-in times. You are asking SMEs to start committing to a project which is not even officially launched, because you need to get them involved to find the partners before the launch. Often, we have heard anecdotally that if you wait until the call is announced, it is too late to be involved, because you have only six months to write your application. It takes many hours to prepare the application. There are sections that they need to ensure are covered well, and, as I said, they have to get into their heads that we are thinking of this in terms of a project that will appeal to Europe; it has to have an impact and benefit for European

citizens and not just for themselves.
That can be difficult.

1276. The challenge of collaboration can be difficult. When my team goes to talk to companies, the biggest thing it can do is listen to their needs. Often, we have a referral from a client executive who feels that the company might be ready to do a collaborative project. Similarly, they might have approached us after an event at which we have been promoting the opportunities that are there. My team members will go out and talk to them, one to one, and listen to the company's needs. Then they will look at the range of collaborative solutions that exist. FP7 is just one of a range of schemes. We might encourage them to look at the Technology Strategy Board, because it runs Eurostars, which is a European project. It does not need three transnational partners; it needs only two. That might be a better way in. It also gives a quicker answer on whether you have been successful, and you can get started. There are attractive rates of support there as well.
1277. Similarly, we are trying to encourage more North/South co-operation, because we have another member state on our doorstep. Why not develop collaborative relationships there that can be built on, and progress to FP7, or Horizon 2020 as it would be, in the future? We would encourage them to look at the likes of the Innova programme.
1278. Knowledge transfer partnerships (KTPs) are excellent. They get companies involved in collaborating with the research base to start with. We will look at companies that are active in that space and then take them to the next stage. Again, it is about looking at the idea of an escalator and seeing whether those companies are ready and whether they should be attempting to go to FP7, given the risks involved. As you have seen from the evidence, the average success rate is 20%.
1279. We have also been able to show, through our statistics, that there have been 132 successful participations in

Northern Ireland, many of which are from the academic base. What you do not see behind that is that there have been 848 applications seeking funding of £301 million. They have, therefore, sought a considerable amount from Europe, but they have reached only £36 million. That shows that there is a willingness there but some are failing. That is why we looked at the idea of mentoring support.

1280. I want to clear up some issues. We have always provided project definition assistance to companies that participate in FP7. The mentoring scheme was introduced specifically to look at the needs of our research base, because we expected it to participate at a higher level, and we could see areas in which it was failing. We thought that it could benefit from mentors. The industrial base has always been able to avail itself of that support.
1281. **Mr Dunne:** I have one other point. We talked earlier about the white-coat perception of R&D. Could more be done to try to broaden the outreach to a lot of firms and organisations that are involved in the service industry, providing IT and so on? I think that we have a perception that R&D applies more to people or firms involved in manufacturing. It is a lot more than that.
1282. **Ms Keery:** It is.
1283. **Mr Dunne:** I think we need to spread that message.
1284. **Ms Keery:** To spread the overall message, we have gone out with calls. We have gone out with only two calls under the Boosting Business campaign, and we have received 153 enquiries. Over £1 million of support has gone out under that campaign. Through that, we are getting a number of services. I accept that a number of service companies with potential may have ruled themselves out of applying for R&D. We support a lot of service companies to engage in process innovation. The majority of the companies coming through in our design programme are in the service area. They are looking to

avail themselves of design to upgrade the branding and overall aesthetics of their business. I accept that there is still that perception. However, we are trying to address that through our case studies, marketing and the message that we are putting out. We provide support for R&D in the service sector as well.

1285. **Ms J McCann:** You are very welcome. I enjoyed your presentation. I want to ask a couple of questions on collaborative working, particularly among small and medium-sized businesses. You said that it is not just about European funding. However, a huge amount of European funding is available. As budgets get tighter here, we need to look at ways in which we can draw down more money. I do not think that we are doing enough to draw that money down. You mentioned businesses working more collaboratively with those in Europe and particularly with those in the South of Ireland. Do you think that organisations such as Invest work closely enough with the other investment organisations, for instance, in the South of Ireland, to promote that collaborative thinking? R&D is not just about small and medium-sized businesses; it is about developing the knowledge base and skills so that there is a skilled workforce that will attract foreign direct investment (FDI). I know that colleges are not in Invest's remit, if you like. However, sometimes, colleges do not even work that closely together. Do you see that as a barrier to the development of smaller businesses in particular and the knowledge base and skills, when we seek to attract investment to Ireland in order to create jobs for people?

1286. **Dr Coyle:** Your point about available funding from Europe is well made. Certainly, the Barroso task force has been set up to try not only to get more money but to get the right money out of Europe. The fact that it has actually set the percentage of extra drawdown that it wants certainly shows its intentions. Certainly, bringing all of the Departments together is a key part of that.

1287. I take on board your point about working with the South. I sit on a group that is

led by InterTradeIreland. We work with the Department of Jobs, Enterprise and Innovation in Ireland, DETI and other Departments in Northern Ireland to look at the opportunity from FP7, specifically on R&D funding that is available and how we can work together. In 2011, one of the group's outcomes was the conference that we held in the Stormont Hotel in June. More than 200 participants from both the North and South of Ireland came to hear about the opportunities that exist. That was a great opportunity. We hope to hold another event like that on 7 June 2012, when commissioner Máire Geoghegan-Quinn will speak. Therefore, we are looking at ways of working together.

1288. As regards our own organisation's being, perhaps, more proactive and innovative, we have, for the first time, been involved in Regions of Knowledge applications. Our remit was that we could work with other regions but that we should work more closely with the South of Ireland. Our target was to submit two applications to Regions of Knowledge. We have submitted three. One thing that I will say about a Regions of Knowledge application is that it is not about funding from Europe for research; it is about looking at the landscape, finding out who the key players are in the area and preparing for the future. One of our project areas is biogas. That is a great opportunity, which also relates to energy objectives and the soaring costs of energy. It looks at alternatives that will benefit the whole of Ireland. Therefore, we have come together to look at that opportunity collectively.

1289. In another area that we looked at, we worked closely with the Institute of Electronics, Communications and Information Technology (ECIT). We were involved in a project to look at security — cybersecurity in particular. Again, that is another key challenge that we all face. So much is done through the internet and the Web that there is a need for cybersecurity, particularly in money transactions.

1290. The other area, which, you will be pleased to hear, deals with our

- strengths, is the Clinical Translational Research and Innovation Centre (C-TRIC). An application came in for a North/South project that also deals with other regions. Again, that sets the way forward for a Connected Health approach. Therefore, we are looking at areas where we have complementary strengths. Looking at the breakdown of funding that each region receives from FP7, our strengths are aligned. We are similarly strong in ICT and health. It shows an area that we can work on. Our colleagues in InterTradeIreland — about which you will hear more later — are working in that area, and we work closely with them to make sure that all the links are made. You made a key point that there is a need for greater co-operation and collaboration. We have those stepping stones in place.
1291. **Mrs Overend:** Thank you for your presentation. I have just a couple of questions. How closely do you work with other Departments, such as the Department for Employment and Learning (DEL) and the Department of Agriculture and Rural Development (DARD), to see where there are opportunities or a need to change the way that you promote further R&D? On a separate issue, we have been primarily thinking about small organisations. Many larger organisations that we looked at are doing research, but we found that there are problems with the time frame of research and development. Funding may be available for a certain length of time but their research will take longer. Have you met those sorts of obstacles as well?
1292. **Ms Keery:** We work closely with other Departments. Certainly, we work with DEL on the whole skills agenda and on making sure that sufficient skills are in place for the projects that we support, particularly from the FDI perspective. That is particularly true of R&D projects as well as wider projects. We also work quite closely with DEL on the Barroso agenda to bring more European money into Northern Ireland. We work closely with DARD on the innovation and R&D agenda. In fact, one of my heads of department leads the food innovation steering group, which is responsible for looking at R&D opportunities and combining R&D strengths in the food sector. We also work closely with the Department of Health, which has a strong R&D agenda. We have signed a memorandum of understanding with the Department to identify potential R&D opportunities in the area of chronic disease. So, we work closely with other Departments to try to maximise R&D synergy in those key areas.
1293. What was your second question?
1294. **Mrs Overend:** Sorry, I should not have given you both at the same time. It was about the time frame of research and development and the fact that funding was for only a certain budgetary period. Is that a challenge?
1295. **Ms Keery:** Yes. I read Almac's evidence, which basically said that longer time frames were needed. There are two issues around that. I have said that, by their very nature, the outcomes of R&D are generally unknown. We tend to work in three-year time frames. Even within those, it is difficult to predict outcomes. Push that any further and you are into high-level speculation. So, it is very difficult to identify what you will be funding or supporting. The other, practical side is that, as a Department, we work in three-year Budget cycles. Funding for anything beyond that is not guaranteed. Longer-term funding is where we see potentially more scope for VCs to become involved and for businesses that need long-term guarantees to look towards venture capital —
1296. **Mrs Overend:** Sorry, VCs?
1297. **Ms Keery:** Venture capitalists.
1298. **Mrs Overend:** Yes, OK.
1299. **Ms Keery:** From our point of view, as a Department, three years would be about the most appropriate timescale that we can live with.
1300. **Dr Coyle:** European projects do not tend to be much longer than that

- three-year time frame, because it is recognised that you cannot predict outcomes beyond that. Potentially, one of the improvements with Horizon 2020 would be taking forward activities funded through the ideas programme, under which the European Research Council has funding that goes directly to academics who are world class in their fields, and they will be funded to continue to do blue-sky research. The idea is that that research can then be moved forward with further project support. So, you are giving support at key parts because you will get more value added at key parts. In the likes of the pharmaceutical industry, what can happen is that a certain amount of development work will take you to a phase of approach, and you will have the value of that. The company can then choose to in-license further research to complement that work or out-license the results of that research to somebody else to take further. There is a long time frame for pharmaceutical research in particular, but there are certain ways in which you can cope with that.
1301. **The Chairperson:** Just to widen out what you were saying, Mrs Overend, we do have a problem, do we not, if you are saying that three years is about the length of time that we can be supportive because we cannot go beyond a Budget cycle? That does raise difficulties and that inflexibility, particularly for a business such as a pharmaceutical firm, is not very helpful. There must be some way to get around that. That company talked of maybe six years to produce a product. You cannot really just say, "Well, I will give you three years' funding, and then you can do what you like after that." I understand your point. It is a very reasonable point, but there has to be flexibility and a more imaginative administrative approach to exceptional research periods, such as for pharmaceutical research. It is not good enough just to say, "Well, there it is, that's it."
1302. **Ms Keery:** And we do not. However, those are the practicalities. We tend to work with the likes of Almac, and we have put over £10 million of research money into Almac. I think it has operated very effectively, so we are working closely with the likes of Almac to support its R&D programmes.
1303. It is about how we set the milestones and what we are trying to achieve with the funding, then reviewing those milestones as we go along and putting in further support. It is incremental support from our point of view, but the time frame would not be as long as they potentially would like at the outset.
1304. **The Chairperson:** As we are talking about Almac and the link-up it has with Queen's University, it put quite a bit of effort into that and so did Queen's, and it seems to be a very good model of how you can progress at a very high level and in co-operation with an academic institution in research and development. Have you learned any lessons from that? Is there scope for further development such as that?
1305. **Ms Keery:** Yes.
1306. **The Chairperson:** Or is that just a one-off collaboration?
1307. **Ms Keery:** No. That model is very familiar to us.
1308. **The Chairperson:** Right.
1309. **Ms Keery:** That used to be the model that would have operated through a previous scheme called Start. There are other examples, such as the work we have been doing on the composite side, which is very much about promoting and funding a collaboration between the research base and business. So, it is a model that is very familiar to us, and one that we would like to emulate. It is something that we agree has proven very successful.
1310. **The Chairperson:** There seems to be some lack of knowledge among companies about tax credits, their extent, availability and how to get them. Do you go to companies or have any facility for companies coming to you and saying, "We think we could get tax credits for x, y and z. Will you help

- and advise us in relation to that?" Is there any facility such as that in Invest Northern Ireland?
1311. **Ms Keery:** We provide information. We have produced a booklet with HM Revenue and Customs (HMRC) to advise companies. There was a misperception that you could not get grants or support for R&D from Invest NI or tax credits. So we have advised companies on that.
1312. **The Chairperson:** So businesses can get support from Invest NI, and they can get tax credits as well?
1313. **Ms Keery:** Yes; we have advised them on that front. However, we advise companies to go to their accountants to get detailed guidance on financial regulations and Financial Services Authority guidelines. We have done calculations that will allow companies to decide whether it is cost-effective for them to go down the tax credits route or whether it is more effective to come to us, because there is a break-even point where it is more effective for them to go for tax credits.
1314. **The Chairperson:** So are you saying that that facility is available? If I had a company and I came to you and said that I thought that I could get tax credit for this or that, could you advise me?
1315. **Ms Keery:** We would advise companies as to whether that was the case, and we would also provide them with either a source of expertise or direct them back to their financial advisers.
1316. **The Chairperson:** Obviously, you cannot micromanage their tax returns. Do you know what percentage of companies are availing themselves of R&D tax credits, or are you not privy to that information?
1317. **Ms Keery:** It was there in the dim and distant past, but it has gone. It is low, but it is increasing.
1318. **The Chairperson:** If it is low, what does that indicate? Does it indicate that companies are not involving themselves in research and development or, alternatively, that they do not realise that they can get tax credits for research and development?
1319. **Ms Keery:** I think that it would be the latter.
1320. **The Chairperson:** Or is it that they do not realise that they are actually doing research and development?
1321. **Ms Keery:** It would be a combination of those. When we look at the survey of companies that say that they are doing R&D, the numbers are extremely low. About 400 say that they are doing R&D. We know that that is not the case. However, companies still equate R&D with white coats and labs. Therefore, they exclude themselves from going for R&D tax credits because they do not think that they are eligible. From that point of view, there is an awareness issue; it is important to make it clear to businesses that it is highly likely that they are doing work that would qualify for R&D tax credits.
1322. **Dr Coyle:** Until 1 April this year, companies had to show that they were spending at a rate of at least £10,000 per annum on R&D to be able to claim the tax credits. That has now been removed. That was an indication from HMRC that it did not want to disadvantage anybody, particularly the small businesses, and to show that tax credits are also an option. I emphasise this key point: people in businesses who are doing R&D are not necessarily closely connected with their financial directors, for example. When we evaluated our own schemes and asked about their awareness of R&D tax credits, the people in the labs might not have been aware of it but their financial accountants were. It is a process of understanding what R&D they are doing that can be put towards the scheme. Again, our advice is that, in order to understand the actual calculations that are involved and the amount that they might be able to draw down, they should speak to their accountants and HMRC. We have a good relationship with HMRC; its representatives have come to Invest NI to update us on the changes that are happening. The situation has evolved

- over the years to try to encourage greater participation.
1323. **The Chairperson:** Do you get that information out to companies?
1324. **Dr Coyle:** We have the booklet that we produced in association with HMRC.
1325. **The Chairperson:** It is right and proper to produce a booklet, and I am sure that it is a very helpful booklet. However, should you not be a bit more proactive and go out and tell companies that they could get tax credits and advise them to look into it more closely? You could tell them that you can give them a little bit of advice on it but that you cannot give them detailed advice on their tax returns or things like that. Should you not be a little more proactive?
1326. **Dr Coyle:** I believe that we are. Our innovation advisers advise companies, and the feedback that we have sometimes got from companies is that they may prefer to take the tax credits route rather than go through the appraisal process.
1327. **The Chairperson:** When was the role of innovation adviser established?
1328. **Ms Keery:** Around 2009.
1329. **The Chairperson:** How do you think they are working out?
1330. **Ms Keery:** Extremely well. We have 16 in total across the group, and three working specifically in R&D, in three specific sectors. They are proactive, so they are out there actually knocking doors to try to get more companies to understand that they are doing R&D and there is potential for R&D support. They are also hand-holding businesses to take them through what we acknowledge can be an onerous step for them to actually apply for funding. As a resource, particularly for the smaller businesses, they have worked extremely well.
1331. **The Chairperson:** Thank you for that. It would be helpful if you could send us a copy of Invest Northern Ireland's organisational structure for its R&D arm. I just want to let you know that, during our research, we had a very positive response to what Invest Northern Ireland has been doing. I do not think there are any further questions. Thank you very much for coming along, it was very helpful. If there are any further questions, we will write to you.

29 March 2012

Members present for all or part of the proceedings:

Mr Alban Maginness (Chairperson)
 Mr Steven Agnew
 Mr Gordon Dunne
 Mr Paul Frew
 Ms Jennifer McCann
 Mrs Sandra Overend

Witnesses:

Mr Aidan Gough InterTradelreland
 Dr Simon Grattan
 Mr Liam Nellis

1332. **The Chairperson:** Briefing the Committee today are Mr Liam Nellis, the chief executive of InterTradelreland; Mr Aidan Gough, the strategy policy director; and Dr Simon Grattan, the EU programme co-ordinator. I welcome you all to the meeting. Would you like to make an opening statement, Mr Nellis?

1333. **Mr Liam Nellis (InterTradelreland):**
 Thank you, Chairman, I will indeed. Thank you for the invitation to present evidence to the Committee here today; I am delighted to be here. It is an important piece of work that you are doing, in a very important area. You have already introduced my colleagues, so I will not do it again. I intend to make a brief opening statement, and then Aidan will follow up with the detail and the technical points.

1334. From our point of view, now, more than ever, innovation matters to business and to growth, and the promotion of innovation and development of innovation capability is at the very top of InterTradelreland's agenda. The central theme of our activity is cross-border co-operation, and all of our activities in that space facilitate greater connectivity across both jurisdictions. You may find it interesting that over 70% of InterTradelreland's programme budget is spent helping to build innovative capacity in different ways and to build

the capacity of small and medium-sized enterprises (SMEs) to be innovative. That reflects the importance that we attach to that area. Through our programmes and support we are helping companies to spark innovation. That goes right across the spectrum, from the very cutting-edge, high-level, pharma-type companies, through to manufacturing, and even down to mushroom farms. We are touching all companies, from the SME to the big guy. Our programmes support all aspects of innovation. We have programmes that involve technology transfer into collaboration, equity financing, best practice and advice on innovative capability. This portfolio, which we have developed over the past number of years, has seen a shift in the focus from project-based interventions that focus on R&D and technology to interventions that will embed capabilities in companies to make innovation a fundamental business process.

1335. Existing programmes that we have been operating, such as the Fusion technology transfer programme and our Innova collaborative R&D programme, are very successfully demonstrating the benefits of a collaborative approach in the innovation ecosystem. Collaboration is key. To date, the business value that has been realised by the companies that are participating in our Fusion programme, for example, is £148 million, while £35.8 million has been realised from the Innova programme. Raising finance is very important in this area, as you discussed during Invest NI's presentation. It is a significant issue linked to innovation and includes factors such as timing and the length of a scheme. InterTradelreland has been very active in this space, almost from the day that we started. We fund several all-island business angel networks, and we provide free advice to companies.

1336. We also run an all-island Business Seedcorn competition. Each year, we get over 200 companies presenting business plans with innovative ideas, running through various levels of competition across all parts of the island, culminating in an all-island final. The winner can get €100,000 to invest in innovation and R&D, and that has been extremely successful. We track the companies that are involved in that seedcorn competition, and have done that over the past eight or nine years. We have found that the companies that reach the regional finals and the overall final have attracted way over €120 million already. Those are companies that would normally find it very difficult to attract private investment. We help to raise the visibility of those companies for potential private investment and to make the companies more confident when they meet potential investors, so that they are capable of delivering the pitch in the right shape and the right form to secure the money. A lot of very important work is going on in that area.
1337. However, leveraging the benefits of connections and collaborations is very dependent on a firm's ability to manage them. Some companies are just not capable of doing some of that stuff from the outset and need help and support, so a recent addition to our portfolio on innovation has been the innovation challenge programme. That programme aims to embed a capability in companies to successfully create markets and launch new products and services with minimal time, money and risk. It is a pilot programme, and, although it is still in the early stages, there has been a significant level of demand. We are working on that programme with our colleagues in Invest NI and Enterprise Ireland. The returns on InterTradelreland programmes confirm our view that innovation is not solely a technological or research and development process but is a value-creating business-growth model in its own right. I will hand over to Aidan, who will continue on the more technical side.
1338. **Mr Aidan Gough (InterTradelreland):** It will be more technical, and, hopefully, not boring. I am sure that you will stop me if it is. I will say a few words on the model or system that structures our strategic intent in this important area for economic development. We see innovation as a collective, interactive and very open process that involves many different players and resources, of which R&D is only one, albeit a very important one. As a result, we do not think that R&D can be considered in isolation but rather as an integral part of a wider ecosystem, as it is termed. This system includes public research organisations, banks, venture capitalists, business angels, financial services organisations, national and regional innovation and development agencies, policymakers, regulators and various intermediary bodies. Government have a role to play in setting the wider framework conditions for the system. At the centre of the system, in our view, is the enterprise — the firm. Getting the interactive system right, from our point of view, is about ensuring that firms can readily connect to the resources that are needed to engage in innovation and, critically, that they have the capabilities to manage those interactions. It is about connectivity and capability for the firm.
1339. We are currently under the auspices of a steering group, along with various agencies and bodies from across the island. We are undertaking a study to determine the characteristics of the wider innovation system across Northern Ireland and Ireland and, crucially, to put enterprise and the firm at the centre. So far, the research has tried to map the systems in Northern Ireland and Ireland. It is benchmarking them against international comparators. We have surveyed 1,000 enterprises across the island to seek their views on how it is performing.
1340. I have some of the key preliminary findings that have emerged from the research. There is a very comprehensive support structure within the system, which is primarily driven by the various agencies such as Invest Northern

- Ireland. There is a greater difficulty for small companies to access that system and the supports. That is due, primarily, to a narrower range of managerial and technical capabilities in the companies.
1341. Internationally, there also appears to be low levels of venture capital, but, on the other hand, based on international comparators, there are high levels of third-level educated people in the workforce. There are low levels of SMEs innovating through collaborative networks. We have found that SMEs that are innovating are doing so without leveraging external resources. They are almost doing it alone or through their own supply chain, primarily. In general, therefore, SMEs are not practising open innovation and, where they do so, it is confined, by and large, to their own supply chain. For many SMEs, innovation does not necessarily involve research and development. We did a survey through our business monitor, which found that well over 60% of businesses say that they have been involved in an innovative project or process over the past year. That is way above the number of businesses that say they are R&D active. Innovation is a much wider concept than R&D.
1342. Another finding to emerge from the work to date is that the role of intermediary bodies is poorly understood and utilised in the system. Those bodies, or boundary spanners, which is the technical name, help connect businesses to the various resources that they need. A good example of that is the Northern Ireland Science Park Connect initiative.
1343. Given our legislative remit, the ecosystem that is envisaged by InterTradelreland is necessarily cross-border. By being cross-border, we see that it introduces more diversity and opens up complementary resources and competencies to firms in each jurisdiction. By putting enterprise at its centre, we are trying to ensure that the resources, be they technical, financial or otherwise, are readily available and accessible to companies, regardless of which jurisdiction they are located in.
- That will ensure that creative ideas are commercialised more effectively and more efficiently.
1344. It is very important that we view innovation as a strategic, value-creating, business-growth process. It is not an ad hoc technical project; it is a business-growth process. Innovation leads to business growth. As Liam said, all of our innovation programmes are trying to help improve the enterprise's capability to connect to the resources that they need. Liam mentioned such initiatives as Fusion, which connects a company to a research institution on a cross-border basis. It also connects a company to technical expertise through the graduate who works on it. Innova connects businesses to businesses, and Equity Network connects businesses to finance. The new challenge programme is primarily focusing on small businesses that want to innovate but do not necessarily have the capability to manage an innovation process, to embed innovation within their company or to make innovation the foundation for their growth strategy. We know from our survey that companies that innovate grow much more quickly than companies that do not.
1345. Improving connectivity within the system and developing firms' capability to connect with it can also help increase participation in international R&D programmes. In that regard, we have been particularly active in putting in place schemes to improve North/South collaborative participation in the framework programmes and, looking to the future, the Horizon 2020 programme. We also provide the secretariat for the US-Ireland research and development programme. Details of those initiatives are in the paper we submitted, and we are willing to answer any questions on them.
1346. **The Chairperson:** Thank you very much, Mr Gough. Any applicant to framework programme (FP) 7 has to have at least two states to provide the basis for that application, and a third partner in another state in the union. That puts InterTradelreland at the head of

- the game, in partnering companies from both sides of the border. How successful do you think you have been in doing that? The level of success in FP7 has not been that good. Horizon 2020 may be much better. It will be less bureaucratic, one would hope, and wider areas of interest might be available. How do you measure that? What is your assessment of it?
1347. **Mr Nellis:** Our specific involvement as a broker in this game has been in place only since about autumn of last year. We did not have a specific programme until then, and we brought in Dr Simon Grattan to help and support that.
1348. **The Chairperson:** Why was that, Mr Nellis?
1349. **Mr Nellis:** We did not specifically have a programme with the stated objective to encourage greater partnership North/South to attract European funding. We brokered collaborations, but we never had a programme with that specific target. Various experiences were coming through from the earlier framework programmes, and Máire Geoghegan-Quinn became European Commissioner for Research, Innovation and Science and came to speak to the Ministers at the North/South Ministerial Council in sectoral format. One of the things that came out of that meeting was that the ability to attract this money was not universal; it was quite cumbersome and overly bureaucratic. One of her goals was to try to reduce that bureaucracy. I hope that that will flow through from the new Horizon programme. At that meeting, we were tasked by Ministers from North and South to develop a specific programme to enable that to happen, and that is what we have been doing. Through that, as Carol Keery said earlier, we have now developed an all-island group. All the key players are there to go after this funding. We are providing a number of supports to companies and institutions to help secure that funding, because it takes time and money. Those are not necessarily in abundance for the people applying. They looked upon it as too hard to do. They felt that when you got into the system, it was so bureaucratic that the game was not worth the candle. We have to change those perceptions, and that is what we are doing now.
1350. **The Chairperson:** I want to get back to this point. I am not being critical of InterTradelreland in this, but FP7 started in 2007, so surely we are playing catch-up in relation to FP7. I do not think that that is good enough. Both governments should have said, "We have a body, InterTradelreland, which is in pole position to do the sort of work that we want in relation to framework programme 7." It seems a pity that there has been this time lag in realising the potential of InterTradelreland in relation to applying for European funding. Is that a fair comment?
1351. **Mr Nellis:** The comment is fair. We are not saying that there was not anything happening; there were things happening.
1352. **The Chairperson:** I understand that.
1353. **Mr Nellis:** Our analysis of the work carried out in the framework programmes overall showed that a collaboration with two of the partners from North and South had a better chance of getting through the very difficult process than if they were not two partners from the island of Ireland. The success rate for such applications was marginally higher.
1354. You can look at the size of that pot and think it is massive, but the whole of Europe is going after it. Realistically, even with the wind behind us and our best game, it will still be difficult for companies from the island of Ireland to secure it. However, maybe we were slow to pick up on it.
1355. **The Chairperson:** There is no point in us hoking through the ashes of the past. What do you think about Horizon 2020? Can we do better? We know the potential is there and it is convenient that we have companies on both sides of the border willing to collaborate. Can we improve with Horizon 2020?
1356. **Mr Gough:** The statistics that we presented to the North/South Ministerial Council showed that North/

- South collaborative applications had a higher success rate, so there is good reason to go after them. We are also building on a level of success. There have been over 553 collaborative applicants under EU FP7. So, we are building on a fairly substantial base.
1357. Maybe it was slow to gather momentum because, for a number of years, particularly in the South, there was a massive investment into research and development and the structures supporting research and development. They were very much focused on developing and getting their structures right. Now that they are right and they are happy with that, there is time to collaborate. There is also a much greater focus on FP7 in Northern Ireland, so the time is now right.
1358. Is there scope to improve? As Liam said, we have doing this for about a year, with the appointment of Simon, and have been very specifically getting involved in the nitty-gritty of increasing the number of North/South applications. The first success is the cross-border all-island steering group that we got together, with all the relevant Departments and agencies sitting on that and sharing knowledge and best practice. A lot of positives are coming out from that because the South, as a national member state, has the full national contact network, so it has ready access to what is pertinent within the EU FP7, and knows what calls are coming up and when, and how to access them. That sharing of knowledge has been very important.
1359. The group has also helped us to develop initiatives, the first of which was the conference at which we had over 200 delegates. We are revisiting that in June when we will, hopefully, have Máire Geoghegan-Quinn and the Ministers from North and South addressing that. It will be hosted by Minister Foster. We set a target at the conference last year. We are focusing very much on calls that are coming up. FP7 comes out in tranches of various calls. Last year there was a call for regions of knowledge. The steering group set itself a target of making sure that two very good North/South applications went in. In fact, we got three in. We are developing that model, and the next conference will focus on calls coming up, the next of which is on research for the benefit of SMEs. Therefore, we will set targets to get North/South collaborative applications in response to that call.
1360. We have also, through the steering group, set up a number of initiatives to bring researchers together and SMEs together, so that we have as series of events that focus on FP7. It is not rocket science. Recently, we had an event that focused on cancer research, and that brought together the leading cancer researchers in academia and industry from Northern Ireland and Ireland. We have other events coming up on the environment and health that will bring key researchers from both academia and industry together to focus on the calls that are coming up and facilitating them to go ahead and develop the applications. In the past year, we have implemented a host of other simple, straightforward, practical initiatives. The demand for them has been high. Would you agree, Simon? Therefore, we expect to be able to increase the number of North/South applications both in the latter stages of FP7 and, going forward, for Horizon 2020.
1361. **Ms J McCann:** Thank you for your presentation. You are very welcome. I will not go into too much detail. On page 4 of your paper, you mention the EU framework programme. You say that the funding moving into Horizon 2020 actually gives you a good opportunity to analyse and put structures in place now. Throughout this inquiry, there has been talk of a one-stop shop, if you like, where businesses could go to access information and, then, be signposted onwards. Particularly given your role and the collaborative way in which you work North and South, do you think that InterTradeIreland, for instance, would be a good place to locate that one-stop shop, because you have a North/South and all-island view as opposed to a view

- that focuses on just the North or the South?
1362. **Mr Nellis:** I think that that is already happening to a certain extent following the call from the two Ministers at the meeting of the North/South Ministerial Council in Armagh last year, when Máire Geoghegan-Quinn presented. One of the action points that came out of that meeting was that we would dedicate a resource to do just that. Simon is that resource. He has been working very closely, as Invest NI said today, with them and with all of the players, North and South, to, at least, get a focused, consistent approach across all of the agencies, which is a good start.
1363. **Mr Gough:** We have actually launched an FP7 support website, which offers useful information on all of the supports that are available in Northern Ireland and Ireland. We are also developing what we call an EU noticeboard, which will bring forward those who are developing projects. Therefore, if I am in a particular area, and I intend to make an application to a particular call, I would post on that website what I am doing and that I am looking for partners in such-and-such an area.
1364. **Dr Simon Grattan (InterTradeIreland):** Through the website, we signpost not only local supports, but key European websites — as you say, one-stop shops — and anywhere where there is relevant information or places where people can register as evaluators or register their organisations so that they can be part of the system, if you like, and get the codes and things that they need to actually participate. We have a solid list. We explain what those websites are and how to access them. Therefore, we have already housed a lot of that information on the website as well as information on other supports that we have.
1365. **Ms J McCann:** I have another very quick question. You said that, in the past, the collaborative way of pushing that out, for want of a better word, did not work well. Do you, therefore, envisage that it will work better now, and there will be a more effective approach to drawing down money and dealing with that?
1366. **Mr Nellis:** It was not that it did not work well: nobody was focusing on it. People were focused on many other things. As Aidan said, in Ireland, the main focus was on Science Foundation Ireland and the massive amount of money that was coming in to the Exchequer. They did not really need to go chasing European money. Now, times are tight in both jurisdictions. Now people are looking at that money and saying, “We can get more of that.” That is why people are so focused now; the opportunity is there.
1367. **Dr Grattan:** Critical to that is the information and being aware of who they can partner. We are able to facilitate that for them. Anybody we meet and talk to is more than happy to work with a partner in the North or the South. They are delighted to do so. However, it is about being aware of who is in their space or who, perhaps, is not in their space but with whom they need to collaborate on a particular aspect. That is where, again, through our supporters, we are able to pinpoint those.
1368. **Mr Dunne:** I welcome the panel once again. It is good to see you. A lot of the issues have been fairly well covered. You will have heard our session earlier with Invest NI. Are you still satisfied that there is a clear distinction between what you are doing in your two organisations and that there is no risk of duplication in R&D? Is that fairly clear?
1369. **Mr Nellis:** The niche that we have in R&D innovation is that every programme we operate has a North/South dimension. The Innova programme involves a company North and a company South, and the Fusion programme has a university, North or South, working with a company in the other jurisdiction. Everything has that North/South dimension. Neither Invest NI in the North nor Enterprise Ireland in the South has that North/South focus. That is where we make the difference and where we avoid duplication.

1370. We work on all of our programmes with Invest NI and Enterprise Ireland. We have them on our steering groups to make sure that duplication does not happen, because we are very alive to that perception. It is something that both Ministers, but particularly Minister Foster, have been very strong on, certainly in all the meetings that we have had with her at the North/South Ministerial Council and in the presentations she had given to our board. The chair and I have met her on a number of occasions and she is always stressing that. It is something that were are very conscious of.
1371. **Mr Dunne:** You mentioned some programmes there: the Minister referred to the success of the Fusion programme in the Assembly this week. She made reference to, I think, Fivemiletown Creamery and how its involvement with a graduate on the programme was successful. You mentioned the seed corn business competition earlier. That is an all-island initiative.
1372. **Mr Nellis:** Yes, it is. We run that ourselves.
1373. **Mr Dunne:** Has that been successful?
1374. **Mr Nellis:** It has been very successful from a number of points of view: first, in raising awareness and getting greater participation in innovation, and, secondly in raising the visibility of potential high-growth companies to investors outside. It is modelled on a potential high-growth company that is going to make a pitch to a group of venture capitalists (VCs). That is a very difficult thing to do for a company that is focused on day-to-day activity. Someone from the company gets a few minutes in front of a VC and quite often says the wrong thing or focuses on the wrong thing and completely loses it. You only get one chance to make a first impression. That programme is about bringing companies in through business plans at the start, and, through the various stages of the competition, it will give them support, advice, training, development, mentoring and masterclasses to up their game, so when they get through to the final pitch at the —
1375. **Mr Dunne:** They get training, then?
1376. **Mr Nellis:** What we find is that the companies, even the ones that do not secure a cash prize in the competition, come back and say that the discipline that it brought to their company was invaluable. It is much more than a competition.
1377. **Mr Dunne:** Good. The other interesting point was about the survey of 1,000 businesses that you referred to in your evidence. It showed that 72% of the firms did not have a formal process for managing new developments or improving the business. That is an area that needs to be moved. That is quite a shocking figure, really, is it not?
1378. **Mr Gough:** It is, and it has led to our developing the innovation Challenge programme that we are piloting. The Challenge programme is about giving companies the capability to manage an innovation process and base their growth trajectory on innovation. The other finding that makes that one even scarier is the fact that innovative companies are the ones most likely to grow.
1379. **Mr Dunne:** That is the problem; if they are not looking outwards, they are looking inwards. If you do not keep moving forward, or if you stop, you are effectively going backwards. That is disappointing.
1380. The other factor, after that, talks about their importance. The firms felt that the importance was with staff, customers and suppliers. That is good. I think that we all appreciate those principles. Certainly, in the equality system, those are the sorts of principles that you work to.
1381. **Mr Nellis:** Absolutely.
1382. **Mr Dunne:** But they are insular, and that is disappointing. People need to really think outside the box, and more and more needs to be done to broaden that.
1383. **Mr Nellis:** One of the things that we measure and one of our key performance indicators is first-time

- innovators. A lot of companies have no history of R&D, have maybe never employed a graduate or have never had anybody with any kind of formal education coming through, other than those with a trade or an apprenticeship. So, what we are really trying to do is to get those companies engaged for the first time in a serious innovative programme with an institution. Quite a lot of them are scared of universities.
1384. **Mr Dunne:** They would be.
1385. **Mr Nellis:** The key point of the Fusion programme is to have that engagement in the first place. What we find is that, when companies experience for the first time how a university or a graduate can help them to help develop a programme, they retain the graduates — the retention rate on that programme is over 70% — and they then go on to develop other programmes and approaches to innovation. The key is to have that engagement in the first place.
1386. I want to explain one of the beauties of the Challenge pilot programme that Aidan is talking about. At the start, we invited 100 companies to come along. After a couple of meetings, we let the companies self-select the 10 that we were really going to concentrate on during the pilot to increase their capability. The 10 companies that came through the process were really hungry to do it by the time they got through it, and so their chances of succeeding were much greater. You can get any number of companies to come into a room, but, unless you get people who are prepared to put in the effort, you are not going to go.
1387. **Mr Dunne:** I think that we covered the issue of framework 7 fairly well. The evidence we have is that firms are clearly reluctant to get involved because of the heaviness of it.
1388. **Mr Nellis:** Complexity.
1389. **Mr Dunne:** Yes. They are also reluctant to get involved because of the issue with getting partners throughout Europe and so on. You have appointed a new officer to help out with that. Is it the intention to keep that post and carry it through to Fusion 2020 and so on?
1390. **Mr Nellis:** Horizon 2020. Absolutely.
1391. **Mr Dunne:** Is that the intention?
1392. **Mr Nellis:** It is a permanent post, as far as we are concerned.
1393. **Mr Dunne:** OK. Will that work across the island?
1394. **Mr Gough:** Yes. As I said, as part of the conference we are organising in June, we are issuing a call for research for the benefit of SMEs. So, we will set targets to try to get SMEs and, in particular, SME trade associations involved in writing applications to that call.
1395. **Mr Dunne:** I do not see InterTradeIreland being promoted heavily in the greater Belfast area. I think that we talked about that before. Is there something that you need to do there? Do you tend to work more in the border areas?
1396. **Mr Nellis:** No. In the past few years, one of the key areas that we have focused on is greater relevance and greater outreach across the island, hitting every part. We organise events in areas where we feel there is not great penetration of understanding about what we do. Our experience is that Belfast and Dublin companies are well aware of what we do. We have been going into areas in the south-east of Ireland and the north-east of Northern Ireland. We have gone to Ballymena, Cookstown and places like that. Those are the areas in which we generally perceive there is no great awareness. Our database shows that we do not have penetration there. Awareness in Belfast is pretty high, but we are always open to organising specific events.
1397. **Mr Gough:** We measure awareness levels in various areas, and they are fairly high in Belfast.
1398. **Mr Dunne:** How do you do that?
1399. **Mr Gough:** We do it through surveys. The awareness levels are fairly high in Belfast. A few years ago, we found that there was less awareness up in the

north-east and down in the south-west and south-east, so we took action to address that by running a number of events in Ballymena and Cork.

1400. **Mr Dunne:** Fair enough.

1401. **Mr Agnew:** The Chair touched on most of the points I wanted to make about North/South partnerships in respect of applying for European funding. I think that we covered it pretty comprehensively. The only thing that was not touched on was that Invest NI suggested that we could forge better North/South partnerships. I appreciate that you have focused on that in the past year. Since you have done so, what barriers have you encountered? Are there difficulties, or is it working well, now that somebody is focusing on and trying to form such partnerships? Are there still difficulties that you have to try to overcome or are struggling to overcome?

1402. **Mr Gough:** Simon is the man who is getting his hands dirty here and is probably best-placed to answer that.

1403. **Dr Grattan:** As I said earlier, the barriers are a lack of awareness. It is the knowledge of who you can partner. Key people will know that. For example, we looked at the cancer element towards the end of last year, and a lot of the key cancer people will know who they are, and that is fine because they will be able to partner up. However, it is not always applicable to partner somebody who is in that sector; they may need somebody who can do database work or something that is not in their exact sphere. So, there is no difference, or it makes little odds, for them to go to France rather than Belfast to find somebody because, if you do not know somebody in an area, you do not know somebody in that area. Raising that awareness of who might be in their area is key for us — trying to make sure that people are aware that, if they are looking for somebody who can do x, y and z, they should come to us. We can try to find them somebody on a North/South basis to do that. We will try because of the host of reasons that we have stated

about why North/South collaboration works, and because of the sheer fact that it is geographically useful for face-to-face meetings, which, for European funding, is what you must do; you have to sit down and be face to face with each other to thrash out the details. The biggest barrier that we have seen and are trying to overcome through our schemes is just that: the awareness of who is out there and what they can do for you.

1404. **Mr Agnew:** Are you seeing greater success as that awareness increases?

1405. **Dr Grattan:** Exactly. Yes.

1406. **Mr Nellis:** There is also the overhang of perception. Many people feel and hear — it is coming across even from your questions — that this is very complex, cumbersome, bureaucratic, hard to do and takes an awful lot of time. So they question whether, in the end, it is worth it. Those are the sort of perceptions that we need to break down.

1407. **Dr Grattan:** Part of the issue with that is that people are confusing involvement in a project and co-ordinating a project, which are two distinct and different things. Involvement in a project does not require the same rigorous bureaucratic approach as co-ordinating one. That applies even to the difference in financial checks, for example, between a company that is a co-ordinator and somebody who is just a partner in a project. Again, it is about getting the message out to people that they can play a role in a project without having the same burden that they may feel they will have because what they are hearing concerns issues about co-ordinating projects, which is very different. For us, it is an education process to try to encourage people into feeling right to be involved in European projects. If it is right for them to be co-ordinating, that is great, and we will encourage them in that. However, where they should be partners, we are able to express to them that they are not getting into that same level of complexity. It may be that co-ordinating should not be done until you have been through two or three of

- these projects as a partner to get an awareness of how the systems work and how you do that.
1408. **Mr Agnew:** Does the co-ordinating role relate to size or experience? Does the largest or the most-experienced partner normally co-ordinate?
1409. **Dr Grattan:** It can vary. A two-man company in Donegal is running two FP7 projects itself, but that is because the people involved know what they are doing. They have been through other programmes, such as Fusion and Innova. They have experience of R&D and of dealing with reporting mechanisms and that kind of thing. So, the level of knowledge and experience that they bring to it allows them to hold the co-ordination role. It can vary, though, and often the Commission may specify who they prefer. Sometimes SMEs are preferred to co-ordinate, because that sits much better with the Commission's goals. Sometimes, you find that the larger partners want control because their systems and background staff make it easier to make these things happen.
1410. **Mr Agnew:** OK. Thank you very much.
1411. **The Chairperson:** We are coming towards the end of the session. The US-Ireland R&D Partnership is an interesting aspect on which you have not commented. That seems to me to be an interesting area. I am not sure how far you have developed it. Will you enlarge on that?
1412. **Mr Nellis:** I will say a few words and then pass over to Aidan. Dr Bernie McGahon, who directs the secretariat, is with us today as well.
1413. It was a project with a very long gestation. The Washington conference in 2002 was the first time it was agreed that it would good if researchers from Northern Ireland, Ireland and the US could come together as peers to do collaborative research at the high end. That all sounded very easy, but when you started to do it, you realised there were three different funding mechanisms and three different peer-review systems. We were given the job of brokering the collaboration on the island and then working with the States. It took about five or six years to get it over the line and get the first proposal through. It has now been fairly well tried and tested, and there have been eight or 10 good collaborations coming through. Recently, they expended into a couple of new areas. Aidan, do you want to say a few words?
1414. **Mr Gough:** The process has been slow, but the main benefit of the US-Ireland R&D partnership is that, because it was agreed that the projects would be peer reviewed through the US system, when those projects are peer reviewed and go ahead, the participants are branded right away as being world class in whatever area they are working in. We have eight projects that have been approved, with a total value of about £13 million of research and development across the three jurisdictions.
1415. **Due to its success, it has expanded into two new areas:** energy sustainability and telecommunications. It has also been moved on the US side; it now sits in the State Department. That gives it an even higher profile. So, it is an area that has been successful, and, as I say, it brands the participants as world class.
1416. **The Chairperson:** Thank you very much for that. Obviously, there could well be very significant potential in that area. It is really just taking off now.
1417. **Mr Nellis:** It has been in the last couple of years. It is now getting the traction, and it is getting the confidence of people.
1418. **The Chairperson:** Yes. I thank you. It seems that you have a very important and pivotal role in trying to get collaboration between companies North and South and looking for partners, particularly in relation to European funding, both framework 7 and Horizon 2020. So, it is a very important role that you have to play, and I wish you well.
1419. I note that Mr Nellis is retiring as chief executive.

1420. **Mr Nellis:** At the end of May. The advertisement for my replacement is going into the paper today.
1421. **The Chairperson:** And you so young.
1422. **Mr Nellis:** Absolutely. Now, now. Don't go there, you are the same age. *[Laughter.]*
1423. **The Chairperson:** I want to take this opportunity to warmly congratulate you on your very fine work over many years and wish you well in your retirement. I am sure that you golf will improve.
1424. **Mr Nellis:** Hopefully, and my guitar playing.
1425. **The Chairperson:** Thank you very much.



Northern Ireland
Assembly

Appendix 3

Rapporteur Meetings

Meeting with Jim Nicholson MEP

Committee Inquiry into Research & Development – Meeting with Mr Jim Nicholson, MEP

Issues: Research & Development in a European Union Context

Date: 20th February 2012

Present: Alban Maginness, MLA, Chair
Jim Nicholson, MEP
Jim McManus, Assembly Clerk
Fergal Campbell, Assembly Research
Neal Gartland, Research Assistant to Jim Nicholson

Preparation for Horizon 2020

1. There should be an emphasis on preparation for Horizon 2020 before its inception in 2014. Smaller companies should concentrate on Horizon 2020 instead of FP7. This should concentrate, not only on SMEs who have greater capacity for the application process, but on the micro-businesses who do not have the resources to apply for funding.
2. Northern Ireland needs to get better connected in Europe and must develop the structures and know-how to work with Horizon 2020 before it is launched in 2014.
3. Northern Ireland representatives need to lobby much more in Europe. We cannot expect them to do everything for us.
4. NI should try to influence thematic elements of Horizon 2020 to suit industry here. For instance, Almac's interest in oncology.

Structure to Support R&D

5. A single organisation or 'One-stop-shop' should be established to drive forward R&D in Northern Ireland. This should cater for large organisations, SMEs and micro-businesses.
6. It is important that, going forward, the distinction is made between SMEs and micro-businesses. The term 'micro-business' must be brought into the terminology to distinguish from larger SMEs of up to 250 employees.

Developing Processes to Support R&D in Europe

7. It has been indicated that there is a disconnect between Brussels and Belfast. It is not clear if this translates into a disconnect on the matter of EU funding between Westminster and Belfast. This area may need further exploration. The UK does not focus on Europe to the extent we may wish it to as it is a net contributor rather than a net recipient.
8. The Executive must ensure that the right people are in place both here and in the Executive Office in Brussels. They must be focused on doing the right work on the ground to assist EU funding. This knowledge must be transferred back to Northern Ireland. It is not clear if this is currently happening or if the right people are in place.
9. Questions should be put to Invest NI regarding their role in EU funding. Are they giving enough support? Are they looking at the right partnerships? Is there a case for focusing more on the newer Member States from Eastern Europe?
10. More should be done at a local level to encourage the involvement of evaluators for EU applications.

11. There should be some emphasis on the agri-food industry due to the wealth of opportunities in the food and renewables sectors. Invest NI has not tended to support the sector because average incomes are quite low.

Co-operation and Collaboration

12. In regard to the lack of drawdown in funds from the EU, lessons should be learnt from our southern counterparts. Meetings should be considered with those in the Oireachtas who have experience of successful drawdown of funds.
13. We need to work more with the universities here. They have been dealing with Europe for years and have a lot of experience.
14. Mentoring through Science Park for R&D projects should also be a top priority. There should also be more of this sort of thing happening. There should also be more co-operation in this area such as with the proposed Science Park link between Derry/Londonderry and Letterkenny.
15. Regional colleges should work together for EU funding instead of independently. What collaboration has been achieved thus far?

Meeting with Belfast City Council

Committee Inquiry into Research & Development – Meeting with Belfast City Council

Issue: Research & Development at council level.

Date: 29th February 2012

Present: Alban Maginness, MLA, Chair
Shirley McCay, Belfast City Council
Conor Maskey, Councillor
Jim McManus, Assembly Clerk
Fergal Campbell, Assembly Research

Connections Between Business, Government and Academia

1. The QUESTOR Centre is a global environmental research network founded by Queens's University Belfast. QUESTOR has a role in Knowledge transfer. BCC indicated that QUESTOR has worked with local companies in support of their R&D activities.
2. BCC indicated that the Connected Programme plays a vital role in generating collaboration between Further and Higher Education Institutions and local business.
3. A collective approach is required. Conversations should occur between the Council and Universities. There is an issue around how universities connect to the locality and to councils.
4. Invest NI has cleared the way for councils to concentrate on business start-ups. Belfast City Council is getting companies 'Invest NI ready'. This is not widespread in other councils.
5. The make-up of the Northern Ireland economy is saturated with micro-businesses. The definition of micro-business was agreed at 20 employees or less. The council representatives feel that at times Invest NI is too concentrated on exporting; a strategy that may not suit many goods and services based micro-business in NI. Therefore councils may be better suited to work with micro-business. Although, BCC indicated that local councils are not in the position to fully support R&D fully in indigenous firms.
6. Belfast City Council indicated its concern regarding the lack of R&D; R&D programs are expensive and not heavily subscribed. They indicated the improvements made by cities such as San-Diego, which have created a hub for Research and Development through collaboration between the City, Universities and Business.
7. BCC indicated the potential importance of the Belfast Metropolitan College's E3 campus, located in Springvale. This campus may offer a connection between business and the college by providing an incubation centre.

R&D Programmes

8. Delay in time it takes to commercialise research. There are gaps between initial R&D, commercialisation and getting products and services to markets. Businesses have to be quite intrepid to get through it.
9. Belfast City Council representatives suggested that Framework Program 7 is too difficult and time consuming for businesses both large and small.

Additional Issues

10. BCC also commented on the business culture of NI. They feel that there is possibly a business culture that lacks ambition to go to the next level.
11. Possibly there should be a block grant for councils from EU to encourage R&D.

Meeting with Asidua

Committee Inquiry into Research & Development – Meeting with Asidua Ltd

Issue: Research & Development in a local business context.

Date: 9th March 2012

Present: Alban Maginness, MLA, Chair
 Steve Brankin, Asidua Ltd
 Linda McMahon, Asidua Ltd
 Jim McManus, Assembly Clerk
 Fergal Campbell, Assembly Research

Experience with Invest NI Funding Process

1. Certain skills have to be learned when applying for Invest NI grants. It is a steep learning curve. The detail required to get an application over the line can be overkill. The repeated variations in the required criteria is an issue with some of the grant schemes available at a local level. The rules are changing again and the Asidua team feel overwhelmed by so much change.
2. The first application took a couple of man months to complete. Funding represents 37.5% of the actual cost. An organisation with around 10 or fewer employees would not be able to do this. There is no support available for payment of overheads.
3. For Invest NI funding the company will define the programme length, establish the costs and put a schedule together. Claims are submitted every 3-6 months based on costs incurred. A progress report is included. This is audited by Invest NI. It is not too onerous. However it would be onerous for a much smaller company. It could also be much more onerous for a company with a higher bill of materials. It may be useful for Invest NI to have somebody in place with financial and business planning experience to provide practical hands-on support micro businesses that wish to become involved in R&D.

Experience Dealing with Invest NI

4. Asidua indicated that they were very pleased with the assistance that Invest NI had provided and highly value their grant schemes. They felt that they are more industry friendly. In the past, Invest NI had been taking too long to assess applications but now they will recognise a project from the application date so that work can proceed prior to funding having been confirmed. The time from application to decision is 40-50 days, which is good.
5. An experienced client executive is the key to successful grant applications with Invest NI. They have the experience and know how to steer applications in the right direction. Asidua indicated that an initial meeting with Invest NI helps to refine concept and aides in the grant application.

Other Schemes

6. Asidua's experience of other grant schemes has been less successful than Invest NI. They felt that the Innova scheme conducted by Intertradelreland is an order of magnitude higher.
7. In terms of their experience of FP7, Asidua felt that it was not in line with their research and development timeline. The time from application to receiving a grant was 18 months, for a technology company this timeframe is too lengthy as after 18 months the product would be too late to commercialise.

8. Also Asidua voiced concerns that the application process itself was over bureaucratic and too robust. They indicated that because support doesn't cover fully the application process to the time of commercialisation it was too high of an investment.

R&D Tax Credits

9. Asidua welcomed the provision of Research and Development tax credits but questioned their criteria. They felt that there was a lot of confusion regarding the availability of tax credits to those who have received help from Invest NI for the same R&D project. They indicated that most companies are not aware of how the tax credits system works. For example, many companies will not go for large company tax credits because support is not as high but it is better to have this if Invest NI support is being provided rather small company tax credits, unless Invest NI support falls below 23%. Invest NI need to provide companies with clarity on this issue as there is much confusion.
10. There are some companies which do not understand what constitutes R&D and how to obtain tax credits. Some companies may be able to avail of tax credits but not realise it. Invest NI should publicise what constitutes R&D from a HMRC perspective.

Intellectual Property

11. Asidua indicated some concerns with Research and Development support. They felt that the process is highly risky for NI firms as a large proportion is unsupported. They indicated that the lack of collaboration is due to the issue of IP and the fear that collaboration with bigger companies may result in the loss of a product. The area they work in does not allow for the provision of a patent early on in the process, therefore there are risks in relation to Intellectual Property rights.

Incubation Centres

12. Asidua brought to light the lack of incubation centres in NI. They indicated that these centres are present in ROI and the rest of the UK and provide a place for companies to research and develop their ideas with the help of in-house expertise. These incubation facilities generate a culture of R&D and provide industry with the tools to engage in R&D.

Meeting with EU Commision

Committee Inquiry into Research & Development – Meeting with Maurice Maxwell C/O EU Commission

Issue: Research & Development in an EU context.

Date: 14th March 2012

Present: Alban Maginness, MLA, Chair
Maurice Maxwell, EU Commission
Jim McManus, Assembly Clerk
Fergal Campbell, Assembly Research

Framework Programme 7

1. QUB have been very active in FP7, Ulster have pledged to up their game.
2. One should not concentrate on FP7; it is too late in the programme.
3. It is unrealistic to go to small companies and say take part in FP7.

Horizon 2020

4. Horizon 2020 begins in 2014 and will provide funding of up to €80 Billion for all aspects of Research and Development, this will be one overall fund. The emphasis should be on making the most of Horizon 2020. This should involve looking at the areas of funding and seeing where our research base can deliver in these areas. We should be more focused on the knowledge, experience we receive and the business networks we create.
5. We cannot influence the program but we should make ourselves aware of the potential key players in Horizon 2020. Businesses should then try to sell themselves to these key players as supplier/subcontractor.
6. We should begin with the objective of trying to achieve research excellence instead of trying to draw down as much funds as we can from Europe. Currently, not many have the capabilities to do research in the EU/Horizon 2020 context.
7. The Commissioner has made SMEs and simplification of Horizon 2020 a priority.
8. Start with those who have the ability to provide services as a supplier or subcontractor. This will enable companies to get in, get some funding, contribute knowledge whilst gaining a lot of knowledge and creating business networks in the field in which they have strengths.

Working with the Republic of Ireland

9. RoI has drawn down a lot of funds for R&D in areas relating to societal issues e.g. renewables, NI strengths should lend themselves to these sorts of issues.
10. The EU commission does a great deal of work with Intertradelreland and it would be useful to get a briefing from the organisation on its work. This is a good way to secure partnerships with companies in RoI.

EU Context

11. 99% of business in the EU is defined as SME. This makes things difficult as there is not subset of this and businesses are not narrowly defined within the 99%.

12. A positive step has been made with the setup of the Executive Office in Brussels but the EU should not be our first port of call. We need to see what is going on here in terms of research and then this should be relayed to the Executive Office. We must have the appropriate resources on the ground in Brussels. The Invest NI representative in Brussels needs to be matched with knowledge here but we must know what our capabilities are.
13. The Executive is starting to actively engaging building up the compliment of officials in Europe. Everything cannot be covered therefore there is a need to prioritise. OFMDFM priorities are now too broad brush.
14. There are a lot of good people and detailed knowledge in Invest NI. We need to build on what we have and the policy end in DETI and the people on the ground liaising with what is happening in Brussels. Also, the universities are key.
15. We need to know how our strengths fit into Horizon 2020. This is a two-way process of learning and feeding back.
16. Why not use funding from DARD to leverage funding from the EU.
17. Issues associated with EU funding must be demystified. Organisations' contribution is mostly time.

Joined up Approach

18. We should build on the knowledge within DETI, Invest NI and the Universities. Collaboration with ROI and the rest of GB is also vital.
19. Agriculture has not reached its full potential in R&D funding. It is cross-cutting and will fall into different categories. AFBI funding from DARD can be used to leverage funding from the EU. DARD is becoming more active in this area.
20. We can do very little without getting the Civil Service on board. We need to open Civil Servants' eyes.

Meeting with Cirdan Imaging

Committee Inquiry into Research & Development – Meeting with Hugh Cormican C/O Cirdan Imaging

Issue: Research & Development at a local business level.

Date: 21st March 2012

Present: Alban Maginness, MLA, Chair
 Hugh Cormican, Cirdan Imaging Ltd
 Jim McManus, Assembly Clerk
 Fergal Campbell, Assembly Research

Support for Indigenous Businesses

1. There needs to be more support for indigenous firms to engage in research and development in order to keep jobs in the long term. There is too much pressure on Invest NI to work towards inward investment as these provide bigger stories. Smaller companies should be invested in.
2. There should be a large number of grants to small companies instead of large grants exclusive to the larger companies.
3. There is no robust support for R&D funding in Northern Ireland. In ROI there is considerably more support such as support for training and for writing applications. Here you get advice but no practical support.
4. Local businesses in NI should look at the possibility of working on an EU funded project as a supplier or subcontractor.
5. Public sector should support local business. There should be more incentives for Government to procure from indigenous SMEs.
6. In relation to Incubation centres, there are more important things that can be done to generate more research & development. NISP are doing a great job.

Administrative Problems

7. Payment schedule is unreasonable. Cash flow is important for a micro-business. Money must be spent and then reimbursed. This can take 90-100 days.
8. Issues with grants lie with the need to spend money first and then claim the money back. Due to cash flow restrictions for small companies this is a significant barrier to research and development. Currently, the process works by the business developing a significant business plan to support the application, there is then an appraisal followed, if successful, by a letter of support. Research work is then undertaken and the money spent. Only then can a claim be made. Additional time is then spent auditing and checking. Funding should be delivered up front in order to aid cash flow.
9. Grants are designed to deliver 40% of direct costs but due to application costs and time in the grant process this ends up being only around 30% of direct costs, this does not cover full costs.
10. Hugh Cormican also indicated that he felt the percentage of monitoring costs per grant were possibly too high. If more than 10% of the grant is monitoring costs, this should be looked at.

Stimulating R&D

11. At a time when we should be investing in STEM subjects, it is not happening. STEM subjects are important in creating a culture of research and development. Businesses could expand and grow if they had the people.
12. There is a dearth of Venture Capital. Much more provision is needed. London companies will come here when deals start to be made. Northern Ireland pension funds are not currently reinvested locally.
13. Certain businesses need a certain level of capital. If they cannot get it here they will go elsewhere. You cannot set up a business in Northern Ireland if you need more than £2m, the money is not available to do it.

Meeting with Iain Gray

Committee Inquiry into Research & Development – Meeting with Iain Gray, C/O, Technology Strategy Board

Issue: Research & Development.

Date: 24th April 2012

Present: Alban Maginness, MLA, Chair
Iain Gray, Technology Strategy Board (TSB)
Brian McCarthy, Technology Strategy Board
Ciaran McGarrity, DETI
Eoin McFadden, DETI
Jim McManus, Assembly Clerk
Fergal Campbell, Assembly Research

1. Technology Strategy Board is involved in exploitation of technology and innovation.
2. They aim to achieve mid-long term benefits.
3. They have been involved in 2 billion pounds of funding from public/private sources.
4. The Knowledge Transfer Partnership (KTP) involves collaboration between University and Business.
5. The SBRI programme uses the power of government procurement to drive innovation. It provides opportunities for innovative companies to engage with the public sector to solve specific problems.
6. NI – what can governments departments do with procurement? Articulate to small business challenges departments are trying to solve. Challenge small business to solve problems. Involve companies earlier well before the procurement decision.
7. Government have to take the lead and develop procurement panels ie. This is what we are trying to solve, what can you do?
8. How to define challenges to attract businesses.
9. Government can play proxy role as there are no huge companies.
10. Pre-commercial procurement.
11. Make government aware that this option exists.
12. SBRI – 50 million worth of contracts (700 contracts).
13. NI – 3% of applicants, 11% of successful applicants, 12% of funding.
14. QUB is number 1 in KTPs, there are 44 live KTPs in NI currently.
15. 3:1 economic return for every £1 invested.
16. Prolonged evaluation: UK review sat alongside a reduction in budget and investNI wanted to do a value for money exercise.
17. The KTP scheme is due for relaunch in NI this week – NI's strength are good higher education systems, strong SME base and Invest NI.

18. Relationship with BMC not as strong as it could be. BMC are interested in short KTP scheme but criteria is less encouraging to short term schemes. Better suited to 2-3 years commitments.
19. NI has a huge opportunity to be the UK exemplar for KTPs.
20. Areas for increased focus life sciences agenda, digital agenda, manufacturing (Manufuture – FP7)
21. Develop mind-set to include global perspective.

Meeting with Diane Dodds

Committee Inquiry into Research & Development – Meeting with Diane Dodds

Issue: Research & Development in EU Context

Date: 26th April 2012

Present: Alban Maginness, MLA, Chair
Diane Dodds MEP
Jim McManus, Assembly Clerk
Fergal Campbell, Assembly Research

SMEs

1. Consideration needs to be given to the EU definition of SME. Does this apply in the Northern Ireland Business context? Greater emphasis should be on micro-businesses.
2. The definition of SMEs should be more specific to the sub-sections which apply to NI.
3. Micro-business in Northern Ireland is diverse. Economy benefits from those companies that have a small number of employees. For example, Tech companies.
4. The question is how best do we help small business access funds?
5. There is a need to have a system in place internally in Northern Ireland to support businesses through the process.

Funding Issues

6. Issues for small business arise in the need for capital to develop ideas for growth. There is also an issue of raising finance in a time where financial lenders are less willing to lend. The funds are there for the later stages of the process but what about the seed capital.
7. We need to look at what Invest NI does and build on their work. Companies know there are funds available, they just need the practical assistance to get access to the funding.

Horizon 2020

8. Horizon 2020 needs to recognise that most companies do not have the sort of money available that many successful FP7 supported companies would have had. It must be made more applicable to the market place.
9. It would be useful if the Commission considered how Horizon 2020 could be structured for the benefit of the sorts of smaller businesses that are present in Northern Ireland.

Additional Issues

10. Innovation centres, whilst valuable, are difficult to manage due to the diversity of the SME base in NI.
11. Universities are benefiting from EU funding but commercialisation is important to economy.
12. Local enterprise centres could play an important role in the promotion of R&D and the development of ideas.
13. There is the issue of whether, what Invest NI is doing permeates to those businesses that are not engaged with Invest NI. This is a matter for consideration.



Northern Ireland
Assembly

Appendix 4

Written Submissions

Response from Aerospace Defence Security

**aerospace
defence
security
space**



ADS response to Northern Ireland Assembly, Committee for Enterprise, Trade and Investment

Inquiry into Developing the Northern Ireland Economy through Innovation, Research and Development

About ADS

ADS is the trade organisation advancing the UK Aerospace, Defence, Security and Space industries. Farnborough International Limited (FIL), which runs the Farnborough International Airshow, is a wholly-owned subsidiary. ADS has offices in England, Scotland, Northern Ireland, France, the Middle East and India. ADS comprises over 900 member companies within the industries it represents, of which over 850 are small and medium enterprises (SMEs). Together with its regional partners, ADS represents over 2,600 companies across the UK supply chain.

ADS also supports SC21, Sustainable Aviation, Defence Industries Council, RISC, Defence Matters and hosts the Aerospace & Defence Knowledge Transfer Network.

ADS Northern Ireland was established in early 2010 with the support of InvestNI and already has 45 member companies with 7,500 employees.

Contribution of the ADS Sectors – Aerospace, Defence, Security & Space

The sectors that ADS represents are hi-tech and innovative. They contribute to the UK's economic growth and create and sustain high-value engineering jobs:

- UK Aerospace is the second largest Aerospace Industry in the world (17% market share), and worth over £23 bn. to the UK, of which £16 bn. (70%) is exported world-wide. The sector directly employs nearly 100,000 people in the UK, and supports a workforce of around 360,000. Total R&D in 2010 amounted to £1.7bn, more than 7% of annual turnover.
- The Defence Industry employs 314,000 people in the UK – directly and through the supply chain. The industry is highly skilled, with 59 percent of workers holding a university degree or equivalent. The industry invests 8% of annual sales revenue in research and development – amongst the highest in industrial sectors.
- Around 450 companies within the membership of ADS are engaged in growing Security, resilience and policing markets, at home and overseas, for which there are many interfaces with UK Government, the police service, the other emergency services and operators of the Critical National Infrastructure (CNI). Security-related SMEs maintain a heavy focus on upper tier technologies and comprise 93% of the ADS membership. A recent survey completed by ADS found that its members generated around £2bn worth of business in the UK security market during 2010.

- The UK Space industry recorded a total turnover of over £7.5 bn. in 2008/09. This represented a real growth of 8 per cent since 2007/08 – the UK sector expects to grow 10 per cent each year. The sector is strong in areas such as satellite communications and satellite navigation, and well placed to capitalise on new emerging services derived from Earth Observation, Cyber Security, Cubesats, and Broadband Services. The global market is anticipated to continue to grow at a robust rate of 5 per cent on average in the next decade.
- The ADS Sectors in Northern Ireland contribute £1bn per year in revenues to the local economy and supports 7,500 high calibre, high value jobs. Last year, total exports were £860m and total reported R&D investment was £34m.
- More information on ADS Group can be obtained here: www.adsgroup.org.uk

Research & Development

The sectors that ADS represents are successes because of the investments that have been made in them to make them globally competitive. This seedcorn investment often takes place 5-15 years before it yields economic results. The long term nature of the ADS sectors makes them less attractive to capital markets and so Government support for R&D is particularly important in this “market failure” scenario. However, the long-term highly-skilled jobs, exports, Intellectual Property (IP) and tax contribution resultant from these industries are, as set out above, second to none.

The high-end engineering and design carried out by Aerospace, Defence, Security and Space companies can provide solutions to some of the public policy and societal challenges faced by the UK, particularly security and environmental ones. To this end, ADS believes that Government support and investment in our sectors represents a good investment in many regards.

Future value of R&D comes from where it is exploited. The “innovation eco-system” has to be supported properly throughout (research funding, R&D tax credits, grant funding, etc) to ensure IP is exploited in the UK. The UK is excellent at generating IP, which reflects that the base research and IP framework are fit-for-purpose, but all too often, it is exploited elsewhere as the rest of the eco-system does not work to best effect.

R&D and Exports form a virtuous circle that leads to more innovative and competitive products and services, wealth creation and economic growth in the UK, and a vibrant, productive and innovative companies sustaining high-skill, high-value and long-term jobs. There is a proven and inextricable link between investment in R&D within a company and its export performance – both in terms of export incidences and export intensity. R&D activity in companies enables the creation of more ‘exportable’ products. Exporting increase both productivity and innovation, as well as additional revenues that are often re-invested in intangibles such as R&D, which is positive for all stakeholders.

ADS welcomes the opportunity to input into this inquiry by the Committee for Enterprise, Trade and Investment.

1 What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

1.1 ADS is aware of R&D funding support from the following sources:

- Northern Ireland - Invest NI Grants for R&D
- Cross Border - Intertrade Ireland, Innova and Fusion Programmes linking North/South Companies and Universities
- UK - Technology Strategy Board(TSB) – Eurostars Programme, Collaborative R&D, Knowledge Transfer Partnership, SBRI
- European Union (EU) funding for Research and Innovation: - Framework Programmes (FP7) and Horizon 2020

2 How appropriate are the available opportunities for developing the Northern Ireland economy?

- 2.1 European Union funding opportunities in particular require a lot of resource in form filling and have very long lead times. Typically it is more that a year before a company knows if it will receive support. Companies cannot cope with this and due to these factors, small companies in particular find this source of funding unattractive and not appropriate. National Governments must not view EU funding as an alternative source, but must recognise it as a complementary source of R&D support, the full value of which can only be unlocked with strong national R&D programmes.
- 2.2 In Northern Ireland, ADS has some large key companies like Bombardier and Thales that lead major R&D programmes which flow down the supply chain. We need R&D support for the large companies and we need tailored support for the very large base of small companies. SMEs can only thrive with the presence of successful large companies to pull through their products to market; large companies need strong, innovative supply chains to remain globally competitive.

3 What support is available to assist organisations to access opportunities for research and development?

- 3.1 UK research is second to none but to derive value and wealth from science (discovery and knowledge), the UK requires a strategic approach to Engineering (applying those discoveries and knowledge). A strong Science and Engineering policy would ensure the retention, and growth in the UK Manufacturing sector. ADS believes that this is feasible as we have seen with the coherence that is forming around the Government's Manufacturing strategy.
- 3.2 Investment in Research Councils is £4.4bn per annum. Investment into the Technology Strategy Boards (TSB) is £320m, meaning less than 10 per cent of academic research has a clear route for future exploitation. TSB and other routes for exploitation are sound but they are grossly under funded and could be strengthened in the reporting of outputs.
- 3.3 The Government's £200m investment in the Catapult Centres (formally known as Technology Innovation Centres (TICs)), and in particular the high value manufacturing Catapult Centre is warmly welcomed by Industry. This investment is over a four year period which is a signal of the Government's commitment. Industry looks forward to working closely to ensure the success of this initiative.
- 3.4 The Aerospace Growth Partnership, a forum where Government and industry now meet, provides an effective framework through which government and the industry are able to identify the technologies and engineering capability needed to enable UK companies to compete for work share on future aircraft programmes.
- 3.4.1 On defence, the Government's principal mechanism for engaging Industry has changed recently but through the Defence Suppliers' Forum, Government continues to engage with Industry. The Centre for Defence Enterprise, a welcomed initiative providing a fast decision-making process to assess the viability of Defence innovation programmes, has recently be re-absorbed into Dstl, raising concerns about its future agility, responsiveness and dynamism. With the backdrop of Defence cuts, Defence R&D funding will be challenging to unlock in the short term.
- 3.4.2 On security issues, there is productive dialogue between the Home Office and Industry through the UK Security and Resilience Industry Suppliers' Community (RISC), but more could be done to harness Industry's contributions on the full range of national security issues in a coherent and strategic manner.

3.5 In addition, ADS is aware of:

- The EU Enterprise Network offers support for building partnerships across Europe for collaborative funded projects
- Invest NI offers support for setting up projects and proposal writing
- ADS supports member companies access opportunities and link up partners. For example we are bringing the Technology Strategy Board (TSB) and the Aerospace, Aviation and Defence Know Transfer Network (AAD KTN) to Northern Ireland to present R&D opportunities to the Aerospace Supply chain companies.

4 How beneficial is the available support in assisting organisations?

- 4.1 Government and external support for setting up projects and writing R&D proposals are welcomed by companies. However the fact that external support is required, in itself, proves that the process and forms to access the opportunities is too complex and time consuming.

5 What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

There are a number of issues facing organisations:

5.1 *Lack of confidence by companies in investing in R&D*

Many SME's in Northern Ireland have a poor view or cautious view of the market and have little confidence in investing in R&D. The companies that are investing are mostly companies with overseas HQ's or that have large global footprints.

Large companies with good global market perspective like Bombardier and Thales have a better market view than an SME serving the local market. We have to increase the market view of these companies, increase their confidence so that they can perform on the world stage and invest in new products.

5.2 *R&D calls not market driven*

Some SMEs have responded that many calls for R&D projects seem to be very blue sky R&D and not market driven. Small companies require market driven projects so that they can achieve a faster return on their investment.

Collaboration with Universities can provide small companies an effective means of R&D participation. However some SMEs report that this is not always practical for business as some programmes are focused more on research papers rather than market driven opportunities.

5.3 *R&D calls excessive timelines*

The timeline for calls for R&D projects is also not very market driven with applications taking more than 1 year to approve and projects being 3-5 years in duration – which means a minimum time of 5 to 8 years to bring a product to market and in real terms the opportunity is likely to have passed by this stage.

6 What can government do at UK, cross-border, NI and local level to assist organizations and to improve opportunities for R&D?

- 6.1 Government needs to streamline and simplify the R&D application process and reduce the approvals timeline
- 6.2 Make more R&D funding market driven and available to industry. Investment in UK Research Councils is £4.4bn per annum. Investment into industry led projects is less than 10% of this figure.
- 6.3 Invest in growth sectors. By retaining our 17 per cent global market share, UK Aerospace is estimated to be worth £352bn between now and 2029. The Aerospace Growth Partnership,

chaired by Mark Prisk, Minister of State for Business and Enterprise and hosted by ADS, can provide an effective framework through which government and the industry are able to identify the technologies and engineering capability needed to enable UK companies to compete for work share on future aircraft programmes. Northern Ireland “punches well above its weight” on Aerospace and must be firmly linked into this programme.

- 6.4 Investment in R&D helps to sustain high-value jobs and increases the competitiveness of UK companies throughout the supply chain. Aerospace companies that find more attractive R&D environments overseas are likely to move their R&D to other countries, the consequent jobs being migrated outside the UK. Placing science and engineering at the centre of policy-making is likely to encourage Aerospace companies to invest in the UK.
- 6.5 *EU funding:* It is critical that UK representatives and Ministers are aware, and make the case for UK based industries at EU level. In particular the civil Aerospace sector is seeking thematic clarity within the Horizon2020 framework, which would enable UK Aerospace to maximise its participation in this important programme.

7 What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

- 7.1 For the Defence and Security industries, clarity from Government is required of the UK's priorities which will provide the environment in which industry can exploit advances in science and technology. These priorities should identify an appropriate long term focus on where the understanding of science will inform the future direction for the two sectors; and a short-term focus where today's challenges have to be met. Efficient exploitation of science and technology will be achieved through generating confidence in industry to invest alongside Government. This means transparency of priorities and plans which would be enhanced by the involvement of industry in their development. Then both industry and Government will believe that those plans are deliverable and can invest with confidence
- 7.1.1 There are no shortcuts to obtaining a world class technology and industrial base for defence and security. Capabilities once lost are rarely recoverable; risks taken with this base will almost certainly translate into military and security risk before too long.
- 7.2 Maintain R&D tax credits. The Government intervention to support R&D is vital due to the broader benefits that accrue to the wider UK economy from such investment. These include technological benefits that “spill over”, as well as increased demand for services from the supply chain. The Government's tax credit system is widely viewed as an efficient mechanism for incentivising R&D and stimulating investment in innovation in the UK. Such investment is a core driver of productivity and growth in the economy. The retention of the Government's R&D tax credit scheme for companies, therefore, remains an essential element in increasing the level of innovative activity in the UK.
- 7.3 One overall suggestion for the Northern Ireland Government would be to look at streaming or separating the support for SMEs which is focussed on their business and market requirements. As Northern Ireland has a large number of SMEs the way to encourage R&D in this area is to have a simple accessible system, which is market driven.

8 How can business and academia work to support research and development opportunities?

- 8.1 The new Northern Ireland Advanced Composites and Engineering centre (NIACE) is an excellent example of how industry and academia can work together to support R&D. NIACE is an industry-led technology hub that will carry out research across a range of industrial sectors. This is an opportunity for local companies, particularly SMEs, to invest in and access R&D. In conjunction with the local universities, the centre will help the high-value engineering and manufacturing sector to develop its capabilities, move up the value chain and compete on a global stage.

ENDS

14th December 2011

Response From Agri Food & Biosciences Institute

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Agri Food & Biosciences Institute	02890 255078 (Research Support Office)			
Organisation Address	Organisation Type (Include one or more X)			
Agri Food & Biosciences Institute 18a Newforge Lane Belfast BT9 5PX	Business		University	
	Business Support		FE College	
	Government		Research	x
	Other (Please Specify)			
	NDPB undertaking work on behalf of DARD, other Government Departments and other bodies			

Please provide some background information on the organisation

The Agri-Food and Biosciences Institute (AFBI) is a Non-Departmental Public Body (NDPB) that was established under the Agriculture (Northern Ireland) Order, 2004, which empowers it to undertake assigned work programmes on behalf of DARD. These programmes include statutory, analytical, surveillance and R&D activities.

AFBI also carries out scientific work on a commercial basis, currently securing in the region of £14 million per annum outside of DARD's Grant in Aid. This revenue makes a significant contribution to the institute's operating overheads, thereby reducing the overall cost of delivering essential services to the Department. It also assists in developing scientific skills and capacity within AFBI. This work also makes a very significant contribution to innovation in the local agri-food sector.

AFBI's core functions are to deliver a programme of statutory testing, surveillance, emergency response, research and development and scientific advice in relation to animal and plant disease, the environment, food safety, freshwater and marine fisheries and rural and agri-food economics. Aspects of this scientific programme enable DARD and Northern Ireland to comply with national and EU legislation. AFBI's local emergency response capability provides critical scientific support to the DARD Minister, DARD and other government departments and agencies in the event of animal or plant health, environment or food safety incidents. Recent examples include the dioxin feed contamination incident in late 2008/09, and UK foot-and-mouth disease outbreaks in 2001 and 2007. AFBI continuously carries out surveillance for major animal diseases in animals submitted to its animal disease diagnostic service. This work utilises cutting edge skills and technologies developed through AFBI's portfolio of research projects. Such scientific support is essential to government in assessing and managing risk and underpinning the international confidence in Northern Ireland food products that is required to keep vital export markets open.

Section 2 Questions to Consider

1. **What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**

A significant proportion of AFBI's work is focused on research and development.

AFBI is aware of the local, national and international funding programmes that are available to support both early stage research and more market focused research and development. AFBI utilises most of these programmes either directly or in collaboration with the private sector. In addition to significant private sector support for research, AFBI has worked with public bodies such as DEFRA, the Food Standards Agency and the EU FP7 and INTERREG programmes, as well as local councils in Northern Ireland and the Republic.

For research and development carried out in collaboration with industry, Invest NI programmes are perhaps most widely used. Intertrade Ireland programmes are used to a lesser degree by AFBI but still offer important cross border support for research and development. National schemes led by the Technology Strategy Board appear to be less well subscribed to by local companies as are EU programmes under FP7. In regard to the latter it would appear that the burden of administration limits the engagement from the private sector.

DARD's Research Challenge Fund is an important source of funding for research and development in the agri-food and rural sectors in Northern Ireland.

As well as engaging in research and development in collaboration with the local private sector, AFBI engages in directly funded research. This research is important in generating novel early stage knowledge that can lead to new Intellectual Property. This early stage research base provides an important pipeline that feeds innovation in the local private sector. Funding from the EU FP7 programme, INTERREG and Wellcome Trust have proven valuable for funding early stage research.

2. **How appropriate are the available opportunities for developing the Northern Ireland economy?**

Opportunities for supporting research and development are largely appropriate. In particular, Invest NI's Proof of Concept programme has provided an important bridge between research outputs and commercialising that research through innovative processes and products.

Competence Centres also provide an important vehicle for engaging the private sector in research and development. The centres being proposed provide local companies with an opportunity to steer and direct programmes of research in the local research base. These centres will also provide an important forum for coordinating strategic research in focus areas, enabling the private sector to interact with the research base in both AFBI and the local universities through a single 'virtual' organisation.

3. **What support is available to assist organisations to access opportunities for research and development?**

Invest NI have a team that assists with identifying and drawing down EU funding. Innovation advisors also assist in building research projects with local companies. Both teams have proven that they add value in terms of engaging local companies in R&D and drawing down EU funding.

Like other research providers, AFBI plays an important role in advising companies of the know-how, expertise and intellectual property that exists within the public sector research base. AFBI will also sign-post companies to support available for assisting research and development.

4. How beneficial is the available support in assisting organisations?

Support referred to at point 3 is invaluable. The Invest NI EU support team have been very supportive. It should however be noted that the team work with limited resources when compared with other regions and similar bodies. Enterprise Ireland for example, support a number of substantial programmes aimed at increasing the proportion of funding drawn down from Europe. Other regions also provide substantial programmes to support research providers and companies in drawing down EU funds.

Consideration should be given to raising the level of investment into this area, including awareness raising, training, mentoring and funds to assist with project consortia building and bid writing.

Consideration should also be given to evaluating the potential for innovation and economic development from the non-university public sector research base in Northern Ireland. The research and knowledge base within the sector is substantial. Consideration should be given as to how best to ensure that these assets are maximised for the benefit of the local economy. Unlike the university sector, with the exception of Invest NI's Proof of Concept programme, the non-university public sector research base in Northern Ireland does not enjoy direct support for promoting and engaging in collaborative research and the commercialisation of its knowledge base. This is discussed at point 6 below.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

The most significant barrier to non-university public sector research organisations is finding match funding for shortfalls not covered by grants for research and development. As noted above, non-university public sector research establishments locally do not enjoy the same support for commercialising their research base as local universities and colleges.

The status of AFBI, not being classified as a Higher Education Institution, also means that it cannot access funding support from UK Research Councils such as BBSRC, NERC despite undertaking scientific research of a quality and importance to attract such funding.

More could be done to support public sector research establishments to increase awareness of resources, facilities and services available to the private sector and the benefits associated with exploitation of IP.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

In addition to the points noted above, the research and knowledge capabilities available to the private sector in Northern Ireland could be better promoted by universities and public sector research establishments working together to jointly promote through single points of contact. At present, a company considering research in any one area would have to approach universities and public sector research organisations individually and on their own initiative. Similarly, there is overlap between departmental responsibility in areas such as food, climate change and energy. Joint working between departments to develop strategies for these and other key sectors would be beneficial.

The Higher Education Innovation Fund (HEIF) is a joint initiative between DEL and Invest NI that aims to improve Northern Ireland innovation performance as a key element in raising productivity and delivering economic growth. Approximately £3 million is available from Invest NI and DEL. DEL, DETI and Invest NI have worked together to make HEIF a permanent stream of core knowledge transfer funding. This programme, the first of its kind in the UK, was designed to enable the two universities and six regional colleges to meet the knowledge transfer needs of business and the wider community in a coordinated, holistic fashion. The non-university public sector research base locally is substantial; this area is not supported by HEIF funding.

PSRE4 funding, (Public Sector Research Establishment funding round 4), administered by the Department of Business Innovation and Skills (DBIS), has proven to provide significant economic impact by supporting the commercialisation of the public sector research base. The annual PSRE survey published by DBIS, demonstrates the economic benefits that are achieved from supporting commercialisation within the public sector research base. This funding, unlike HEIF funding, is provided as a once only support. Consideration should be given to providing core support, similar to HEIF, to ensure that the knowledge base in the non-university public sector research establishments is fully commercialised for the benefit of the local economy.

Support is available from various sources for individual organisations. However in a region the size of Northern Ireland there is considerable competition for resources. A co-ordinated Government approach and assistance to maximise R&D outputs by working on collaborative projects could be encouraged.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

Research organisations should be encouraged to pool resources for promoting R&D and commercialising outputs. A single point of contact should be considered for promoting R&D in NI.

Industry directed research as in QUESTOR and the proposed competence centres are to be welcomed.

Please also note points above and below in regard to supporting public sector research establishments commercialising their research and engaging with the local private sector.

8. How can business and academia work to support research and development opportunities?

The development of Competence Centres offer good opportunities for local industry and scientists to work together on strategic issues. These centres should be supported in the medium to longer term and it should be recognised that the research providers have a significant role to play in managing the industry/research base relationships.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response From Almac Diagnostics Ltd

Northern Ireland Assembly Committee for Enterprise trade and Investment Inquiry in to Developing the Northern Ireland Economy through Innovation, Research and Development.

Organisation details:

Almac Diagnostics Ltd,
Business unit of Almac Group
19 Seagoe Industrial Estate
CRAIGAVON
Co. Armagh
BT63 5QD
Northern Ireland

Tel: +44 (0) 28 38337575

Almac Group is an Industrial organisation supporting the Pharmaceutical Industry in services extending from research through pharmaceutical and clinical development to commercialization of product. Almac Diagnostics discovers, develops and delivers biomarkers and clinical tests for clients as well as having an internal biomarker research and development pipeline.

What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in R&D?

As Product Development Team Manager, one of my key roles is to identify projects suitable to populate our internal research and development pipeline. This pipeline covers the discovery of novel biomarkers in oncology that are then developed into clinical tests. These include the stage II colon cancer prognostic biomarker, ColDx test that was recently licensed to a US Diagnostic company. We have other biomarkers in the pipeline in breast and ovarian cancer. Some of this work has been funded by the European Regional Development Fund (ERDF) through INI.

We are currently actively participating in additional public funding initiatives including several EU FP7 initiatives, including FP7-IAPP, and the UK Technology Strategies Board (TSB) Stratified Medicines Initiative. We participate as collaborators or service providers on these programs. In addition, we have previously participated in an InterTrade Ireland funded initiative.

Almac funds a research group at Queens University for early stage research, with a view to in-licensing proof of concept novel products to expand the Almac biomarker pipeline.

How appropriate are the available opportunities for developing in the Northern Ireland economy?

Many of the investment opportunities give reduced levels of investment to industrial organisations, particularly large organisations, e.g. 20% of costs. This represents a major limitation. The low level of assistance is not sufficient to offset the risk involved and as a consequence, higher risk/higher return projects are de-prioritised.

In addition, it is often the case that projects further advanced on the R&D pipeline are given a smaller percentage of costs compared to those at the early stages of research. In our industry, the later stages of R&D can be quite expensive as they may involve work packages such as running clinical trials or other expensive programs.

What support is available to assist organisations to access opportunities for R&D and how beneficial is the available support?

Certain staff at INI and InterTrade Ireland are tasked with supporting organisations to apply for funding. Typical support includes information on funding opportunities that may be suitable, running networking and information events as well as offering support on networking with other organisations throughout Europe.

INI is aiming to adopt some of the more comprehensive support mechanisms in place with Enterprise Ireland in supporting NI organisations to apply for R&D funding in Europe. This will be of benefit to all NI Organisations.

In addition the Framework Focus group discussion in June and Sep were very useful and the points raised were disseminated to the appropriate government bodies.

What are the main barriers faced by organisations in accessing opportunities to be involved in R&D?

Dearth of opportunities for industry led initiatives compared to the number of academic led opportunities.

The low level of funding available to industrial organisations that only covers a small proportion of costs.

The turn around times from funding application to commencing work on any program is a severe limitation, as this can take up to 2 years.

Selection of suitable collaborators can be a limitation for a variety of reasons, including strategic alignment and focus, location, experience, lack of suitable networking opportunities to identify potential partners. Maintaining timelines can be a problem with some academic groups. SMEs are also suitable partners but some may be limited in their ability to participate due to the low level of financial support, or conflict of interest around IP.

What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities to become involved in R&D?

Provide business led initiatives to facilitate industrial organisations opportunities to lead more programs. Industrial organisations are more focused on the delivery of the goals in a timely manner. This will ensure commercial return, and consequently improve the economy.

Northern Ireland should have its own National Contact Point (NCP) for accessing EU FP7/Horizon 2020 funding. The UK NCP is based in England, therefore having a local NCP in Northern Ireland would be very beneficial in supporting access to European funding opportunities.

Information and support on NI, UK, cross border and international funding opportunities, particularly from the US. Organisations in Northern Ireland and through out Europe are eligible for certain funding opportunities available from the US, e.g. from NIH and NCI, however there is currently no one in Northern Ireland or the Republic of Ireland (that I have been able to identify) that can support this. Further support in this area could bring significant investment into Northern Ireland.

Enhanced all-Ireland support for European funding would be beneficial. NI and the Republic of Ireland are considered separate states from a European funding perspective and this could be leveraged more effectively at a European level.

Top up financial support on funding obtained from European funding: eg. top up award from the government for a successful funding application that obtained a low level of funding. Alternatively, if an application is not successful, due to a limitation on numbers of projects funded rather than on the quality of the application, maybe some form of funding might be available from the government to cover at least part of the application such that the

program can advance and be in a stronger position to apply for additional external funding in subsequent years.

Financial, project management and/or administrative support for the compilation of applications as well as the negotiation of successful applications would be of great assistance. Experience of completing successful applications is invaluable in compiling future successful applications.

What additional or alternative policies or actions could be considered to assist organisations to become involved in R&D?

In addition to some of the relevant suggestions above, proactive promotion of funding opportunities to all types of organisations from academic to SME and large industry would be highly beneficial. This includes dissemination of information from government officials involved in discussions in the EU regarding R&D funding as well as awarding opportunities to organisations to contribute to suggestions for future topics of funding being considered by such funding organisations.

An official group established and tasked with supporting all types of organisations in the various ways mentioned above would benefit the whole of the Northern Ireland economy. This group could be government or academic based and would participate in information dissemination as well as training of individuals on the completion of applications for the variety of R&D funding opportunities that are available internationally as well as locally.

How can business and academia work to support R&D opportunities?

It may be that business and academic organisations need to work with and support the official R&D funding information organisation with regards to passing on their experience or supporting in other ways mentioned above.

All organisations, government, academic and industrial, should lobby for a more time and labour saving application processes.

Response From Asidua Ltd

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Asidua Ltd	028 9072 5000			
Organisation Address	Organisation Type (Include one or more X)			
10 Weavers Court Belfast BT12 5GH	Business	<input checked="" type="checkbox"/>	University	<input type="checkbox"/>
	Business Support	<input type="checkbox"/>	FE College	<input type="checkbox"/>
	Government	<input type="checkbox"/>	Research	<input type="checkbox"/>
	Other (Please Specify)			

Please provide some background information on the organisation

Asidua is a Services - led IT organisation
 The company was founded in 2002. There are 3
 offices - Belfast, Birmingham + Dublin. Belfast remains
 the HQ and financial centre for Asidua.

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

From Invest NI - Compete Support Programme
 Intertrade Ireland - Inova etc
 EU - Framework 7. etc. Support.

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

Invest NI's Compete programme is superb.
Intertrade offers grants for collaborative projects,
but does not do much to stimulate the networks
that could identify collaborative partners.
FP7 looks to be mind boggling.

3. What support is available to assist organisations to access opportunities for research and development?

Invest NI Client Executive Support has
been excellent.
We are looking at Intertrade 'Innova' programme
now, support from Intertrade has been
good.
Don't know about support in FP7.

4. How beneficial is the available support in assisting organisations?

From INI and Intertrade - excellent
and high value.
N/A on FP7.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

For SME's, the 'hurdles' to be
jumped through to be able to be awarded
support funding is a barrier.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Locally: INI need to be more focussed on promoting R+D in local companies.
 R+D is vital, and support and encouragement for any 'innovating' companies is required.
 Cross-border: Help identify 'clusters' of companies that could collaborate.
 UK: UK should be seen as NI companies' No. 1 target market geography. ~~INI~~ Need to stimulate NI ↔ GB business more.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

Better tax breaks for related to spend on R+D.

8. How can business and academia work to support research and development opportunities?

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Government departments need to understand that R+D is a 'risky business' and not always successful on every ~~one~~ R+D project.

However the 'spirit of R+D' can be built in
an organisation even if individual projects
are not a market success.

If the mindset is 'keep trying' then success
will come in the end.

Steve Franklin
CEO
Asilua.

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Automated Intelligence Limited

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 – Organisation Details

Organisation Name:	Automated Intelligence Limited
Organisation Address:	3rd Floor, Wellington Buildings, 2-4 Wellington Street, Belfast, BT1 6HT
Telephone Number:	02890996118
Organisation type:	Business
Organisation Background:	Automated Intelligence Ltd was established in May 2010 by Mark Godfrey and Simon Cole and develops Enterprise Content Management Software. AI's solutions aim to assist an organisation by automatically identifying and analysing data for its 'usefulness' to the organisation and manage this content into the future. At the same time irrelevant data will be deleted from the source system.

Section 2 – Questions to Consider

1. **What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**
 - AI benefited from a £10k Proof of Concept grant from NISPO in 2010. This aided the early stage research work for developing new software products.
 - INI provide R&D support that AI has benefited from over the last 18 months. This allowed 35% of the costs of a defined R&D project to be reclaimed.
 - The HMRC NIC holiday aided AI as we were able to offset the Employer NIC payments for our newly recruited R&D team.
 - Although no support was received from Intertradelreland, we are aware that there is R&D funding available through the Innova scheme.
2. **How appropriate are the available opportunities for developing the Northern Ireland economy?**
 - All opportunities provided were essential to our business in order to perform and complete the R&D project and enable our products to become commercially viable. Of those outlined above, the INI R&D support was the most beneficial as it supported the cost of internal salaries, an essential cost for any software development company.
3. **What support is available to assist organisations to access opportunities for research & development?**
 - A large amount of support was provided by our Client Executive and R&D Executive from INI. They guided us in the direction of the support available through INI and NISPO from an R&D perspective as well as support programmes for other areas of the business.

- 4. How beneficial is the available support in assisting organisations?**
 - The support provided by INI client executives is essential.
- 5. What are the main barriers faced by organisations in accessing opportunities to be involved in research & development?**
 - Access to funding – R&D activities require an up-front investment before they can commence. This can be difficult for companies especially those in a start-up phase.
 - Timescales – The process required to receive grant support can be administrative heavy and divert the company from its normal day to day operations.
 - Access to skilled personnel – recruiting people with appropriate skills can be difficult and costly (through use of recruitment agencies).
- 6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?**
 - Increase the level of financial support available to companies (50%+ support on R&D projects)
 - Continue to fund and support the good work that INI does.
 - Reduce the “red tape” around the provision of grant support and make it easier and less time consuming to access.
 - Support recruitment costs for to help attract personnel with the right skills from inside and outside Northern Ireland.
- 7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?**
 - A cultural change is required in Northern Ireland. People need to be driven to take risks and engage in R&D projects. The personal and wider benefit of R&D needs to be publicised and encourage in NI in order to create this cultural change.
- 8. How can business and academia work to support research and development opportunities?**
 - Get engaged in assisting with the cultural change and promoting the benefits of R&D.

Response from Belfast City Council

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Belfast City Council	004428 9032 0202			
Organisation Address	Organisation Type (Include one or more X)			
Cecil Ward Building 4-10 Linenhall Street Belfast BT 1 8BP	Business		University	
	Business Support		FE College	
	Government	X	Research	
	Other (Please Specify)			

Please provide some background information on the organisation

Belfast City Council is the largest local authority in Northern Ireland with 51 Councillors representing the nine electoral areas across the city. The Council provides public services and leadership for the city of Belfast.

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

A variety of opportunities exist for engagement in R&D:

Invest NI provide a wide range of support mechanisms to encourage local businesses and research institutes to engage in R&D. The main mechanism is the grant for R&D which incorporates three main funding types, namely proof of market, proof of concept and support for prototyping. Invest NI also administer schemes such as Innovation Vouchers and Knowledge Transfer Partnerships which enable local businesses to engage with academic and research institutes for the development of project ideas.

At a higher level, Invest NI have been involved in the implementation of large scale R&D programmes, specifically the development of the Peace II funded Research & Technological Development Centres of Excellence within larger businesses and universities in Northern Ireland and the subsequent competence Centres Programme aimed at the development of strategically significant R&D infrastructure.

Local Authorities have implemented a number of schemes under the various European Structural Funds aimed at providing early stage R&D support to micro-businesses. This type of support is principally aimed at encouraging businesses to engage in R&D for the first time and provides direct mentoring support for the participant businesses.

Examples of this include:

- Lisburn City Council's Innovation Networks Programme
- Craigavon Borough Council's You Can Develop It Programme
- Belfast City Council's Stepping Stones Programme

Finally there are a range of European wide projects that are available for local businesses including the 7th Framework Programme and the Competitiveness & Innovation Programme.

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

We feel that the bulk of opportunities and attention are focused on larger businesses and inward investors and this is to the detriment of the majority of businesses in Northern Ireland. The figures appear to support this with 10 companies accounting for almost 60% of all Business Expenditure on R&D locally, a figure which is increasing year on year. Also almost 70% of R&D expenditure is accounted for by externally owned businesses. The 7th Framework Programme (FP7) is a striking example of this. NI underperforms considerably in relation to drawdown under FP7 however, the complexity and difficulties inherent in accessing this programme have created considerable barriers for NI based SMEs to access it. In the Republic of Ireland, a substantial support structure exists in order to facilitate business access to FP7 with support for bid writing and partner sourcing for example. Little similar support exists in Northern Ireland and an 80% unsuccessful rate of applications has resulted.

We also feel that unnecessary restrictions on some of the Programmes also have a negative impact on the uptake of these opportunities – i.e. one of the eligibility criteria for Innovation Vouchers is that businesses should hold a current, valid Company Registration Number. The inter-departmental business register identifies in excess of 70,000 enterprises in Northern Ireland, just over half of which are live companies registered. No clear rationale behind implementing this restriction appears to exist.

There is a perception that the existing support comes with a heavy price tag both in terms of the potential risk to the applicant businesses but also in terms of the bureaucratic structures they need to navigate in order to avail of the support.

Finally, we feel that a disproportionate amount of funding for R&D in Northern Ireland is allocated to universities with little success achieved in transferring the results of R&D undertaken into the business sector.

3. What support is available to assist organisations to access opportunities for research and development?

Support is available across a number of levels including at individual Local Authority level, region wide, cross border and European:

Some Local Authorities have introduced smaller scale schemes to introduce their business clients, predominantly micro-businesses, to the ideas and concepts around R&D and innovation. These projects have been framed with the aim of establishing sustainable relationships between the local research communities within Universities and Colleges and the business base.

The establishment of a team of innovation advisers within Invest NI is a welcome development and can assist to demystify the process of engagement with R&D, particularly for first time participants. Obviously this is a finite resource and if NI is to significantly increase the levels of take up of R&D and the subsequent levels of expenditure on R&D, some consideration should be given to enhancing the availability of innovation advisers.

InterTradeIreland have introduced a number of initiatives aimed at stimulating cross border knowledge transfer and R&D including Fusion, Innova and the All Island Innovation Programme comprising of a series of workshops, seminars and masterclasses.

Invest NI have also established an R&D liaison executive based in Brussels to enable local businesses to take advantage of opportunities through European funding for R&D.

The availability of tax incentives for R&D such as R&D tax credits is another important support mechanism available to businesses to support the undertaking of R&D.

4. How beneficial is the available support in assisting organisations?

We feel that the support for accessing R&D opportunities is largely skewed in favour of larger businesses and the research community, particularly within Northern Ireland's universities and further education colleges. Larger organisations, by their nature, are more likely to be able to plan more strategically, with smaller businesses more constrained by the availability of resources and the need to plan on a shorter term basis with an impetus on shorter payback periods, which is not always appropriate for R&D investments.

Belfast City Council's recent 3rd annual survey of Belfast businesses has indicated that those businesses with less than 10 employees are more likely than their larger counterparts to require support for innovation, product development and research & development. We feel this is a reflection of the previous responses that indicate that larger businesses are more likely to engage in R&D due to the more ready availability of resources, both financial and human.

While the UK R&D tax credit is recognised as internationally competitive, in terms of its attractiveness to potential new investors, there is conflicting evidence on the success of tax incentives for R&D, particularly with regard to SMEs. The current structure is confusing, although the 2011 Budget has announced steps to address this confusion, with UK investment in R&D continuously declining as a proportion of GDP since the introduction of the R&D tax credit scheme. This is in sharp contrast to the experiences of countries such as the US, Germany, France and Japan where the introduction of increased fiscal incentives has led to increases in the investment in R&D as a proportion of GDP.

As mentioned above, we feel that the introduction of innovation advisers within Invest NI has been a particularly welcome development but that this mechanism could be enhanced in order to improve its impact.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

Barriers faced by organisations, predominantly SMES include:

- Perception of R&D as a large business activity;
- Over complication of the support mechanisms and associated literature;
- Lack of awareness of existing opportunities;
- Excessive bureaucratic process; and
- Availability of resources both financial and human for project development and subsequent implementation

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

New support mechanisms should be aimed predominantly at ensuring that micro and small businesses have the capacity and capability to engage in the R&D process.

From our research, we have identified the need for flexibility in funding and direct financial support as being key to enhanced expenditure on R&D and innovation. The current structures are over complicated and excessively bureaucratic and lead times for applications can mean that critical competitive advantages are lost. We believe that simplification of the existing support structures, particularly the tax incentives, could lead to enhanced investment in R&D.

We believe that there is significant potential to learn from best practice in other regions, notably the Republic of Ireland, and their approach to encouraging investment in R&D and innovation. The establishment of a new National Support Network for R&D in the Republic of Ireland has been welcomed as an extremely beneficial development with Enterprise Ireland having the capacity and capability of providing financial assistance to support co-ordination, travel and proposal preparation under FP7 .

The identification and promotion of R&D role models, mentors and advisers, particularly within the SME sector, could assist smaller businesses to address some of the psychological barriers to investment, particularly around the perception of R&D as a larger business activity.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

We believe that the improvement of business awareness of opportunities is crucial to improving the levels of involvement by businesses in R&D and Innovation. This could be achieved through a series of funding clinics, seminars and workshops and an enhanced engagement programme with businesses at all levels.

Promoting improved linkages between the research community in Universities and Colleges and the business community and promoting lower risk R&D can be a useful mechanism in facilitating early stage R&D, particularly for first time engagers.

We believe that due to the small business dominance of the local economy, new and revised support structures should be developed in consideration of their particular needs and requirements.

8. How can business and academia work to support research and development opportunities?

The establishment and creation of small business R&D role models and case studies can assist to address some of the existing perceptions that R&D is the preserve of large businesses. We feel that larger businesses can play a significant role in the promotion of R&D, particularly within their supply chains through the promotion of supply chain innovation incentives and initiatives.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

We believe that there is a real opportunity to look at best practice in R&D and Innovation support, particularly the Republic of Ireland model of support with the involvement of Enterprise Ireland and all Regional colleges.

We also believe that there is an opportunity to take advantage of the establishment of new posts in the NI Executive office in Brussels in order to promote access to opportunities at a European level for local small businesses.

Finally, we feel that it will be important for the Northern Ireland Assembly, informed by business support practitioners, to play a role in shaping the new R&D support mechanisms emerging from Europe under the structural funds programme 2014-2020 and to ensure that support is tailored to the specific requirements of the business landscape in Northern Ireland and its predominantly small business composition.

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Belfast Metropolitan College

1 Background and Summary

Belfast Metropolitan College (Belfast Met) is the largest provider of further and higher education in Northern Ireland and one of the largest in the UK. Its significance in the life of the city is enormous as it touches the lives of so many assisting them to enhance their skills and in doing so increasing their chances of employment or helping them to improve their chances of promotion and career development in their workplace.

With approximately 48,000 enrolments, an annual turnover of £56 million in 2009/10 and being located in the capital city of Northern Ireland, it is envisaged that regional recovery and growth will focus significantly on this economic centre of activity. The College size, its location in the capital city and its existing influence and reputation enable it to be a major influence in the wider environment. Belfast Metropolitan College welcomes the opportunity to respond to the Northern Ireland Assembly Committee for Enterprise, Trade and Investment Inquiry into Research and Development. The College has primarily based its response on its work in the field of knowledge transfer and innovation. The Further Education Means Business policy has also focused the College on the development of its Knowledge Transfer Programme. With funding awarded for 22 KTPs to date, Belfast Met continues to lead the FE sector for KTP in Northern Ireland and is now ranked first place within the FE sector nationally.

A central priority for Belfast Met is to support the delivery of the Department for Employment and Learning's (DEL) FE Means Business Strategy. Over recent years Belfast Met has played an increasingly important role in supporting economic development both in terms of providing quality provision for learners in priority skill areas as well as engaging directly with employers to address their business needs. The College directly meets the needs of local and international companies and plays a key role in supporting inward investment. It provides a full suite of business support services and is one of the largest providers of professional and technical training.

We are constantly reviewing our sites of learning and to support this, significant improvements are being made to the College Estate with the addition of two major capital builds. The recently opened new state-of-the-art campus-style building in Titanic Quarter has replaced the outdated teaching accommodation in both Brunswick Street and College Square East. Our TQ Campus provides specialised hospitality, catering, science, financial services hairdressing and beauty therapy facilities, as well as a multi-function management training suite. Situated at the heart of the new Belfast economy, this campus provides significant opportunities for industry engagement. With the support of DEL and the International Fund for Ireland, the College is investing in a dedicated and innovative economic development building on the Springfield Road. This facility will support the College to promote and drive Employability, Enterprise and Economic Development in the Belfast region. The building will provide specialist facilities to support industry sectors including creative multi-media, hospitality and catering, IT, manufacturing engineering/product design and renewable energies.

The College recognises that there have been significant changes in the overall context of Further Education (FE) and the skills, both in Northern Ireland and the UK. These developments have reinforced the need for a demand led approach to FE and have provided an impetus for colleges to deliver excellence in response to industry needs. The College will continue its focus of delivering quality education, training and employability services to learners and businesses in the Greater Belfast region and Northern Ireland. Going forward our aim is to develop innovative education and training solutions to meet the needs of our customers, people and communities through fostering outstanding stakeholder and client relationships.

2 Consultation Questions

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Belfast Metropolitan College	028 9026 5454			
Organisation Address	Organisation Type (Include one or more X)			
Centre for Corporate Communications and Marketing The Gerald Moag Campus B1-L2-R12A 125-153 Millfield BELFAST BT1 1HS	Business		University	
	Business Support		FE College	X
	Government		Research	
	Other (Please Specify)			

Please provide some background information on the organisation

Outlined in Section 1.

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

Belfast Metropolitan College (Belfast Met) is aware of the following opportunities to become available in research and development:

- Innovation Vouchers
- KTP & Fusion Projects
- FP7 Projects
- European Programmes
- National TSB Projects – DALLAS etc.
- Interreg
- Connected Fund

Further Education Colleges (FECs) do not have the same research opportunities, and therefore income generating opportunities as the Higher Education Institutes and therefore must seek to develop alternative revenue streams through their expertise in Higher Education eg KTPs and increased penetration of the international market.

The Further Education Means Business policy has also focused the College on the development of its Knowledge Transfer Programme. With funding awarded for 22 KTPs to date, Belfast Met continues to lead the FE sector for KTP in Northern Ireland and is now ranked first place within the FE sector nationally. During recent years, the College implemented partnerships with companies operating in the electronic, health, hospitality, ICT, construction, electrical and hydraulics, automotive and web development sectors. The

College assisted these companies to innovate and achieve strategic growth in both profits and market share through the excellent expertise and knowledge transferred through its academics.

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

The above initiatives provide a range of opportunities.

KTP is not typical of most research initiatives however Belfast Metropolitan College KTP projects have created significant innovations within local businesses. Such has been the success of these projects that businesses usually request second and third KTP projects. It is important to note that recent changes to KTP criteria have made it more difficult for FE KTP partnerships to achieve funding.

Innovation vouchers initiate engagement between Belfast Met and local businesses as this relates to short periods of research activity and usually lead to further development of the College and business relationships.

Whilst it is recognised that FP7, for example, is a viable opportunity for supporting research, it is imperative that local government supports the development of FE sector involvement in this arena (E.g. Information events, application training events, visits and submission development etc.)

Belfast Met will host an FP7 event in February/March 2012. Discussions with INI are ongoing as the event will target other FE sector providers and local businesses. Due to the success of the College's KTP research activities, we have been proactive in identifying FP7 opportunities during 2011. Strong links have been established with VTT in Finland and the College has also attended Intertrade Ireland and INI FP7 training events.

Belfast Met believes therefore that the role of FE colleges should have a greater prominence in the HE strategy. For example, there is a need to continue to fund applied research in FE colleges. Great strides have been made in recent years with the introduction of the Connected Fund, and the Innovation Fund and this has led to industry-focussed applied research in areas such as Renewables, Composites and Bio- business. This applied research has a direct, immediate and measurable impact on companies, including SMEs.

To support this area of work the College also recently launched three new exciting Foundation Degrees in Building Services and Renewable Energies, in Mechanical Engineering and also Product Development.

3. What support is available to assist organisations to access opportunities for research and development?

Support is available from:

- INI
- DEL
- Intertrade Ireland
- European Unit at BCC
- TSB
- Helix Innovations
- European Connected Health Forum
- European Unit/Brussels

Belfast Metropolitan College believes therefore that there is a need to continue to fund applied research in FE colleges. Great strides have been made in recent years with the

introduction of the Connected Fund, and the Innovation Fund and this has led to industry-focussed applied research in areas such as Renewables, Composites and Bio- business. This applied research has a direct, immediate and measurable impact on companies, including SMEs.

To support this area of work the College launched three new Foundation Degrees in Building Services and Renewable Energies, in Mechanical Engineering and also Product Development.

4. How beneficial is the available support in assisting organisations?

Innovation vouchers are a very credible first step into the research arena for businesses.

Products such as KTP are exceptional tools for enabling the FE sector to support local businesses however this initiative is led by TSB and therefore complies with national criteria. Whilst INI part funds local projects, these are assessed against national criteria. It is the view of BMC that if INI is in a position to focus on regional criteria by offering 100% support for selected KTP projects that this would greatly improve opportunities for local business research activity.

Businesses view innovation and research from their vantage points and a definition of research and innovation varies according to the nature and type of an organisation's needs. Thus the nature and content of Belfast Met KTP projects vary from those implemented by local universities. The College views its KTP projects as making a substantial contribution towards research, development and business growth for SMEs within Northern Ireland.

INI, DEL, BCC, Intertrade Ireland etc. offer a range of support for FE engagement with local businesses.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

- Lack of information
- Inability to identify opportunities without assistance from FE/HE etc.
- Difficulty in meeting funding criteria
- Comprehensive documentation
- Lengthy approval processes
- Difficulty in obtaining research funding if this is not for high profile/lengthy projects

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

- Implement promotional campaigns which highlight relevant research opportunities.
- Establish stakeholder forums which enable government to work closely with FE and HE sectors
- Simplify funding documentation
- Host and fund business clinics in partnership with local colleges. BMC is currently planning an 'Innovation Week'. This will include a series of events and clinics to increase local business awareness and access to innovation vouchers, KTP, FP7 and other project initiatives.
- Provide additional KTP funding which is set against regional criteria and support the types of projects emerging from the F.E. sector
- Implement a strategy, in partnership with FE, which targets specific sectors in relation to research opportunities of key significance to that sector.
- Support F.E. research opportunities as these relate to prototyping developments for SMEs

- Review current funding models and modify how funding is administered – E.g. Innovation vouchers are awarded in three £4k sums to a business however if a business could acquire £12k in one lump sum it would allow for greater depth of research study and more effective outcomes. If this model was then rolled out through a clustering approach within sectors E.g. 10 ICT companies wished to undertake concept testing that was of interest to the cluster and which did not decrease individual competitiveness – a £12k award per business would lead to research to the value of £120k . This could readily be undertaken by Belfast Met or other F.E colleges.
- Increase collaboration between universities and F.E. colleges through the Connected Fund

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

- Involve local colleges in policy developments from the outset
- Gain regular feedback on the changing needs of local businesses through FE/HE/ business consultative forums
- Review how research and innovation is defined and interpreted by local businesses
- Review terminology used in literature targeting local businesses in relation to research opportunities
- Regularly review funding criteria
- Make funding more accessible to small business owners
- Adopt a clustering approach to research within sectors

8. How can business and academia work to support research and development opportunities?

Whilst KTP is not viewed as a traditional research product, it has proved an excellent vehicle for research engagement between Belfast Met and local businesses. The expertise gained in this area has led to the College's current exploration of FP7 initiatives. BMC is proactively engaging with INI and Intertrade Ireland on development of its FP7 platform. The College is working with a leading European research centre and a local company on exploration of an FP7 proposal which focuses on assisted living technology. Belfast Met has also developed a number of strategic partnerships with organisations representing all business sectors within Northern Ireland with the objective of exploring research opportunities with these sectors. Thus this model is working for the college.

Establishing networks for sharing information and developing ideas is crucial to supporting research and development. Belfast Met's KTP Centre recently established 'Club Met' knowledge network. This network facilitates business to business engagement and access to a range of resources at the College which provide research and development support.

Club Met has been useful in promoting and identifying opportunities for innovation vouchers, KTP and FP7 activities and also promotes activities such as student based projects to support research at the College's e3 economic development building, which will open in February 2012. The e3 building houses leading edge technologies which will be utilised by local businesses. Further funding support for e3 will do much to enhance research and development activities between academia and business.

In addition, Belfast Met is engaging with cross border Institutes of Technology to ascertain the factors affecting their success within the FP7 arena. It is envisaged that this will lead to more effective engagement for the college with ROI partners within FP7 developments.

Development of appropriate events facilitates support for local businesses such as Belfast Met's 'Innovation Week'. This will provide business clinics which will explore local company needs and research routes for meeting these. It is envisaged that innovation vouchers, KTP and FP7 opportunities will emerge.

Utilisation of experience and sharing that with other organisations is also an essential ingredient of effective collaboration between academia and business. Thus, BMC provides consultancy training for other colleges in the area of KTP given that the college is ranked number one in this area within the UK FE sector.

Belfast Metropolitan College also welcomes the development of industry-led Innovation Clusters. The enhanced focus on collaborative networks in the form of industry led Innovation Communities, represents an important shift in our economic thinking. It requires that we move towards an approach which routinely encourages our companies, universities, FE colleges and other institutions working together in more sustained and lasting partnership arrangements.

In relation to the STEM strategy, Belfast Metropolitan College welcomed the development of industry led Innovation Clusters (IICs). The College has been very proactive in the development of clusters such as Engineering Skills for Industry, Skillset Media Academy, Composites and more recently Bio-Science. The College welcomes the collaborative opportunities and the enhanced role of Further Education Colleges in working with industry led communities and Higher Education Institutes in supporting high technology businesses and would welcome more support for this type of collaboration work.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

The College supports the Committee's priority that Northern Ireland maximises its potential to access all available opportunities for R&D support for business. The College welcomes the Committee's focus on examining how the Northern Ireland economy can be developed by improving our performance in relation to innovation, research and development.

Belfast Metropolitan College is grateful for the opportunity to participate in this consultation and would welcome the opportunity to input into any further consultation or actions resulting from this inquiry.

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

3 Contact Details

Darrelle McSherry
Senior Marketing Officer
Centre for Corporate Communications and Marketing
Belfast Metropolitan College
The Gerald Moag Campus
125-153 Millfield
BELFAST BT1 1HS

Tel: 028 9026 5454 · Email: dmcsherry@belfastmet.ac.uk

15th March 2012

Belfast Metropolitan College – Knowledge Transfer Partnership (KTP) Services

What factors influence this success story?

Belfast Metropolitan College (Belfast Met) is the largest provider of further and higher education in Northern Ireland and the fourth largest in the UK. Its offer to business and industry is designed to support the delivery of the draft Economic Development Strategy and ultimately Programme for Government. The College exists to guarantee “outstanding learning for successful futures”. This embraces outstanding provision of knowledge transfer to businesses operating across a wide range of industry sectors in Northern Ireland and beyond.

Campuses include key locations in the Belfast and Greater Belfast area at Titanic Quarter, Millfield, Springvale, Castlereagh and Whiterock. Local businesses view services provided at these locations as a hub for learning, innovation, creativity and business support.

Belfast Met's new e3 campus which will open in April 2012 is an outstanding and dynamic response to local business needs and the organisation's objective of delivering ‘state of the art’ support services to business and industry. The campus will house specialist zones dedicated to digital media, manufacturing technology, teaching and learning, catering, business incubation, SME training and renewable technologies.

A wide range of development initiatives to support local businesses have been implemented very successfully by the College over decades of ‘service to business and industry’. Belfast Met prides itself on an approach of piloting new service ideas and using its creativity and innovation skills to support entrepreneurial activity in local businesses. An example of this outstanding service to business and industry is Belfast Met's impact on Knowledge Transfer Partnerships (KTP) in Northern Ireland.

KTP is one of the UK's leading programmes, helping businesses to improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK knowledge base. In Northern Ireland, KTP is funded by the Technology Strategy Board (TSB), Invest Northern Ireland (INI) and other sponsors.

The ‘One Stop Shop’ KTP Service at Belfast Met

The KTP journey for Belfast Met involves forming a strategic partnership with a business that facilitates transfer of knowledge critical to the success of that business. The college has responded to the challenge and opportunities presented by KTP with a passion for excellence and a key objective of delivering a high level of quality through its service provision. There is consistent focus throughout the process to ensuring enhanced commercial outcomes for KTP business partners. The result has been outstanding achievements relating to improved competence, capability, competitiveness and profitability of these large businesses and SMEs. Such levels of success for these businesses could not have been realised without the knowledge and expertise transferred through KTP from the college.

During 2011, as a result of the number of KTP projects implemented by Belfast Met, the college achieved lead provider status within the F.E. sector both in N.I. and wider UK. Its dedication to developing partnerships which lead to successful commercial outcomes for N.I. businesses has earned it an excellent reputation for providing a structured, dynamic approach to the true meaning of ‘partnership in action’.

Demand for its ‘One Stop Shop’ service to business through KTP has grown substantially over the last two years and just as recently as January 2012, Belfast Met became the only F.E. College in N.I. to have representation on the National KTP Forum. Indeed Belfast Met is the only College to represent the F.E perspective of UK colleges on the National Forum.

This opportunity is one that Belfast Met does not treat lightly nor takes for granted in its goal of supporting and boosting business and the economy in N.I. through effective strategic partnership.

Belfast Met's dedication to building a strong team of specialist KTP mentors within faculties across the college has secured the future for KTP between the college and local business. Lecturing staff involved in HTP mentoring have been selected not just for the comprehensive knowledge of their areas of specialism but for the relevant, recent industry experience they will share with local businesses.

The benefits for KTP Business Partners

The benefits of a KTP with Belfast Met are not short lived. Knowledge transferred through this service ensures that business capability vastly increases over the 18 month or two year period of the programme.

The essence of a KTP with Belfast Met is encapsulated in the enlightened observation of Lao Tzu who states

'Give a man a fish and you feed him for a day. Teach him how to fish and you feed him for a lifetime'

Thus the college strives at all times throughout each element of its KTP services to ensure that knowledge and expertise transferred to the business is embedded in the operational and strategic processes and systems of that business. Ultimately, the objective is to ensure that this knowledge capability is adopted and put into practice by the KTP business partner. It would therefore be pertinent at this juncture to elaborate on what a KTP with Belfast Met means in practice.

Belfast Met has implemented several successful KTP programmes over recent years, ten of which were ongoing during 2011, Partnerships operated across Hospitality, Electrical, Electronics and Engineering, ICT, Online Media, Printing and Graphics, Automotive, Health, Textiles and Manufacturing, Commercial Property Sales, Construction, Food Production, Packaging and Creative Industry sectors.

The relationship that develops between Belfast Met and its business partner could be likened to a courtship, in that, significant time is spent in active listening to the business and getting to understand its goals, capability and potential long term future. In turn, the business learns about the extensive and often quite unique expertise, specialist knowledge and resources which can be provided by Belfast Met.

The college begins each partnership with comprehensive discussions with a business to facilitate identification of both problem areas impeding the strategic growth of the business or opportunities which could be seized to propel its development, competitiveness and profitability into other realms of success. The business then explores with Belfast Met, the range of knowledge and expertise available to it for a strategic area of its operations where it has limited capability, knowledge and experience to overcome problems or grasp opportunities.

The next stage of the process results in lecturers at the college, with specialist skills in the identified area that is critical to business success, producing a strategic plan to address this area whilst ensuring that a sound business case is in place.

Businesses working through KTP with the college have gained knowledge and expertise in areas such as Business Development, Business Improvement, Marketing, ICT/CRM, Mobile Technology, Software Development, New Product Development, Export Marketing and Lean Manufacturing. Assisting in the development of business infrastructures in the above areas has made outstanding impact on the ability of these businesses to compete in local, R.O.I., UK and global markets.

Common to all KTP programmes is funding to support costs for employing a graduate with relevant skills to implement the strategic plan emerging from the partnership. The college through development of a strategic work plan for the graduate produces a detailed map of how the business might get there over a two year period. The journey requires a compass and that is consistently provided by weekly mentoring from the Belfast Met mentoring team.

The graduate, who is based at the company, is visited for one afternoon each week and further supported through email and telephone. Each month the KTP team also meets with a key person at the company whom the graduate reports to and through this process further mentoring is undertaken by college specialists. In addition, a committee, represented by the college, company, graduate and funding provider meet every three months to review progress on implementation of the plan. This identifies variances and results in detailed analysis of where Belfast Met can further meet the business needs of its KTP partners.

Why and how this has made a difference to Asdon Ltd and the impact on competitiveness

A&S Donaldson, trading as Asdon, completes a two year KTP with Belfast Met in February 2012. The business operates in four main business categories. IT Services, Office Products, Copier Technology, Digital Dictation. Within its current portfolio the business has identified that Digital Dictation, CRM Software, Server Virtualisation, Business Continuity planning and Document Management are all areas key for Asdon's business growth.

Prior to KTP with Belfast Met, the business used various strategies for marketing and mostly applied very ad hoc in-house efforts. Through the KTP partnership Asdon began a process of embedding a Strategic Marketing Management infrastructure in its operations.

As a result of the KTP graduate's efforts and knowledge and expertise transferred from the college a process of cultural transformation affecting all employees at Asdon occurred. This process has now been embedded in the business and Asdon boasts of having developed a global strategy for each of its business units whilst continuing to penetrate and develop regional markets. The business is proactively targeting these markets.

Asdon has continued to evolve and succeed in gaining sustained incremental growth during a period of economic recession. Having created a strong foundation to market its services and develop its tendering capability through the partnership with Belfast Met, Asdon bravely invested in a guided process of market expansion. This resulted in the business winning tenders in target sectors such as public sector healthcare and appointments to 2 NHS frameworks for digital dictation and speech recognition in UK mainland.

The SME has also expanded its Digital Dictation and Speech Recognition service into the ROI market. In addition, through the partnership the business has undertaken R&D in the area of CRM and has worked on its partner certification and competencies. During this time strong links were also established with CRM development partners and Asdon has now successfully implemented its first CRM installation. With a continued focus on these technologies, the business is now better aligned and equipped to increase its presence in this space going forward.

Through the KTP, Asdon utilised all the resources available for the business and the KTP graduate. This SME ensured that an extensive programme was defined to allow the graduate to integrate with the business and get an understanding of the products and services and have full hands on experience with them. The resulting SWOT and environmental analysis was reviewed by the Belfast Met team to provide feedback on the continued direction the business could take.

SWOT analysis was also used to highlight deficiencies which were impacting on the business. Through the application of continued development and use of CRM and the expanding understanding of project management and process development areas of improvement were identified. From this platform, Asdon was then able to define its goals and required outcomes which helped form a series of training plans which were delivered in-house by the graduate.

The graduate's input is now crucial to the effective compilation of tenders and in consultation with management drives, the company's entire marketing activity. In addition, the sales team operates much more effectively as a result of Asdon's 'strategic fit' with its environment. The business is now much more competitive and has boldly explored new R.O.I. and UK markets.

Asdon supported the KTP graduate's achievement of a Prince II Project Management qualification, CIM, Digital Marketing Diploma delivered at Belfast Met and advanced tendering workshop training. The business believes that this investment in training has impacted very positively on the new brand profile and marketing collateral which emerged through the KTP with the college. This SME has also benefited from the partnership in relation to establishing a digital marketing strategy to include social media and emarketing.

Ronnie Hill, Director at Asdon, comments:

'Through the continued development and application of KTP we expect we will continue to focus on the strategic objectives outlined and by 2015 we expect to increase our turnover to £4.5M

The KTP programme provided us with a valuable resource to allow us to better understand an area within the business we needed to develop. Without the KTP programme it is unlikely that we would have reached this point as quickly. The knowledge and assistance transferred in addition to the funding provided was a key enabler for us.'

Asdon has now reached a level within its business which allows it to be confident of gaining Invest N.I. client status. Delighted by the outstanding success of this KTP with Belfast Met, Asdon now seeks to explore a second KTP with the college which will have a technical focus. Another key marker of the partnership's success was recognised in February 2012, when the graduate was offered and accepted, permanent and fulltime employment at Asdon.

Bite Snack Foods Ltd

Based in Enniskillen and established in 1998, Bite Snack Foods Ltd manufactures and distributes sandwiches, wraps, rolls and sandwich fillers to a wide range of customers. The company has a growing private label range, supplying to corporate businesses. In addition, the company offers a third party distribution service throughout Ireland, for ambient and chilled products.

The company entered into an excellent KTP with Belfast Met which made a significant impact on its commercial activities. A key achievement resulting from the partnership was cultural transformation for the company which incorporated an effective marketing orientation into its production and distribution processes.

As a direct result of the KTP project, the company acquired a better understanding of the market in which it operates. Through both primary and secondary research, the KTP project was able to define the market size, market drivers and market demographics. This led to forecasts of Bite Snack Foods Ltd's estimated share of the market through application of market penetration and product/market development strategies.

The KTP significantly improved the awareness of Bite Snack Foods Ltd and its associated brands, through a prominent media relations campaign and the development of numerous promotional materials. Bite Snack Foods Ltd was able to gain multiple new contracts, while securing major existing contracts for the foreseeable future, partially as the result of the partnership. Branding for all promotional materials was defined through implementation of the KTP project thus solidifying the company's corporate identity.

Bite Snack Foods Ltd achieved capacity to reach a large number of potential new customers thanks to a series of contacts made during the KTP project. The company expanded its customer base into the Republic of Ireland. During the latter stages of the KTP it embarked

upon new product development processes and invested in suitable facilities to support these activities.

Mo Team Ltd

Mo Team Ltd focuses primarily on industrial automation and machinery safety. It offers all types of project management and consultancy, including design, manufacture and installation of safety systems, automation equipment and control panels. The company specialises in turnkey solutions, providing design, manufacture and installation management solutions for challenging engineering projects, large and small. A CE Marking turnkey package is offered for international clients intending to use their equipment in Europe which includes design, installation, commissioning and integration to existing safety, control and mechanical systems. The company is one of few engineering companies in the UK to have all three of the ISO standards in the areas of quality, environmental management and health and safety.

As a result of the KTP with Belfast Met, Mo Team gained a vast array of new knowledge and skills. A marketing ethos and function which did not previously exist was firmly embedded within the company. The partnership resulted in a deeper understanding of the role of marketing and enhanced companywide commercial awareness and customer consciousness.

In assuring the continuance of marketing practice beyond the project, the Associate successfully embedded processes and systems for ongoing usage, particularly with regard to marketing and communications planning the effective use of databases, the creation of innovative approaches to public relations activity, and the evaluation of marketing effectiveness. Mo Team staff will continue to benefit from marketing protocols, templates and an enhanced customer database which allows the creation of an automated marketing service whereby any member of staff can comfortably carry out the design, communication and evaluation aspects of operational marketing activity.

The KTP has improved operations and competitive position in a number of key areas:

A significant increase in brand awareness and brand equity – Mo Team's brand proposition is now strategically communicated to defined target audiences, informed by newly developed and industry specific customer databases. Innovative communication channels have been introduced, which serve to differentiate the company from its competitors.

Improved internal capabilities - the Associate's design skill set enabled all corporate literature to be produced internally, and templates and capabilities established in relation to the ongoing production of promotional literature, with associated cost savings.

Research and development into the carbon composites industry resulted in a comprehensive business plan being developed in conjunction with the Chairman and Managing Director that has now created a consortium of companies coming together under the SPARC Composites brand umbrella. An application for government funding was also made and approved which will ensure the successful running of the company for the next 5 years.

The partnership played an important role in the company's entry into the Assisted Living Technology Market, effectively a new application for existing expertise. The Associate ensured that Mo Team was commissioned to write a report for a high profile case which should result in the company being included in the 'ALT Expert List' creating opportunities for future growth.

As a direct result of the KTP Mo Team is forecasted increased turnover in the years following project completion. This was primarily due to marketing initiatives by the Associate, including the preparation of a detailed Proposal for the creation of the next generation of Screening and Crushing Machines for a local manufacturing company.

Mount Charles Catering Ltd (MCC Ltd)

Mount Charles Catering Ltd is an independently owned contract catering company currently operating within Northern Ireland. It provides its services to organisations within both

the public and private sectors. It currently meets contracts for Education and Healthcare providers and a range of industry clients. The company also operates direct to the general public from a number of its own commercial catering outlets. The company has also established a vending division which supports many of the company's catering outlets but also provides a standalone service for a variety of public and private sector organisations.

The Knowledge Transfer Partnership with Belfast Met enabled the company to implement procedures and increase its product offering in order to tender for this lucrative business. Through the partnership the company developed an increased knowledge of other service opportunities and other markets. The partnership provided Mount Charles Catering Ltd with the knowledge, expertise and ability to identify growth opportunities and the required changes to the company's support services portfolio, processes and systems. In addition it facilitated determination of additional resource requirements affecting the company's human resource capacity, training provision, finances, sales & marketing division.

A key part of the company strategy was to develop the range of services it provides and through this achieve company growth. KTP has contributed greatly to the set up of systems and procedures which now enable us to provide cleaning services in a professional manner and to a quality standard. Achieving recognisable accreditations which allowed it to compete for business is also key to the company's strategic growth. The KTP project allowed MCC Ltd to successfully gain and implement ISO 14001 integrating it with ISO 9001 2000 to have a workable and measurable quality system.

The company now has

- knowledge to detail equipment requirements
- ability to accurately provide costings to support bids/tenders
- operational expertise to effectively deliver the services to the required standard
- knowledge of the legislative requirements to be met by undertaking to provide these services
- ISO 14001 Environmental Management Systems accreditation
- The ability to roll out the systems more efficiently throughout the business
- Managers with the skill and ability to carry out internal audit processes

Breezemount Electrical and Hydraulics Ltd

Breezemount Electrical and Hydraulic Ltd provide bespoke access control solutions to a wide variety of industrial and governmental sectors. This includes supply and installation of vehicular and pedestrian control products, such as, automated gates, traffic barriers, rising bollards, traffic light systems and manufacture of bespoke hydraulic power units.

There are two main aspects to the business operations of Breezemount, namely, Electrical and Hydraulic. The company operates within both public and private sector for e.g. education, prison and wider government agencies. It serves the needs of a range of organisations where controlled access is a requirement.

The marketing project enabled the company to find new customers which impacted dramatically on its bottom line enabling it to more than make up the shortfall caused by the recession. Most of Breezemount's export turnover was generated in the Republic of Ireland which has ceased due to ROI's economic problems. The company has now targeted the English market and is currently setting up an office in Poland. It is envisaged that if processes embedded during the KTP are maintained that the company will be competitively positioned to see substantial strategic growth in profits and market share.

The company has benefited from a much improved system of customer feedback which identified a need to improve the delivery and scope of its services. As a result of this new

knowledge of customers Breezemount has enhanced capabilities to meet their needs and identify opportunities for new services, products and selling opportunities. The project established the need for a much improved marketing database. This was implemented and in turn enabled the company to respond to requests both more professionally and more quickly. A system was put in place for managing customer enquiries for both technical advice and quotations.

The template for all promotional materials has been defined through the course of the KTP project, helping to solidify the company's corporate identity. The colour scheme, layout and slogan has all been defined, while a series of new logos have been created and stored within the company, as part of a 'streamlining' of the corporate business operations.

As a direct result of the KTP project, Breezemount Electric & Hydraulics Ltd. has acquired a better understanding of the market in which it operates. Through both primary and secondary research, the KTP project has been able to define the market size, market drivers, market demographics, make forecasts for the future of the market and estimate Breezemount's current and forecast share of the market. The company is now in the final stages of a second KTP with Belfast Met. This second project is assisting the company's merger of a new company which it recently acquired into its existing operations.

Biznet IIS Ltd

Biznet IIS Ltd provides web based management information systems; E-commerce solutions, secure hosting facilities and search engine optimisation services to all of its clients. In addition, Biznet IIS Ltd provides IT consultancy and web design services along with maintenance & support. Furthermore, the company has undertaken research and developed its one product suite which is strategically positioned and marketed at the travel sector.

The KTP project with Belfast Met enabled Biznet IIS to revise the hosting services provided to clients. Commercialising the hosting services has contributed to the entire corporate strategy providing Biznet IIS with a clear understanding of the product's value in relation to the entire business. As a result of the partnership, Biznet IIS's hosting department has been able to market a range of standalone hosting services, with the use of new company branded marketing material and a dedicated hosting website. This will continue to enable the growth of Biznet IIS's hosting services in both the UK and ROI markets.

The company has gained benefits through revisiting and reinvesting in its hosting infrastructure and associated hosting services provision. In the longer term this will improve the company's competitiveness, return on capital invested, market share and geographic scope in relation to its exporting drive. New systems relating to information gathering and management have been introduced which will improve the company's efficiencies and identify opportunities for both new product and market development. Improved marketing collateral and web development has led to a higher level of support for the company's sales and marketing team. It is envisaged that when the economic environment stabilises and improves that the company will be primed and ready to seize emerging opportunities as a result of the processes it will have in place relating to its new CRM and associated systems. Acquisition of ISO 14001 through the support offered by the associate has led to a change in Biznet's approach to its environment and operational practices.

Ashcroft Trailer Hire

Ashcroft Trailer Hire Ltd specialises in trailer hire and external maintenance and repair work for clients who own their own vehicles in the specialised haulage, manufacturing and waste and recycling sectors. The company has a client base of over 400 companies, 1% of which is based in the Republic of Ireland.

The partnership with Belfast Met resulted in significant cultural transformation of the Company's attitude, infrastructure and relationships both internal and external. It led to implementation of procedures for marketing which changed its business processes to such

an extent that its product and service offering reflected a new way of engaging with both suppliers and customers. In addition, this approach permeated customers which had not engaged with the Company for over 10 years began to use Ashcroft's services again.

Knowledge transferred enabled identification, exploitation and maximisation of a range of growth opportunities. Enabling technologies were identified and embedded resulting in an increase in market growth, revenue and profitability. The partnership embedded a culture which resulted in improvement to business processes within marketing, human resource and information management. This required change management which also resulted in two new appointments at the company.

An excellent outcome of the KTP was a substantial increase in revenue generation within the hire facility of the Company's operations and a key aspect of this achievement was that this level of revenue was acquired during a period of economic downturn. The Company's business strategy has developed from being passive and reactive to one of pro-activity and marketing orientation.

In addition, the KTP increased Ashcroft's competitiveness/profit/growth via market development/penetration strategies in Northern Ireland and in particular as aforementioned the Republic of Ireland market. Ashcroft experienced a downturn in sales within the Northern Ireland market which would have been a more major development had it not been for the proactive marketing activity brought about through the KTP associate.

The project resulted in the embedment of a culture of information capture and utilisation; production of marketing collateral which heightened brand awareness and our market profile. A key achievement was the development of an effective website which facilitated direct sales targeting. Revenue from the KTP also enabled us to capital invest in new equipment which has increased the value of our asset base.

Ashcroft Trailer Hire Ltd is liaising with Belfast Met regarding the application of a further KTP project in the area of eco-environmental trailer product design and manufacturing.

Elite Electronics Ltd

Based in the Enniskillen, Northern Ireland, Elite Electronic Systems is an established Contract Electronics Manufacturer (CEM), providing the broadest range of Full Turnkey Contract Electronics Manufacturing Services.

Assembly capabilities include PCB, conventional and surface mount; wiring harnesses; electromechanical and complete systems build. These capabilities include turnkey procurement, manufacture, inspection and full test services.

Elite Electronic Systems, offer services that span the entire product life cycle, from consulting and network services to reverse logistics and repair. In addition, the company has established a manufacturing plant in South Carolina, USA which offers a range of Cablelooms / Harnesses and Control Cabinets for the Power Generation Industry.

Through the KTP with Belfast Met, processes and systems for marketing were embedded and implemented, this incorporated information technology and development of an effective database which was linked to the Company's CRM system. The new system now contains 1275 client contacts. This facilitated effective implementation of marketing campaigns which targeted selected segments of the NI and ROI marketplace.

Excellent relationships were established with the Company's suppliers to facilitate reciprocal exchange of information on common clients. This ensured maximisation of revenue generating activities for Elite and information which led to new product development opportunities and prototyping.

Tendering processes and approach to identify tendering opportunities enhanced Elite's capabilities in attracting new business. This resulted in Elite gaining contracts in new areas

of business and in new market sectors. The Company experienced significant levels of engagement with new customer types within the ROI marketplace.

Excellent marketing collateral was produced and improvements to the Company's website achieved. This ensured effective repositioning of the Company's brand offer to industry. Utilisation of information within the Company led to proactive marketing strategies and embedment of more effective operational processes for inventory and financial management. Marketing research conducted through the KTP led to a comprehensive analysis of Elite's competitive environment. This resulted in implementation of effective market penetration and market development strategies. The confidence gained through extending its reach within the ROI market has led to a strategic plan for targeting the wider UK market.

Penetration of NI market has been very effective. In particular, the KTP enabled Elite to sustain existing business during a period of economic decline and the structured processes for marketing activities enabled growth and market development to continue for the Company. The success of this KTP has resulted in the Company's objective of progressing achievements gained through investment in a second KTP with Belfast Met which will focus on its ICT infrastructure and link this more effectively with its lean production and supply chain processes.

Occupational Health Consultants Ltd (OHC)

Occupational Health Consultants is the largest independent occupational health consultancy with clients throughout Ireland. The Organisation now supplies occupational health consultancy services to over 400 corporate bodies with a diverse spread of both public sector and private sector clients. The main Company offices are situated in Holywood, Northern Ireland, and Dublin, Ireland.

The Company employs 15 full-time Occupational Health Advisors with a further 3 Occupational Health Advisors utilised on a part time basis. The company is also supported by an administration team of 5 staff.

The KTP project with Belfast Met resulted in OHC making a key contact with Partnership Health in Dublin. This strategic alliance was not envisaged at the outset of the initial project proposal. However, this joint venture is enabling OHC to forge new relationships and identify potential clients, under the umbrella of an already established professional health company. Initially OHC had anticipated that it would penetrate the ROI market via its own brand identity. However, the strategic alliance with Partnership Health will allow it to gain a more effective and stronger market position much more quickly than was originally anticipated. Tender submissions are likely to be more successful in the ROI market and new clients should emerge, leading to subsequent acquisition of market share.

The company embedded a new marketing infrastructure through the KTP and in particular digital marketing processes have been established. Focus was placed on the company's brand identity and associated web development requirements. A key outcome is the strategic planning process for export markets which has increased the company's revenue generating potential. Whilst it was decided to abandon the CRM facility in favour of a more effective database management process, the company now maximises opportunities for gathering and utilising information more effectively

One of the main outcomes of the project has been the opportunity for Belfast Met academics to mentor a SME through challenging economic times and witness their ability to remain competitive and explore new markets. Academics have extended their expertise in this area more comprehensively through the project phases and as a result curriculum has been modified and further developed.

CES Quarry Products Ltd

CES Quarry Products Ltd is a quarry and concrete business operating from six production sites in Co Down. The company supplies the local building trade with quarry stone, concrete block, mortar, floor screed and ready mixed concrete.

In recent years the company has been working hard to add value to its products and new export business representing nearly 10% of its turnover. CES Quarry Products Ltd is exporting high (polished stone value) stone to Republic of Ireland, England and the Netherlands

The KTP project with Belfast Met resulted in the establishment of an effective strategic marketing infrastructure for the Company which was put in place to support new product development for consumer segments. The Company's brand identity was more firmly established in both existing market segments and those new segments which the Company wished to target. There are now significant processes embedded within the Company relating to marketing activity and associated services.

Several trade events were undertaken which will result in a substantial increase in revenue for the Company in the longer term. It is recognised that the web has been developed to support recent changes to the brand and this will continue to be further developed through an innovation voucher in partnership with Belfast Met following the KTP project close. The KTP Associate worked diligently on identification of the best production processes and selection of target markets. The initial task of identifying the colouring processes and producing a sample product to test proved to be timely and the further KTP project tasks were delayed as a result.

Substantial research was undertaken to support the new product development process for the coating of stone etc which it was anticipated would lead to development opportunities in consumer markets. A number of challenges emerged in relation to accessing suitable suppliers to bring cost effective coating about. The product launch phase was delayed and considerable further investment in kilns/ovens etc. was required to sustain product development. College academics have advised undertaking further risk assessments before making this financial commitment given that the Company and product was new to consumer markets.

Development of Belfast Met's KTP offering and service reliability

Links with KTP companies remain strong and relationships within the partnerships also lay the foundations for potential future research and KTPs. A key feature evolving in Belfast Met's KTP service is the ability to offer FP7 research engagement. This will bring both the college and local businesses into a European collaborative arena. Belfast Met has already developed its services in R.O.I. through IntertradeIreland which funds FUSION (a cross-border version of KTP).

Collaboration is a primary ingredient of Belfast Met's service through KTP and in 2011 the college launched 'Club Met'. This knowledge network facilitates all KTP businesses to trade with each other; share new capabilities and experiences gained and access the extensive range of service and expertise at the college. This also includes, harnessing key undergraduate project and placements to support business activity.

In particular, Belfast Met is delighted to access channels for directing lecturers into industry, heightening the commercial awareness of its staff and students, gaining student project and placement opportunities, improving teaching materials through real, local case studies and projects, identifying new research themes of commercial relevance and ultimately continuing its journey of sharing the 'magic' of Knowledge Transfer in N.I. and beyond. To this end the college has also developed its technical expertise in line with growing business needs and areas of interest for stakeholders.

Belfast Met views its invaluable KTP service as providing outstanding outcomes, not just for partner businesses or academics but as harnessing graduate career opportunities and encouraging these graduates to remain in N.I. This is a 'Good News Story' for all partners.

Response from Castlereagh Borough Council

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Castlereagh Borough Council	028 9049 4500			
Organisation Address	Organisation Type (Include one or more X)			
Bradford Court Upper Galwally Castlereagh County Antrim BT8 6RB	Business	<input type="checkbox"/>	University	<input type="checkbox"/>
	Business Support	<input type="checkbox"/>	FE College	<input type="checkbox"/>
	Government	<input type="checkbox"/>	Research	<input type="checkbox"/>
	Other (Please Specify)			X
	Local Government			

Please provide some background information on the organisation

Castlereagh Borough Council offers an Economic Development Services Function to local businesses. For local businesses this offers:

- Grants advice and support;
- Business development programmes and mentoring
- Links to partner programmes offering support and development
- Tourism development and collaborative support and marketing projects.

Section 2 Questions to Consider

1. **What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**

Opportunities for Business to become involved in local Research and Development

Castlereagh Borough Council launched a new project in Sept 2011 titled the Evolution Project. The project maximises the support available through www.nibusinessinfo.co.uk by providing tangible support. Through the project the Council facilitates an audit benchmarking process and puts in place an itinerary of support built around the specific needs of business participants / applicants. The first port of call is to audit what support is already available from our project stakeholders. The stakeholders involved in the Evolution Project are:

- | | |
|-----------------------------|-------------------------------------|
| ■ Invest NI | ■ The Princes Trust |
| ■ DEL | ■ The Federation of Small Business |
| ■ The University of Ulster | ■ Business in the Community |
| ■ Queens University | ■ Health and Safety Works NI |
| ■ Southern Regional College | ■ Her Majesty's Revenue and Customs |
| ■ Opensource Centre | |

- Castlereagh Enterprises
- The Centre for Competitiveness
- Belfast Metropolitan College
- The Northern Ireland Chamber of Commerce
- The Chartered Management Institute

Across all of these partners we are aware of opportunities for research and development noted below. Some of these opportunities may not be explicitly directly focused on R&D but aim to increase the capacity and resources in business to enable them to embrace R&D:

- Invest NI Technical Development Initiative Grant Support and Intellectual Property Services.
- Invest NI Design Development Programme (ending this financial year due to re-tendering process).
- Invest NI Jobs Fund.
- DEL Steps to Work Programme.
- DEL Employer Subsidy.
- Queens Connected Programme.
- Belfast Metropolitan College: Industry Support, Supplying People, Job Club and Job Placement Service
- Southern Regional College Open Source Centre: Evaluating ICT systems and offering support, Facilitating training on using Open Source Software and Clarifying licensing issues.
- Cross-College and University Supported Programmes: Fusion, Knowledge Transfer Partnerships and Innovation Vouchers.
- Business in the Community Connections Programme.
- Centre for Competitiveness: Innovation and Creativity, Productivity Improvement, Quality Excellence, Leadership, Collaborative Working, Member Services.

Through Castlereagh Borough Council's Local Economic Development Programme the support outlined above is co-ordinated into a strategic intervention. It means that businesses get the right support at the right time by the right people. In areas where there is no support available from the project stakeholders private sector third-party support is available. Following a competitive tender process Castlereagh Borough Council appointed Noribic and a team of 35 specialist associates to provide support on a range of areas. These support areas are summarised below.

1. General Consultant Mentor's Grants/Funding Applications Tendering For Business Management Skills Strategic Planning Sales Development Skills	5. Online Marketing Mentor's Website Design + set up SEO Social Media E-Mail Marketing
2. Core Marketing & Branding Mentor's Market Research Benchmarking/Data Analysis Market Planning Branding Effective PR/Buzz Marketing	6. Company Formation/Business Set Up Mentor's Company Formation Tax/VAT Requirements Corporate Governance

3. R&D & Route to Market Mentor's New Product Development Exporting	7. Financial Management Mentor's Cash Flow Projections/Budgets Book-Keeping Basics Managing Costs Cost / Price Analysis
4. Business Efficiency Mentor's Harnessing the Cloud Green Management + Energy efficiency Production Management (Lean, Sigma) Process Planning + Change Management Quality Accreditation	8. Legal Requirements For Business Mentor's Patents & Copyright Infringement Contractual Law Statutory Company Requirements Legal Aspects of HR Resolving Disputes Business Start-up

A number of applications were submitted to Interreg IVA by the Councils of the Metropolitan Region (Belfast, Lisburn, Castlereagh, N. Down, Carrickfergus and Newtownabbey). These project applications included programmes to promote R&D but there have been significant delays in the roll out of these funds by SEUPB.

The Enterprise Europe Network (InvestNI) aims to accelerate business development through collaborative European Projects (www.enterpriseeuropeni.com).

The ERDF New Competitiveness Fund for Northern Ireland 2007 – 2013 is available to support local Council led economic development projects across Northern Ireland.

The DARD Rural Development Programme offers opportunities for business growth in eligible sectors / activities across rural Northern Ireland.

2. **How appropriate are the available opportunities for developing the Northern Ireland economy?**

- There is a wide range of support available to local businesses but it takes time and patience to decode the messages of support into what is needs based and strategically important for your business. Local businesses require a single point of contact to act as a local independent broker to facilitate and manage their support across stakeholders.
- Currently, there is very limited support and resource available to accelerate new business starts and to mentor their strategic growth.
- Costs associated with Intellectual Property Protection across countries impedes on entrepreneurs willingness to invest in new product designs and technologies.
- Funding support for R&D is not widely marketed and promoted and is normally targeted at larger exporting companies.
- Many businesses source and manufacture abroad and do not know the quality, quantity and cost of what is available on their doorstep. There is no national supplier search website that extends across Council boundaries.
- There is disparity between and across regions relating to what business support is on offer. The ERDF New Competitiveness Programme 2007 – 2013 is aligned to the strategic economic development needs of some Councils more than others.
- IT infrastructure in SME's is still at a very basic level and opportunities afforded by the online revolution have not been harvested by many businesses.

3. What support is available to assist organisations to access opportunities for research and development?

We view this as a fundamental issue impeding business growth and development in NI.

- As referred to in response to question 1 there is a lot of strategic business support available but support networks across bodies and agencies are not merged to coordinate a consolidated response offering. Current support is in silo and this is something that we have aimed to address via the Evolution Project.
- There is no central shared database of business enquiries to enable businesses to progress from a new business start position right through to export.

Locally, help is offered to businesses via:

- Council Officers project managing the Evolution Project;
- www.nibusinessinfo.co.uk (online information resource but UK based and content not always explicit to NI);
- Invest NI business library;
- Invest NI Client Executives but the definition of 'Client' is still not widely communicated to businesses or entrepreneurs;
- All of the stakeholders mentioned in response to question 1 but sometimes support is offered in silo.

4. How beneficial is the available support in assisting organisations?

From our experience the support is essential to SME'S. Some Economic Development Stakeholders provide a wider offering and quality of service than others. Many issues faced by local businesses are specific to their individual needs and it is often difficult to develop a generic programme to accelerate R&D across all these eventualities.

Ultimately the decision of whether or not to accept support rests with the business. Many businesses have their strategic plan in place and the support available only advises the business but the decisions on which success or failure rests is on their shoulders.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

- No independent and impartial single point of contact through which to access all business support networks;
- Businesses are risk averse to the perceived bureaucracy in availing of support from Invest NI or European Sources;
- Businesses do not wish to disclose operational details which are sometimes required to monitor programme outcomes, especially where programmes are supported by Public Money;
- The level of investment required, the cost of intellectual property protection and the risk of no intellectual property protection;
- Time commitment necessary for businesses to avail of the support, limited human resources and in many instances no staff employed in a strategic development role for the business.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Castlereagh Borough Council has developed the Evolution Project as a best practice model. It is designed to counter-act many of the issues raised in this response. These are:

- Create one consistent programme and point of access through which all local businesses can access all support from a range of stakeholders ([www.nibusinessinfo.co.uk / castlereagh](http://www.nibusinessinfo.co.uk/castlereagh));
- Encourage all local economic development stakeholders to sign up to a memorandum of understanding to protect data protection and FOI implications of sharing data and information.
- Create a management tool that allows all stakeholders to view businesses requesting support and offer strategic interventions in a timely and co-ordinated manner.
- Simplify the administrative process for businesses.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

From our experience the following gaps exist in the current support infrastructure:

- Support for entrepreneurship – support mentoring post the business start programme;
- Increase the limit of existing innovation vouchers to further reduce the commercial risk to businesses;
- Simplification of process in obtaining Innovation Vouchers and additional R&D support through Invest NI;
- Development of Innovation Hubs dedicated to particular sectors. Also, collaboration between businesses and academic institutions;
- Northern Ireland focused version of NESTA – National Endowment for Science, Technology and the Arts.

8. How can business and academia work to support research and development opportunities?

- Increased visibility and provision of R&D services provided through academic institutions.
- Also increase business awareness of initiatives such as the Enterprise Europe Network at Invest NI.
- Additional support from Invest NI and academic institutions to identify new opportunities.
- Businesses need to collaborate and form strategic partnerships. Come together in dedicated working groups – A good example is Digital Circle.
- Development of more strategic innovation hubs or incubation centres focussed on R&D instead of the current enterprise parks who state that they have innovative businesses located within their premises. There is evidence to suggest that this model is out-dated and not relevant in a current turbulent economy in which we live in today. Businesses and academic institutions need to work together.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from CBI Northern Ireland

CBI Response to Committee for Enterprise, Trade & Investment Inquiry into Developing the Northern Ireland Economy through Innovation, Research & Development

NI 35 11

Introduction

CBI Northern Ireland is an independent, non-party political organisation funded entirely by its members in industry and commerce. Across the UK, the CBI speaks for some 240,000 businesses which together employ around a third of the UK private sector workforce. Our membership stretches across the UK, including businesses from all sectors and of all sizes. It includes the majority of the FTSE 100 companies, some 200,000 small and medium-sized enterprises (SMEs), more than 20,000 manufacturers and over 150 sectoral associations.

CBI Northern Ireland welcomes the opportunity to comment on the Enterprise, Trade & Investment Committee Inquiry into Developing Northern Ireland Economy through Innovation, Research & Development.

In the following paragraphs we respond to the general issues raised within each section of the questionnaire, though we do not address all of the specific questions raised. Our specific response will focus purely on how NI businesses could make better use of EU Framework funding (rather than broader innovation/research activities). We start however highlighting a number of key issues which arose during our consultation with CBI members.

A number of studies and reports have explained the growing importance of Science and Innovation in driving an economy. The National Endowment for Science Technology and the Arts (NESTA) reported¹ that 6% of companies that are committed to innovation through making new products or collaborating with new partners on research and development provide 50% of all employment growth. Research and Development (R&D) is seen as the tool by which NI will strengthen its current level of competitiveness, achieved by improving the market focused commercialisation of technological research and innovative activities.

Northern Ireland has one of the lowest levels of R&D activity among UK regions, though in recent years there has been an encouraging increase in R&D activity. There is real need to address how the NI government can encourage and facilitate businesses to participate in R&D activities which will deliver economic benefits, with particular reference to developing how our SME dominated economy interacts. A new emphasis is needed to focus on private sector engagement in particular supporting research and development amongst NI SME's as well as a mechanism to attracting foreign direct investment.

With regard the EU Framework programme NI has a target drawdown of €50 million by 2013 - to date €30 million has been achieved.

What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

Funding must be responsive to business needs. Introducing a greater sense of urgency in administrative processes would be particularly helpful, reflecting the competitive pressures faced by businesses as they seek to take research through to commercialization. In particular:

- The time-to-grant must be reduced to no longer than six months
- Smaller, more effective consortia should be allowed

1

NESTA, The vital 6 per cent (October 2009)

In encouraging businesses to engage in the Framework Programme, bureaucracy must be cut substantially and be replaced with enhanced levels of trust. This could be achieved through:

- The introduction of a two-stage application process
- Development of more flexible trust-based contracts
- The harmonization of rules governing different instruments and acceptance of average labour rates and company auditing processes

If businesses are to engage in the FP, it must allow them to respond quickly to market opportunities; bureaucracy must be reduced and simplified, and award-holders must be trusted. Currently, the FP is seen in an unfavourable light when compared to national schemes on all of these aspects. The result is that businesses focus resources on research projects and collaborations where domestic funding provides a catalyst. The possibility of accessing FP funding is often ruled out as soon as the complexity and timescale involved become clear.

The time-to-grant (TTG) for projects is 12 months. This is completely ineffective for responding to market developments and the exploitation of short-term opportunities for innovation. If funding is to be attractive to businesses, this process must be cut significantly eg to less than 6 months.

Time wasted finding enough partners to satisfy geographical and numerical requirements further reduces this responsiveness and produces oversized and unwieldy consortia. Consortia must be cross-national and involve a substantive cooperation element. However, the requirements should be reduced to representation from two member-states and smaller consortia should be considered a virtue rather than a vice. Consortia of more than six are ineffective for business needs.

The bureaucratic requirements continue to have a clear negative effect on business participation, especially amongst SMEs, who lack the resources for project management and often spend considerable sums intended for R&D on administration and bureaucracy. Bureaucracy must be reduced, and simplified - movement towards a trust-based culture is essential:

What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Horizon 2020, which will run from 2014 -2020, will have an estimated budget of over 80 billion Euros. We set out below a series of recommendations which will help increase the participation of NI companies in this programme.

Recommendation 1

It is recommended that a Horizon 2020 contact point or 'champion' should be appointed. This role would act as a conduit to identify and avoid duplication of activity within various strands of government. It should also ensure that efforts to draw down Framework and Horizon 2020 funding across both the public and private sector are coordinated.

Recommendation 2

Further consideration should be given to the appointment of Horizon 2020 thematic leads such as ICT, Agri-food etc.

Recommendation 3

Increase NI research group participation in National, All-Island, and European wide research and interest groups.

To support growth and focus on the key thematic areas, interest groups should be tapped into and supported to enable industry and academia to share research knowledge, discuss potential consortia and discuss draft competition calls. These groups should initially try to link to ROI-based groups to forge all-Island interest groups. Our links with the Republic of Ireland should be leveraged as this is engagement with another member state.

NI stakeholders should also endeavour to join and actively participate in UK wide networks such as Knowledge Transfer Networks and/or the Technology Strategy Board through their Connect platform.

Recommendation 4

The promotion of the Framework Programme to businesses should continue to be targeted, thematic and co-ordinated with external partners and interested bodies; this will help reinforce Framework efforts by all stakeholders and offer a cohesive message for the audience. Stakeholders should work closely with each other to provide an effective way of sharing information and raising awareness of calls, events, etc.

Recommendation 5

Marketing material and communication portals could be updated with success stories from NI to inform NI stakeholders of those who are active in Europe and the type of projects that are being undertaken, this gives the successful project some marketing and promotion and also gives other non-participating businesses the challenge to become active and increase their capability and presence within Europe.

Recommendation 6

Create a specific website “Horizon2020 as the single point for which all information necessary in relation to Framework (then H2020) could be hosted.

Recommendation 7

The Framework application process is particularly complex and lengthy with an average success rate of just over 20%. It is essential that application writing quality is as high as possible to ensure the application promotes the research project and matches/ reaches the Commission’s criteria.

There is a need to strengthen the capacity of indigenous businesses and researchers to submitting quality applications to Framework. Many SMEs will not have this expertise/ capability. It is important that this skill set is created and maintained within NI so we can exploit this expertise locally and that assistance is offered at this vital application stage.

Recommendation 8

Mentoring schemes are essential to support people which wish to participate in the Framework. Mentoring which encourages the triple helix approach has been proven by comparable regions to be highly successful with a return on investment in mentoring of a 1:12 return - for example the ROI experienced an input of investment in mentoring to the cost of £250k returned projects to value of £3million.

Mentoring also reinforces the benefits of collaboration between government, industry and academia. A pilot mentoring scheme to our research institutions has recently been started by Invest NI. This is to be welcomed and should be expanded to incorporate businesses.

Recommendation 9

Members raised concerns regarding the need for formal assistance available to post-application stages to support the successful delivery of projects.

Experiences shared by NI businesses have detailed that where an FP project has not gone according to plan; there is a need for direct support to business to help manage the process. Businesses need particular assistance navigating European Commission.

Recommendation 10

Members suggested that a 'cradle to grave' approach is continued for the NI model which would offer assistance throughout the lifecycle of a project. It is anticipated that reinforcing this longer term support will encourage businesses and academia to re-apply and continue to participate in appropriate collaborative European research.

Funding to support Framework applications is only available to Invest Clients or potential Invest NI clients. There is a gap therefore in funding support for those companies or organisations who are not Invest NI clients. Consideration is needed for an alternative funding stream. Such a funding stream must not displace the support offered by Invest NI but act as a 'net' to capture any potential participation that falls between existing eligibility criteria, for example third sector organisations.

Recommendation 11

The key to wider SME involvement lies through exploiting linkages with large companies and making third-party participation in projects easier. Linking SMEs into participation through larger companies places the burden of administration on businesses that are better able to cope with it, allowing consortia to benefit from the unique advantages that SMEs possess. The Commission should reintroduce the concept of 'associated partners' from FP5, whereby funding is received by a full partner and services contracted out.

How can business and academia work to support research and development opportunities?

Business support and Academic support needs differ. The support offered should be clearly defined to each group and consideration should be given as to how best we can support academics wishing to explore participation.

When looking at other countries and how their support model differs, in particular Enterprise Ireland, there is specific support provided to academics that are participating in Framework applications e.g. specific examples are funding for travel expenses to help scope a potential project, meeting partners to form a consortia. A NI version of this type of support should be explored.

NI needs to increase the number of evaluators in the evaluation process for Framework funding. An analysis on the current level of NI representation on evaluation panels illustrates the relatively low number of evaluators. The benefits from being an evaluator include the ability to fully understand how the evaluation and assessment process works and gaining insight to the types and level of applications which are being submitted. Having a European presence will help build the profile of the individual involved but also indicate the regional interest and the desire to get involved.

We believe these recommendations, if fully implemented, will ensure Northern Ireland businesses are best placed to take advantage of FP7.

December 2011

© Copyright CBI 2011

The content may not be copied, distributed, reported or dealt with in whole or in part without prior consent of the CBI.



Future champions

Unlocking growth in the UK's
medium-sized businesses



2 **Future champions** – unlocking growth in the UK's medium-sized businesses

Contents

Foreword by John Cridland	03
Executive summary	04
1 Important but neglected: the forgotten army of MSBs	08
What is an MSB?	08
MSBs punch above their weight	09
Victims of neglect: overlooked by government and industry	10
2 Untapped potential for growth	11
Increasing the number of high-growth firms	11
Closing the performance gap	12
Helping to rebalance the economy	15
3 Three steps to growth	16
Generating confidence and ambition	16
Building up their skills base	17
Plugging the finance gap	28
4 Unlocking growth: conclusions and recommendations	32
Championing MSBs will increase their ambition	33
MSBs must broaden their skills base	33
Plugging the finance gap will help nurture the UK's future champions	35
Annexes	
References	36
Glossary	37
Acknowledgements	38

Foreword by John Cridland, CBI



This report aims to champion medium-sized businesses; a part of the business community we cannot afford to neglect as we emerge from the worst economic crisis that most of us have ever known.

Medium-sized businesses (MSBs) already make a vital contribution to our economic well-being, creating jobs and prosperity in all regions of the UK. But not all mid-sized firms are growing as much as we think they have the potential to.

In fact while the UK has some phenomenally successful mid-sized firms, which dominate the global market in their field, far too many others are barely growing at all. Contrast this with the picture in Germany, where Mittelstand firms are heralded as the engine of the economy, responsible for a great deal of the country's exporting prowess.

But this report is a story of opportunity, identifying ways to unlock genuinely new and sustainable sources of growth to create a stronger, rebalanced and more resilient economy in the long term.

We have arrived at our conclusions following extensive discussions with medium-sized businesses from around the country, who share our aspiration that they should have a more prominent role in the growth of the economy.

The key to unlocking their success will be inspiring owners and managers of all mid-sized firms to strive for growth, to give them the right skills to scale up their business, and to make sure they have access to long-term growth capital to fund their expansion.

I will make sure that the CBI plays its part in championing medium sized firms and call on the government, universities, financial services sector, and the rest of the business community to do the same.

I would like to thank all the people who have helped put this report together and particularly McKinsey, who have assisted with the analysis that underpins the report.

If we get it right, this hitherto forgotten part of the business community could have a game-changing impact on the economy, creating an additional £50bn of GDP by 2020.

A handwritten signature in dark ink that reads "John Cridland". The signature is fluid and cursive.

John Cridland
Director-general

Executive summary

Medium-sized businesses (MSBs) make up a dynamic sector of corporate Britain that has the potential to be a powerful engine of growth for the UK economy as it forges a path to recovery. Yet for too long this potential has been hidden – overlooked and neglected by government, financiers and the media. MSBs are a highly diverse group of companies that already make a big economic contribution. However when compared with larger firms in the UK and overseas companies, there is clearly significant untapped growth potential waiting to be released. If the UK can create the conditions that have enabled MSBs in other countries to flourish, we believe this would enable them to play a vital role in transforming UK economic growth over the next 10 years, contributing as much as £50bn to the economy by 2020, and creating job opportunities across all regions of the UK.

At the heart of this challenge is the urgent need to instil a greater sense of ambition and confidence into MSBs so that they have the desire and self-motivation to look for new growth opportunities.

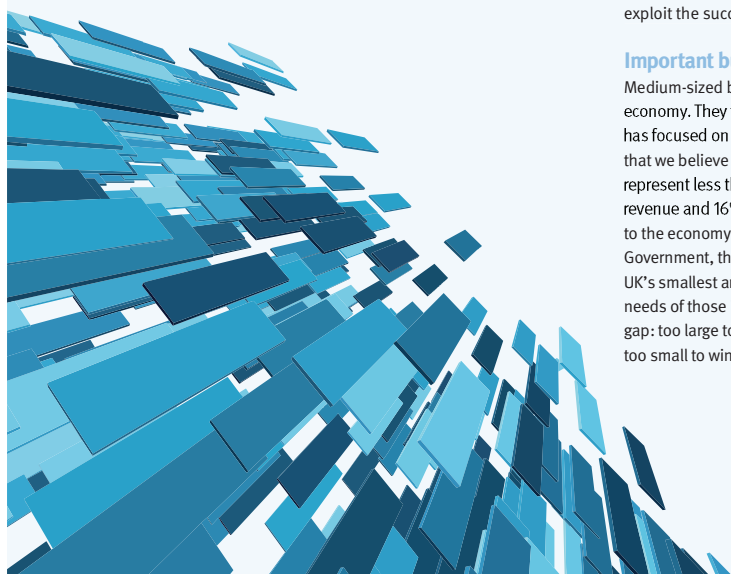
We must also equip these businesses with the skills and resources that will enable them to design the strategies that will harness these opportunities. They need support to improve their management skills, ensure they can recruit the right people, and take advantage of opportunities to export and innovate. Finally the UK must plug the finance gap that means that these potential future champions cannot access the long-term capital they need to fund their growth strategies.

“The owner-manager was happy for the company to remain at that scale and profitability, so opportunities to grow were not exploited.”
Andrew Hodgson CEO, *Soil Machine Dynamics*, which underwent an MBO in 2008

The responsibility for ensuring that MSBs fulfil their growth potential lies with a wide range of organisations. Financiers, academic institutions, professional service firms, larger businesses and trade associations and government all have a role to play in establishing an ecosystem in which MSBs have both the desire to grow and the ability to succeed. The people leading these companies need to be inspired to raise their ambitions and make bold decisions that will take their companies to the next level. The overall message is that the UK needs to do more to celebrate and exploit the success of its forgotten army of MSBs.

Important but neglected: the forgotten army of MSBs

Medium-sized businesses make a huge contribution to the British economy. They turn over between £10m and £500m, but our analysis has focused on the lower end of this range – £10m to £100m¹ – firms that we believe face particular challenges to grow. These firms represent less than 1% of firms, but account for 22% of economic revenue and 16% of total employment.² But despite their contribution to the economy MSBs are often neglected by policymakers. Government, the media and the financial community focus on the UK's smallest and largest firms but often overlook the distinctive needs of those in the middle. MSBs are effectively in a public policy gap: too large to benefit from policies tailored to small business, but too small to win the attention that FTSE firms command.



The CBI believes that MSBs have the potential to make an even greater contribution in terms of creating growth and jobs but face particular hurdles to achieving that success. In both Germany and France the contribution of this sector to jobs is significantly more than in the UK and German MSBs contribute nearly twice as much as UK MSBs to total national revenue. This is why the CBI has spent several months studying the characteristics of MSBs and investigating their potential for growth. With the analytical help of McKinsey & Company, this report paints a picture with insightful case examples of an important but neglected part of the business community, which, with the right policy interventions and support, can play a key role in transforming the UK's economy.

Untapped potential for growth

While MSBs make an enormous contribution to UK economic growth and job creation, this performance is not shared equally across the sector. In fact MSBs can be divided into three groups: fast-growing businesses – the gazelles of the MSB world – that are creating the majority of the new jobs; those producing modest but stable returns; and those that are lagging behind with very low or even declining growth rates. Combined with the fact that MSBs are also a diverse group in terms of size, age and ownership, this means they lack a strong identity.

Two key facts show the urgent need to narrow the gap in both growth and productivity between the gazelles and firms that are stagnating. Doing that would increase the already important contribution MSBs make. Firstly there is a huge variation in growth rates. NESTA, the innovation think-tank, has found that just 6% of UK MSBs account for over 60% of the total job creation that this sector accounts for, while 65% of such firms are achieving less than 1% employment growth.³ If the UK could narrow that gap so that there are both more 'gazelles' but also more slow-growing firms reaching a steady growth rate rather than stagnating, they could add up to £50bn to the economy by 2020.

Secondly there is a significant productivity gap. Between 2002 and 2009 the growth in productivity amongst the UK's MSBs was 5%, close to the rate of growth for small firms at 4.8% but slower than large firms that grew their productivity by 5.6%. Yet MSBs should be able to grow their productivity at a rate closer to that of large firms, as they acquire more of the skills and competencies that larger firms have. On its own this would suggest that MSBs could improve their contribution to the economy. However they could do even better. There are a larger proportion of them in sectors with high productivity growth. This suggests that MSBs should in fact be delivering faster productivity growth than large firms, at a rate of 6.1%.

This report looks specifically at growth; why medium-sized businesses are underperforming and how their potential to grow might be unlocked, both in enabling more firms to join the 'gazelles' and in creating a broader pool of firms that grow steadily over a number of years. If we get this right MSBs could also be instrumental in rebalancing the UK economy, strengthening the UK's manufacturing sector, and creating new job opportunities across all regions of the country.

Executive summary continued

Steps to growth

In order to grow we believe that MSBs need to make three strategic changes. They must:

- Develop a much greater sense of ambition and greater confidence in their ability to design growth strategies that will enable them to expand their operations.
- Build up their skills and competencies that will ensure they can implement successful growth strategies.
- Be able to access development capital that will help make these growth strategies a reality.

Generating confidence and ambition

One of the main reasons that the UK has a high proportion of firms with stagnant growth rates is that those firms lack sufficient ambition and confidence to spur them on to the level of success that the UK's high growth gazelles enjoy. One issue is ownership. Entrepreneurs and family business owners sometimes naturally reach a ceiling in their ambition for the company, when further stages of growth mean taking on new levels of risk that could lead to them potentially losing some of the capital and income they have built up in their firm. Another issue is that MSBs don't have the same identity that much larger and smaller firms enjoy. Overcoming this lack of ambition will be the first step to ensuring that the UK's medium-sized businesses can play a greater role in the UK's economic future. The current economic downturn makes this challenge even more important to meet, as the uncertain environment will reduce firms' appetite for taking on any risk that might come with developing a new growth strategy.

Building up new capabilities

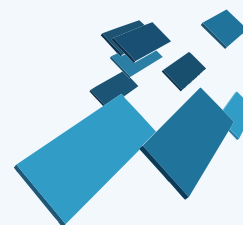
But even with the right level of ambition firms will struggle to grow beyond £10m turnover without the right capabilities to successfully exploit a strategy for growth. This will involve:

- **Acquiring new management and leadership skills**
- **Bringing new talent and ideas into the business**
- **Choosing the right finance strategy for growth**
- **Establishing an export strategy**
- **Exploiting opportunities to collaborate on innovation**

It will also rely on firms having supportive professional networks involving banks, universities, legal and accountancy firms, large companies who are customers of MSBs, as well as the government.

Plugging the finance gap

Even if firms can generate higher levels of ambition and harness the right capabilities, they often face a significant constraint in obtaining access to growth capital. There are barriers to MSBs accessing both non-bank forms of debt and equity capital, at least partly because the venture capital market that provides second and third round funding to high growth potential firms is smaller in the UK than in the US. Filling this gap will require incentivising the financial services sector to come up with new initiatives to ensure that MSBs have a range of appropriate growth capital options to choose from.



Unlocking growth: conclusions and recommendations

If the challenges facing medium-sized businesses in the UK can be overcome, the economy could grow significantly over the next 10 years. Success will depend on the speed with which our recommendations can be adopted and the rate of take-up by MSBs, but the additional growth in the economy could be worth between £20bn and £50bn by 2020 or 0.1% to 0.26% of GDP growth a year.

This calculation is based on achieving our target of increasing both the number of firms that could become very high growth firms or 'gazelles' and the number of currently stagnant firms who could reach a steady growth trajectory.

Unlocking this growth will depend all the actors in this field playing their role to create the conditions in which MSBs can flourish in three key areas. The first is a focus on championing MSBs, giving them the confidence to grow and a greater sense of ambition. The CBI will contribute by providing a strong voice for MSBs as well as small and large businesses, but there is also an important role for the government in engaging more with MSBs. We believe government should:

- **Recruit more MSBs to the Prime Minister's Business Advisory Council**
- **Invite more MSBs onto international trade delegations**
- **Ensure that government initiatives cater for MSBs**

Secondly the UK needs to build up the capabilities of its lagging MSBs. The most important steps to growth will be for the:

- **Department for Business, Innovation and Skills (BIS) and trade bodies to identify sectors to pilot management surveys, working with specialists such as the British Quality Foundation to establish a cost effective method of helping MSBs identify ways of improving their management capability.**
- **BIS and CBI to encourage large firms to work with MSBs in their supply chain to impart best practice in leadership, innovations, recruitment, exporting and even financing, in turn strengthening their supply chain.**
- **CBI to bring firms together to share experiences of management challenges, financing options and exporting to help them plan for growth by learning from other MSBs and industry experts.**

- **BIS to promote the Export Enterprise Finance Guarantee Scheme to MSBs that qualify, so that more firms can access the finance they need to export.**
- **UKTI to proactively target MSBs that should be exporting and help them by signposting private and public sector providers of export advice, and providing an overview of their international competitors.**
- **HM Treasury to explore the cost and feasibility of:**
 - **restructuring Entrepreneur's Relief to provide greater relief for long-term investments in companies and reduce the threshold for qualifying for the relief to below the current 5%; and**
 - **broadening the scope of the R&D tax credit by allowing all aspects of design to be included in the small companies' R&D tax credit.**

Thirdly we need to plug the finance gap for MSBs to ensure that those that are now pursuing a growth strategy can obtain the capital they need to execute it. Our recommendations include:

- **HM Treasury to explore the cost and feasibility of:**
 - **reinstating a Corporate Venturing Incentive, enabling large firms to offset the cost of investing in smaller companies against their corporation tax liabilities**
 - **making equity investments tax deductible so that they are on a par with debt investments**
- **BIS to set up an industry working group to develop the necessary infrastructure, systems and standards so that MSBs can issue bonds more easily either via private placements or via the public debt markets**
- **HM Treasury to explore the feasibility of introducing an additional ISA savings type, once the institutional market is established, to help develop a retail market for bonds issued by MSBs in the long term**

The UK faces a clear choice. Settling for the status quo would mean that a large number of MSBs in the UK would remain virtually static, with either declining, or very marginal growth. The alternative means championing MSBs and developing a plan for growth so that they can thrive, and make a dramatic impact on the growth of the UK economy.



Important but neglected: the forgotten army of MSBs

Medium-sized businesses already play an important role in the UK's economy. But they have a low public profile: survey data on them is scarce and government policy is seldom targeted at their needs. Their anonymity makes them both hard to define and hard to reach.

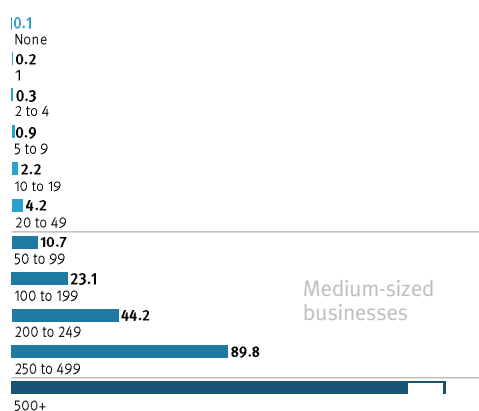
Our aim is to provide an identity for these firms and identify opportunities for their growth. If we get this right we are convinced that MSBs could help transform the UK economy.

- What is an MSB?
- MSBs punch above their weight
- Victims of neglect: MSBs overlooked by government and industry

What is an MSB?

Using a broad definition, we believe MSBs are all those with a turnover of £10m to £500m. However, the focus of our research has been on companies at the lower end of this range – with turnover between £10m and £100m or with 50-499 employees, as we believe this is where firms face particular challenges to grow and therefore where significant growth potential lies. Mid-sized companies with annual sales over £100m are the success stories that have managed to overcome many obstacles to growth and can help us identify what makes a successful mid-sized business.

Exhibit 1 Average turnover of UK companies by employee band (£m)



Source: Department for Business, Innovation & Skills, 2009

About this report

Future champions is based on detailed discussions with senior executives at more than 100 businesses, and a telephone poll of a further 100 MSBs from across the UK to understand the strengths and weaknesses of this sector and the threats and opportunities they face. We have also used analysis provided by McKinsey & Company to identify the main obstacles to growth and potential solutions to unlock growth in this sector.

However MSBs lack a clear identity. Some mid-sized businesses are very old, incorporated 100 years ago or more. Their longevity brings prestige and has enabled them to develop a deep knowledge of their business sectors. Other MSBs have scaled up quickly over a short period of time. They have become accustomed to rapid change and are constantly seeking ways to sustain growth.

Some mid-sized businesses have a single shareholder and others have hundreds, and this inevitably impacts on the decisions taken by their senior management teams. There are businesses within the segment that have a clear intent to grow quickly, but also those with owners and managers that are satisfied with steady growth performance, or lack the appetite to grow at all.

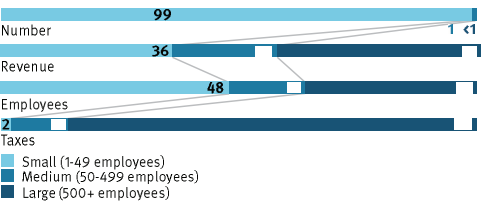
Through this report our intention is to identify the common challenges that MSBs face, and suggest ways to address them so that MSBs can enjoy greater recognition and help the economy grow.

MSBs punch above their weight

MSBs represent a fraction of the total number of companies in the UK – less than 1% – but they drive a significant share of overall economic activity, employing 16% of all employees and accounting for 22% of the UK’s total revenue. Their profitability means that they also make a solid contribution to corporation tax receipts, 12% of the total paid each year (see exhibit 2).⁴

Although significant, their contribution is smaller in the UK than in other countries. For example, German and French mid-sized companies are responsible for a significantly higher proportion of employment and a greater share of total revenue (see exhibits 3a and 3b).

Exhibit 2 Distribution and contribution of UK companies in different size bands (% total UK)



Source: Department for Business, Innovation & Skills; FAME database

Exhibit 3a Distribution of total revenue by company size (%2007-9)

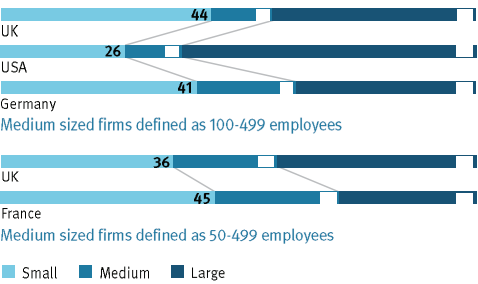
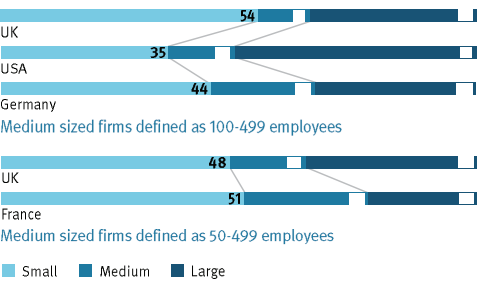


Exhibit 3b Distribution of total employment by company size (%2007-9)



Source 3a and b: Department for Business, Innovation & Skills; US County Business Patterns and 2007 Economic Census; Federal Statistical Office of Germany; French Insee, SUSE

Victims of neglect: MSBs overlooked by government and industry

Mid-sized businesses are not widely understood by government nor indeed by other bodies that play a part in establishing the business environment. Policy is often focused on very large firms, which collectively account for the highest proportion of revenue, or small firms, which are collectively the UK's biggest employers. This leaves the companies in between isolated. Government seldom talks about the distinctive needs of firms in the middle, and they are rarely represented at the highest level. For example, just one member of the Prime Minister's Business Advisory Council is a mid-sized company.

Many MSBs get squeezed out of government initiatives to support smaller companies such as the Enterprise Finance Guarantee, which is restricted to firms with annual revenues below £25m, and

reduced corporation tax which applies to companies with operating profits below £300,000. Yet the same firms don't have the internal resources of larger firms to navigate a complex legal and tax environment.

At least part of the gap in support would seem to be explained by a lack of demand from mid-sized businesses. Companies in this segment either fail to make themselves heard or have trouble articulating their specific needs. Creating better channels of dialogue between MSBs and bodies that can support their growth will therefore be an important step in getting more from these companies.

By contrast MSBs that make up the German Mittelstand are a clearly identified and championed part of the economy, heralded as the engines behind the country's strong economic performance. They are well supported through government policy and by supportive business networks in their regions as the box below explains.

The Mittelstand – the engine driving the German economy

The Mittelstand – literally, 'middle class' – is often described as Germany's economic backbone and is widely acknowledged as a source of economic success since the Second World War. They are often family-owned, but highly ambitious companies with an international footprint.

There is no official definition of what constitutes a Mittelstand company, although companies employing up to 500 people are sometimes considered to make up the group. But Mittelstand businesses are more frequently identified by qualitative characteristics rather than turnover size or number of employees. These include:

- A general focus on **engineering**, often in pursuit of **highly advanced market niches**: products of German engineering companies are often sophisticated and hard to reproduce more cheaply elsewhere.
- A focus on **exports**: globally niche markets, allied to a desire to maintain control over supply chains and distribution systems, mean that German companies often avoid agent relationships, preferring instead to maintain large global networks of subsidiaries.
- A strategy to train and **retain highly skilled workers**: Mittelstand companies particularly benefit from the dual apprenticeship system. Apprenticeships attract high

proportions of well qualified young people who benefit from structured training in businesses while their technical skills are advanced in vocational schools.

- A sense of **responsibility to the region and community** in which they are based, often reflected in a strategy of **long-term ownership and investment**: Financial prudence combined with a belief that a company should provide lasting prosperity for family and community means that their investment horizons are often measured in decades. They are frequently active in local chambers of commerce, of which membership is mandatory.

The prominence of the Mittelstand has prompted the development of a highly supportive ecosystem around it, which is structured to ensure the continued success of mid-sized businesses. For example, Germany's Fraunhofer Institutes are highly specialised technology centres that have been built up to support the industrial strengths of each region. They are an important source of innovation and highly-skilled labour for Mittelstand companies.

Mittelstand companies have also benefitted from the support of the Kreditanstalt für Wiederaufbau (KfW), Europe's largest promotional bank which is 80% state-owned. It supports companies across Germany with classical loans, investments and mezzanine finance over the long term as well as being an important source of professional advice.

2

Untapped potential for growth

MSBs make a powerful contribution to the UK economy and the UK has a number of companies that punch above their weight to compete internationally, and are able to scale up quickly. But at the same time far too many firms lag behind, with low or stagnant growth rates, firms that we believe aren't realising their potential to grow. If we can close the gap in growth amongst MSBs it could rebalance the economy by providing growth in different sectors and regions of the economy:

- Increasing the number of high-growth firms
- Closing the performance gap between MSBs and large firms
- Helping to rebalance the economy

Increasing the number of high growth firms

MSBs are far from a uniform group of businesses; those that are successful have been extremely successful, but far too many have stagnated.

NESTA estimates that, between 2002 and 2007, around 6% of the UK's mid-sized businesses⁵ accounted for more than 60% of job creation in the sector.⁶ The existence of these high-growth firms, such as ARM, featured in the case study below, is encouraging for the UK and a number of studies have highlighted the positive spill-over effects that these "gazelles" can have.

Case study: [redacted] a mid-sized global leader in its field

ARM Holdings is a leading technology company, which has grown to global prominence since its establishment in 1990 by a team of 12 engineers as a spin out of Acorn and Apple Computers. The company does not manufacture anything: instead it designs and licenses the technology that lies at the heart of advanced digital products, from portable computer games consoles to automotive and security products. Semiconductor chips designed by ARM are used in over 95% of the world's mobile phones.

The partner companies that adopt ARM technology pay an up-front licence fee to gain access to the design and a royalty on every chip that uses this design. These deals are usually made with a processor or chip manufacturer, who then sells the chip on to the company that makes the digital device.

The company has undoubtedly benefited from the global technology boom which has sustained demand for the type of products that incorporate its chip designs. But the growth of the company, which has increased turnover from around £40 m in 1998 to £400m in 2010, can also be attributed to a range of other factors.

Current President and one of ARM's original founders, Tudor Brown said: "We have relied on good technology and a talented workforce but, above all, we have shown the ambition and confidence needed to expand globally."

Quantifying the value that this transformation could make to the economy is difficult, but our economic modelling suggests that it could be very significant. We believe that the additional value to the economy from growth by MSBs could be between £20bn and £50bn or an extra 0.1% to 0.26% of GDP growth a year by 2020. This calculation is based on our aspiration of increasing, first, the number of firms that could become very high growth firms or 'gazelles' and, second the number of currently stagnant firms who could reach a more productive steady growth trajectory, more reminiscent of the German Mittelstand.

Exhibit 4 Proportion of firms by 3 year employment growth rate (%2004-7)

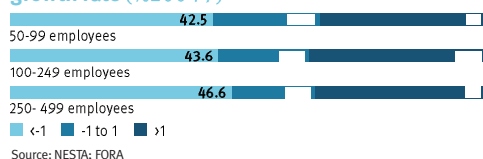
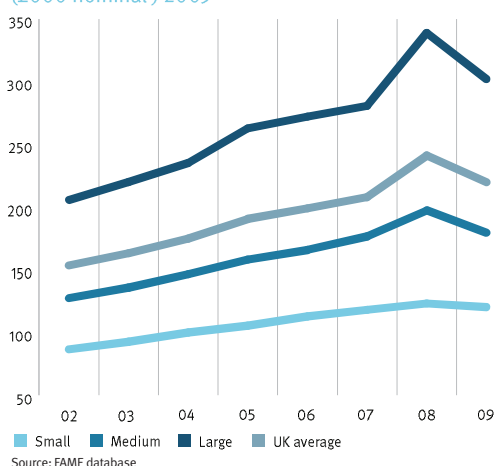


Exhibit 5 UK labour productivity by company size – revenue per employee (£000 nominal) 2009



However, the UK also has a very high proportion of MSBs with either shrinking or stagnant employment growth compared with their international peers. Around 65% of mid-sized businesses in the UK had less than 1% per annum (pa) employment growth from 2004 to 2007, and well over half of these had cut employment by more than 1% pa over this period (see exhibit 4).⁷

It is unrealistic to expect all MSBs suddenly to become gazelles – either because global demand for their product or service is limited or because they are unwilling to take the risks required to scale up quickly – but there are certainly some businesses that have the opportunity and ambition to join the ranks of the high growth firms.

These businesses are on the cusp of rapid expansion but may be unsure how to go about triggering it, or perhaps they need a little extra encouragement to make the required investment, particularly at a time of economic uncertainty. The task for government and other stakeholders is to incentivise entrepreneurship in these firms and make an example of their success stories. They must also look to dismantle some specific barriers that inhibit growth among these companies (discussed in the next chapter).

Closing the performance gap

It is not just the top performers that are important; we believe there is also scope to increase the average performance of mid-sized companies. Between 2002 and 2009 the productivity of MSBs has grown by an average of 5% a year, a rate which is much closer to that of small firms (4.8%), than larger firms (5.6%) (see exhibit 5). Yet growing MSBs should be acquiring more of the skills and competencies that larger firms have in order to reach higher productivity growth rates nearer to that of larger firms.

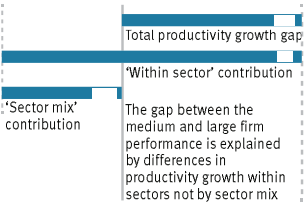
If MSBs can close the performance gap with larger firms, their sector mix suggests that there will be opportunities to grow significantly. Exhibit 6 shows that the sector mix of the mid-sized sector should be an advantage for MSBs as there are a larger proportion of them in sectors with high productivity growth. If MSBs had grown productivity at the same rate as large firms in the same sectors between 2002 and 2007, their annual rate of productivity growth would have been a whole percentage point higher – 6.1% rather than 5%.

The UK’s MSBs need to start closing the gap in productivity growth with larger firms in order to remain competitive internationally and to take advantage of opportunities to grow. Stagnating companies could be transformed into a broader tier of steady growth firms that occupy a solid position in regional economies, creating stable jobs over the long term. These businesses will have to become more aware of their competition and engage themselves more actively in business networks. They will also need to be encouraged to broaden their outlook and look for opportunities to enter new markets internationally.

Exhibit 6
Labour nominal productivity growth
(%) 2002-09 Compound Annual Growth Rate
(revenue per employee)



Gap in labour productivity growth, medium vs large
(%) 2002-09 Compound Annual Growth Rate
(revenue per employee)



Source: FAME database

Family-owned *Mittelstand* companies have shown what is possible in this regard. They are not big risk-takers but manage to grow at a steady pace and are confident enough to seize new opportunities when they present themselves, particularly internationally. Sometimes referred to as the ‘hidden champions’,⁸ these companies create the foundations on which the German economy is built. In more deprived areas of Germany new *Mittelstand* firms are still being built up, as the case study below shows.

Case study:
its own *Mittelstand*

Regions in former East Germany do not have the same industrial tradition as those in the West and fewer globally leading mid-sized companies are found in this part of the country. However, recognising how important the *Mittelstand* has been in western strongholds like Baden-Württemberg and Nordrhein-Westfalen, Germany is now looking to build up the capability of MSBs elsewhere.

Dahme-Spreewald is a county to the south-east of Berlin looking to develop its own tier of growing *Mittelstand* companies – a strategy that seems to be paying off. Between 2000 and 2008 employment grew by more than 70% and investment in manufacturing has also increased significantly. The county was rated top of all developing counties across the whole of Germany from 2004 to 2010.

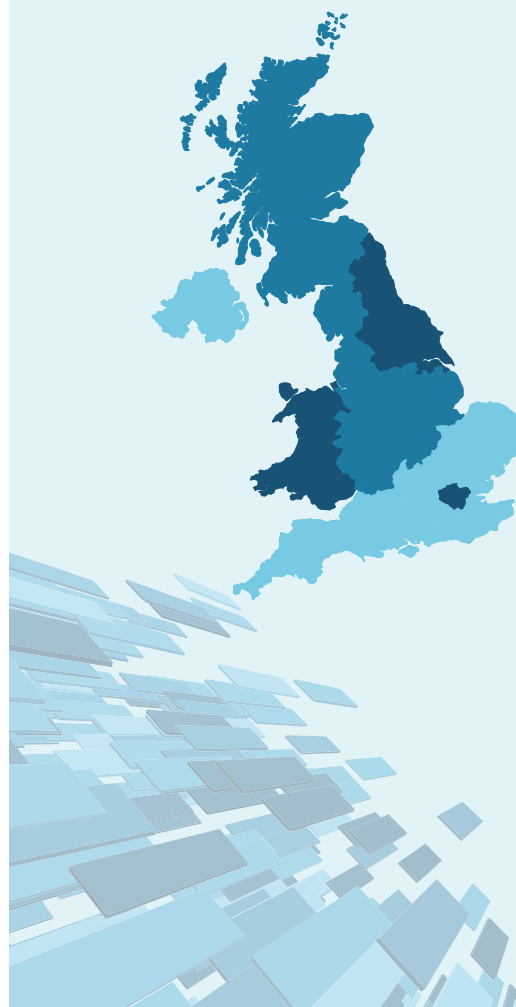
The body in charge of developing enterprise in the region – the Wirtschaftsförderungsgesellschaft (WFG) – has focused on five sectors with high growth potential and has attempted to attract investment from private and public sources to boost these business areas.

One of its most impressive schemes is the development of a 23,000m² technology park specifically designed to support the growth of small and mid-sized companies. Businesses that choose to establish themselves in the park benefit from a highly professional working environment with access to WFG personnel that can help build business contacts. They also have opportunity to collaborate with like-minded businesses in the same sector or with the Technical University of Applied Sciences, which is also located within the park boundaries.

Exhibit 7 Proportion of employment by medium sized firms (% 2001-09) and unemployment rate by region (% 2011)

Unemployment rate by region

- Low unemployment rate
- Middle unemployment rate
- High unemployment rate



Unemployment rate

6.7%



East of England

10%



London

6.6%



South West

5.8%



South East

7.9%



East Midlands

9.7%



Yorkshire and the Humber

8.9%



West Midlands

7.9%



Scotland

9.0%



Wales

8.2%



North West

11.3%



North East

7.4%



Northern Ireland

Source: Department for Business, Innovation & Skills; Office of National Statistics

Helping to rebalance the economy

If the UK can find ways both to increase the number of gazelles in the economy and enable more MSBs to reach a steady rate of growth, they could play a vital role in rebalancing the economy. The UK needs to build greater economic security as well as finding new sources of growth, and this can be at least partly achieved by creating jobs in all areas of the UK, including those that are worst affected by rising unemployment, and secondly by re-strengthening the UK's manufacturing sector so that the UK can compete across a more diverse range of business sectors.

MSBs are found across all regions of the UK, but they could play a particularly significant role by creating new jobs in areas of the country where they are most needed (*see exhibit 5*). For example, mid-sized businesses account for roughly 20% of all jobs in the North East, where the rate of unemployment has now reached 11.3% and the inactivity rate stands at 26.5%.⁹ MSBs also employ larger proportions of people in parts of the country that are dependent on the public sector, such as Yorkshire, where public sector employment fell by over 6% between June 2010 and June 2011.¹⁰ Mid-sized businesses are responsible for lower proportions of employment in regions which are less dependent on the public sector, such as London and the South East.

MSBs are also found in all sectors of the economy, but they punch above their weight in the manufacturing sector, representing 30% of the UK's manufacturing employment base across 7,000 MSBs (*see exhibit 8*). As the UK looks to re-strengthen its manufacturing base as a whole mid-sized manufacturers will become even more important to the UK's future economic health.

The UK also needs to shift where it finds growth, from domestic and EU markets, to the BRIC countries (Brazil, Russia, India and China) as well as the next wave of emerging economies (Vietnam, Indonesia, South Africa, Turkey and Argentina). UK MSBs are not currently strong exporters. We know that only 1 in 5¹¹ smaller and medium enterprises (SMEs – which include smaller MSBs) is an exporter in contrast with the EU average of 1 in 4 SMEs.¹² The UK needs to ensure that they can build up their international profile in the way that the German Mittelstand has, helping to find new sources of growth from much further afield.

Exhibit 8 Distribution of employment by sector (%) 2006



Source: Department for Business, Innovation & Skills



Three steps to growth

MSBs in the UK are an important part of the economy but have the potential to contribute much more if they have the right conditions to grow. We believe there are three vital steps to help MSBs realise their potential to grow:

1. Generating confidence and ambition
2. Building up their skills base
3. Plugging the finance gap

Generating confidence and ambition

The UK has a number of world-class MSBs, which have grown incredibly quickly and now operate successfully as international businesses. But far too many of the UK's MSBs are barely growing at all. One of the fundamental reasons that they lag behind is a lack of confidence to take on new risks, and a lack of ambition to look for new growth strategies. While the economic downturn has created uncertainty across the business community, the lack of confidence amongst MSBs is more deep-rooted, relating to their lack of identity and ownership models. Helping such businesses gain confidence and establish new ways of growing their company will be a vital step to ensuring that the UK's MSBs can create a stronger economy for the UK in the long term.

- Current economic conditions have created an uncertain environment for investment
- MSBs lack a clear identity in the UK
- Owners are reluctant to take on more risk once they reach a certain level

Current economic conditions have created an uncertain environment for investment

The recent economic downturn has dented the confidence of all types of business. More firms are content with keeping their business ticking over, until the future of the economy looks more certain rather than investing for growth, and MSBs are no different. The CBI's MSB poll revealed that only just over a quarter expected to grow their business significantly (by more than 20%) over the next 5 years, and over half expected to grow their business by only 10% or less over the same period. The same poll showed that 37% of firms were holding more cash than they were five years ago, rather than investing it in the expansion of the business. The principal reason is an uncertainty about where the economy is heading in the short to medium term. Firms are retaining profits or using them to pay off debts in order to reduce their exposure to any future economic crisis. While such activity in many ways represents good financial management, the downside is even less appetite for taking on any risks that might be associated with developing a new growth strategy.

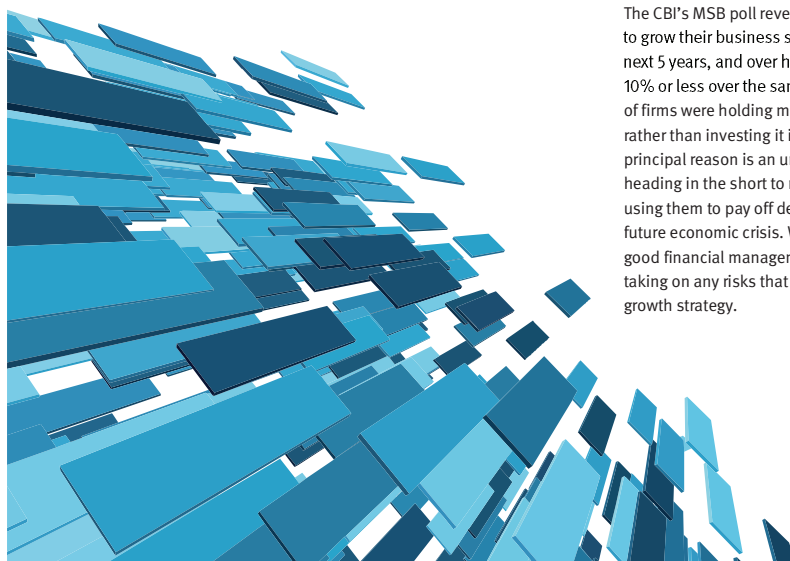
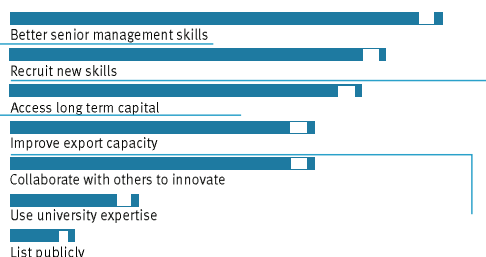


Exhibit 9 Relative importance of growth drivers for UK medium-sized businesses

CBI telephone survey results % responses from companies with turnover between £10m and £250m ranking driver as important or very important

We really struggled to find good candidates for management posts when we opened a new office in London

There are no private equity providers in the UK who are willing to provide the size of investment we need



It's really hard to attract enough skilled workers to our region

Big firms already have an international footprint so can continue to grow when the UK market is flat

Source: CBI/ComRes

MSBs lack a clear identity

One of the more deep-rooted reasons for lacking confidence and ambition is that they lack a clear identity, which in turn means that they are not as celebrated as small and large firms, and that they don't have the same support networks that other firms enjoy. Large firms are big enough to have their own profile, and small firms collectively have a strong identity. The phrase SME is mostly used as shorthand for small and micro firms, ignoring the 'M' or medium-sized enterprises (those at the lower end of our definition of MSB). As a result very little data is collected about MSBs; they are not recognised in government policy, not celebrated in the media and tend not to be studied by business analysts and opinion formers. MSBs often have a significant presence in their locality, employing a number of people that live nearby, but often operate in isolation, without established professional networks to tap into. As a result firms are not exposed to as many new ideas or as much professional advice as other firms and there is a risk that they are unaware of their competition. While Germany lauds its Mittelstand firms the UK's MSBs have been largely forgotten. In many ways the UK has not been ambitious enough on behalf of its medium-sized businesses.

Owners are reluctant to take on more risk

Ownership mind-set and skill-set also present deeper reasons for the lack of confidence and ambition amongst the UK's MSBs. Entrepreneurs and family business owners sometimes naturally reach a ceiling in their ambition for the company, when further stages of growth mean taking on new levels of risk, and potentially losing some of the capital they have built up in their firm. For family businesses the objective of ensuring the business survives for future generations can understandably get in the way of taking risks to expand the business significantly. Owners can also reach a ceiling in the skills they have to run the business, which means they

don't have the confidence to develop innovative ways to keep growing the company or to take on new people with fresh ideas. Without the right mind-set and skill-set it is clear how owners and managers can miss opportunities to reach new levels of growth in their business.

Championing MSBs, giving them a stronger identity, helping to expand their professional networks and broadening their skills base will all help create a climate of greater business confidence so that MSBs can make a greater contribution to the long-term health of the UK economy.

Building up their skills base

For firms that are, or become more, ambitious to grow, the next important step is to ensure that they can obtain new skills that will help them successfully implement their growth strategies. This will rely on making sure a firm has the right internal management skills and structure, and ensuring that they have professional networks in place that can help nurture their growth.

The CBI's survey of MSBs¹³ (see exhibit 9), and the extensive interviews and discussion with individual business executives showed that firms themselves recognise the following five factors as critical to their ability to grow:

- Management capability
- Ability to bring in new skills
- Choosing the right finance strategy for growth
- Export capability
- Ability to innovate

Exhibit 10 Mean management score of medium-sized firms by country Management score 1 = low 5 = high



Source: McKinsey & Company, Management Matters

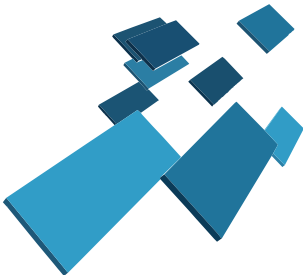
Acquiring new management and leadership skills

Management capability is a key factor in ensuring that MSBs have a growth strategy and can see it through successfully. Yet we know that too many MSBs don't have the right management skills or capability, and that this is a real block to their growth.

On average MSBs are outperformed on management capability by both larger and smaller businesses in the UK, and by MSBs in many other countries, particularly the United States, Sweden, Canada and Germany (*see exhibit 10*). A survey of manufacturing firms in the UK and abroad, testing management skills at all levels saw UK MSBs getting an average score of 2.8. While the differences in these scores don't look dramatic, this was one of the lowest scores recorded in the survey, on a scale where a 1 point difference can translate into a 6% improvement in productivity, the same improvement that would be delivered from a 25% increase in the labour force, or a 65% increase in capital investments.¹⁴

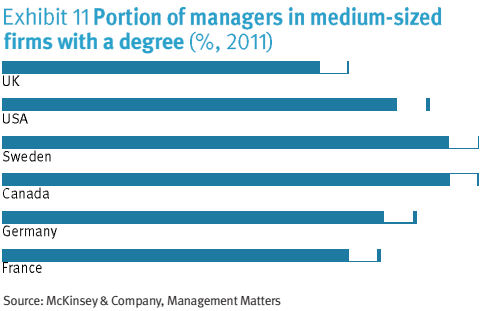
Three factors can help explain why MSBs in the UK lack the management capability of similar sized firms in other countries.

- **Lack of outside management** – Research¹⁵ across a number of countries revealed that family-owned companies have the same management score as all businesses. However there is a clear difference between those that are run by outsiders, where scores jump to 12% above the average and those that are run by the eldest son which are 10% lower than the average. A vital difference between the success of the German Mittelstand and UK firms is that only 10% of family firms in Germany are run by the eldest son, versus 50% of family firms in the UK. Where the default is to appoint the eldest son to run the company, firms are drastically restricting their ability to source the right talent for the job. The most successful MSBs (whether family-owned or not) are those that have put solid governance structures in place, where there is separation between the distinct roles of owners, directors and managers and where emotional commitment to the business is balanced with professional skills.¹⁶



- **Lower education levels** – UK MSBs are also disadvantaged by having fewer managers with a university degree. Comparative management analysis shows that having a greater percentage of managers at all levels with a university level degree correlates with higher management scores. The survey data shows that only 32% of managers in MSBs in the UK hold a university degree versus 38% in Germany and 39% in the US.¹⁷ (see exhibit 11).
- **Lack of awareness** – MSBs tend to have a higher perception of their own management skills compared with managers in small and large firms in the UK, and compared with MSBs internationally. They also tend to perceive fewer competitors in their business sectors. For many firms the result is that management capability is not a priority, as they are unaware of their weaknesses or lack competitive drive.

The case study opposite shows just how critical an ambitious approach, plus professional management skills, can be in the growth of a business.



Case study: [redacted]
– An ambitious new management team leads to large increase in sales

Advanced manufacturer Soil Machine Dynamics, founded in 1971 and headquartered in the North East of England, is a world leader in the design and manufacture of subsea robotics. Its products have been used around the world, including to repair communications infrastructure damaged by the recent Japanese earthquake and tsunami. The company, which has current annual sales of £60m, has ambitious plans: management are targeting sales of £200m within three years.

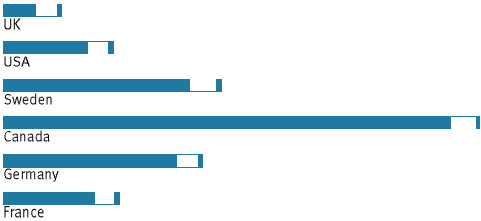
However, the company was not always this ambitious. According to current CEO, Andrew Hodgson, in the middle of the last decade it was at a crossroads: “The company had grown to employ around 100 people but it was still structured like a small business. The owner-manager was happy for the company to remain at that scale and profitability, so opportunities to grow were not exploited.”

In April 2008 the firm underwent a management buyout, funded by private equity group Inflexion. The deal saw the appointment of a new senior management team with Andrew as Chief Executive, and introduced a number of changes designed to support expansion. “We appointed a new finance director immediately which has provided us with much greater certainty on the financial outcome of our programmes,” he states. “We took a strategic look at the workforce and restructured to ensure that specialist engineers were not deployed on tasks that could be carried out by people with more adaptable skills. We’ve also created discrete business units and implemented a leadership training programme for the managers that head them up. As a result, we’ve seen real improvement in our delivery performance times.”

The changes have paid dividends for SMD: in 2009/10 sales increased by 50%, up from £42m to around £60m. But the plans don’t stop there. Management is in the process of implementing a 3-year plan to increase sales to £200m through ambitious growth targets in export markets including Brazil, Singapore and the USA.

“Medium-sized businesses that look to recruit from universities often aren’t visible enough on campus to attract the top graduates. Firms should plug into the annual graduate recruitment round and reach out to students that are increasingly conscious of the need to find employment before they leave university.”
Martin Birchall, *managing director, High Fliers Research*

Exhibit 12 Portion of managers in medium-sized firms educated abroad (% , 2011)



Source: McKinsey & Company, Management Matters

Bringing new talent and ideas into the business

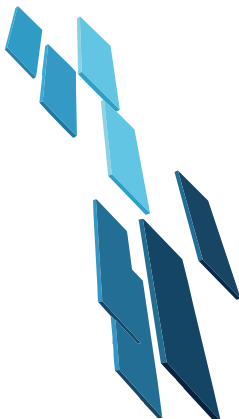
As MSBs grow and face new challenges, their ability to attract and recruit the best talent and skills, and source the best advice is paramount. Interviews with MSBs highlighted two main obstacles to bringing new ideas into the firm:

- Competing with larger firms for the best talent emerging from universities and international labour pools
- Having the confidence to invest in external advice

Competing for the best new talent

The relatively low profile of MSBs means that they are rarely at the forefront of new job hunters’ minds when they leave higher education. In fact, while almost half of all graduates leaving university target employment in major national or international companies only 19% are looking for jobs in small or medium sized businesses.¹⁸ Students perceive healthier long term career prospects in larger employers and better training opportunities. However, the elements of employment that graduates deem most important – being challenged on a day-to-day basis and being given genuine responsibility and access to clients or customers at an early stage – should be areas in which mid-sized businesses can compete. MSBs also struggle to reach into universities and build relationships with talented graduates at an early stage. For instance, only 38% of mid-sized businesses with links to universities offer sandwich courses or work placements to students compared with 54% of large businesses.¹⁹

Talent could also come from international labour markets, yet MSBs are much less likely than larger UK firms and MSBs in other countries to recruit management talent from abroad. Exhibit 12 shows that only 2.8% of managers in UK MSBs were educated outside the UK, compared with nearly twice as many employed in the United States and over three times as many employed in Germany and Sweden.



Investing in external advice

MSBs struggle to take advantage of the knowledge and experience that should be available through non-executive directors for three principal reasons: MSBs are not always convinced of the benefits that a non-executive director could offer; some firms had a negative experience, possibly because of recruiting the wrong person; and other firms simply don't know where to find a good non-executive director. Yet an effective non-executive director should have a considerable amount to offer to a mid-sized firm, by bringing outside experience and new ideas, and by challenging the status quo.

Many MSBs are also reticent to invest in professional advice. In fact many firms see the need for legal, accountancy, recruitment and management advice as a cost to be managed rather than as an investment which could help ensure they have the capabilities needed to scale up their business. This suggests that a core part of the professional networks that nurture growth in large businesses is not functioning well across MSBs.

If MSBs can overcome these challenges the effort can pay dividends as the case study opposite shows.

Case study: Waterstons

– Strong links with local universities ensure that IT consultancy firm has first pick of top local graduates

Waterstons, a Durham-based IT consultancy firm, was founded in 1994 and now employs 60 people. Highly qualified staff are crucial to their business model, but many of the North East's top graduates assume that the best career options are with larger companies and are often in London. To ensure effective recruitment the company has developed very strong links with local universities and has managed to convince the best local talent to start their careers with Waterstons.

Securing the right graduates is a central part of Waterstons' human resources strategy. This is made harder as top graduates' career of choice often starts with a large multinational firm and many of those graduating from universities in the North East assume that a move to London is the best way to find a job: "it's not that graduates don't want to stay in the North East and work for a smaller firm, but rather that they aren't aware of the opportunities. Our challenge is to make sure that Waterstons is high on their list of preferred employers", says Mike.

To ensure that the best local graduates do apply for jobs at Waterstons, the company has taken the step of developing unusually strong links with local universities and schools. Currently Waterstons takes between 3 and 4 school pupils and undergraduates each year under the paid Year in Industry Programme or mid-course placement. They also offer paid internships to the best local university students, many of whom are eventually offered full time employment. A place on such an internship is offered as a prize to the highest scoring graduates on relevant IT related modules and competition is fierce.

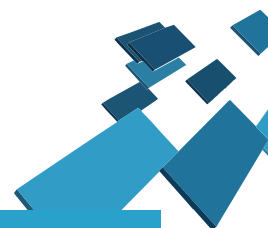
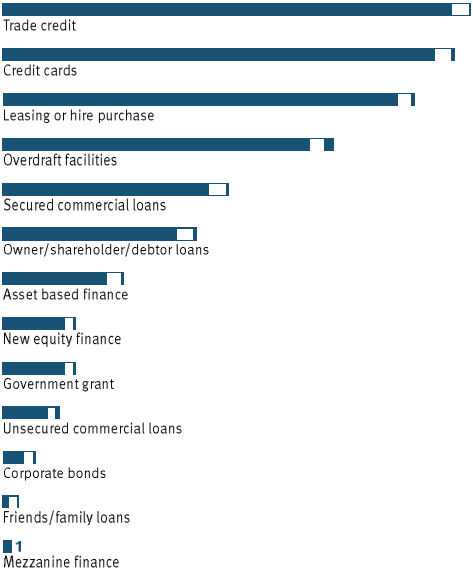


Exhibit 13a **Types of external finance used by MSBs**
Can you tell me for each of the following forms of finances whether your business uses it currently? (%)



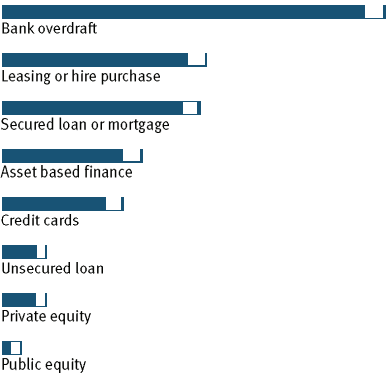
Choosing the right finance strategy for growth

In theory, a wide range of funding options is available to MSBs however most tend to rely on just a few of the options within that range; mainly bank debt (see exhibit 13). While we believe that there is a gap in the supply of long-term finance for MSBs (explored later in the chapter), there is also evidence that some MSBs lack the skills and awareness to choose the right finance strategy for the growth of their business.

Bank overdrafts and short-term lending are a good source of working capital for MSBs, which are usually a central part of any mid-sized firm's financial plan. However the fact that so few MSBs seek non-bank sources of finance, suggests that a large number of firms are either not planning for growth in the most effective way or aren't planning for growth at all.

With the supply of long-term bank lending becoming more expensive MSBs need to start looking elsewhere for genuine growth capital, and choose the right finance strategy to grow their business. Our high growth 'gazelles' will be more suited to equity investment where the opportunity for business owners to share equity and share risk is relatively attractive. However our steady growth firms will be more attracted to debt finance with the opportunity to invest for long-term growth without diluting their ownership.

Exhibit 13b **Types of external finance used by MSBs**
Which of the following types of finance did you seek (including all those you sought, regardless of the outcome)? (%)



Source 13a and b: BIS 2010 Finance survey of mid-cap businesses



We believe that some firms lack the awareness, skills and ambition to take advantage of the funding options that are available. The CBI's survey²⁰ showed that 63% of firms don't plan to broaden the range of funding they currently use (principally bank lending) over the next five years. We believe that the following factors need to be addressed to put MSBs in a stronger position to choose the right finance for growth:

- **Knowledge deficit** – many firms seem to lack financial expertise and therefore rely too heavily on what they know best which tends to be working capital.
- **Uncertainty in today's volatile economy** – MSBs, like many firms in the UK, have become wary of making large investments at a time of global economic uncertainty. A larger proportion of MSBs are holding more cash in reserve than they did 5 years ago.²¹
- **Ownership mindset** – the high proportion of privately owned firms in the mid-sized bracket suggests business owners are very reluctant to cede equity for finance, particularly if it involves releasing a majority stake, allowing external shareholders to take part in running the company, on which the private equity model relies. In fact, 88% of them have never actively sought or considered seeking this type of finance.²²
- **Lack of skills** – while many MSBs know their business well, they too often struggle to put together a sound business plan when they are seeking finance. Banks usually work with their mid-sized clients to put together a more compelling business case, but lack of skills can increase the risk of some firms failing to access finance.
- **Lack of incentive** – Entrepreneurs' Relief can also be a disincentive for business leaders to dilute their ownership. The relief is only available to those disposing of at least a 5% share of the company – disposals of smaller proportions are liable for capital gains tax (CGT) at the higher rate. This works as a disincentive for current owners who are unwilling to bring in new investors that could push their stakes below this threshold.

The case study opposite shows just how important it is for growing firms to seek the right source of finance for each stage of growth and the opportunities that can be made from opening up to equity finance.

ECO Plastics: Confident investment delivering strong growth

ECO Plastics Ltd is the UK's leading reprocessor of recyclable plastics operating Europe's largest and most technically advanced mixed plastic bottle sorting facility. Established in 2000, the company now turns over £40m and recent investment and expansion mean that this is expected to rise to £75m next year.

The business has invested heavily to develop the machinery used to treat and sort the waste plastic that is supplied by contractors and local authorities. In the early years, this expenditure was solely funded through bank loans to the company directors and an overdraft facility. However, recognising that the global demand for recycled materials was increasing the company started to scale up its activity more quickly from 2006 and started looking at alternative finance options to fund this growth. Since then it has managed to raise over £30m of venture capital to support its rapid expansion.

Founder of the business and Chief Executive Jonathan Short accepts that it was a difficult decision to cede equity, but that it had brought benefits beyond cash injection to fund the company's growth: "It's important you pick the right people to work with and you need to work harder now to secure investment on attractive terms than you did before the financial crisis. But the external investment has enabled us to bring some highly skilled people on to the management team and grow more quickly than we otherwise would have done."

The company has already attracted the attention of a number of large multinational companies interested in sourcing ECO Plastics' food grade product. In March this year it announced a new joint venture with Coca Cola Enterprises to develop a new purpose built recycling facility in Lincolnshire, allowing it to expand operations further and CCE to meet its sustainability targets.

“We’ve been able to develop and grow precisely because of the time we’ve invested in expanding our nation-wide and international trade networks.” **Geoffrey Riesel**, *chairman, Radio Taxis Group*

Establishing an export strategy

The UK must become a stronger exporter in order to emerge from the downturn as a more resilient economy. During the last ten years the UK's share of world exports decreased from 5.3% to 4.1%.²³ While export share also decreased in the US and France, it increased in some of the UK's other main competitor countries such as Sweden and Germany, where the export share increased from 8.9% to 9.3%.²⁴ We believe that MSBs could be central to this mission, but currently lack the capability to fully exploit this potential.

Many MSBs do recognise the potential for growth that lies in exports. 38% of firms interviewed for the CBI's survey cited the ability to improve export capability as a critical factor in their growth, and 51% of firms cited exporting to new markets as one of their main opportunities for significant growth over the next 5 years.

However, what data is available on levels of exports by size of company suggests that MSBs in the UK are not exporting as much as they might be and that they face a number of difficulties in both starting to export and increasing their existing export activity. For example in 2009 55% of MSBs that exported derived less than 25% of their revenue from exporting while the average for all firms was lower at 49%.²⁵ In other words MSBs are lagging behind the UK average in how much of their business depends on exporting.

By contrast German export success has been well catalogued over the last ten years and their success seems to be continuing: in the twelve months up to November 2010, German exports increased by 21.7%.²⁶ While all parts of the German economy are responsible for this success, commentators tend to agree that the *Mittelstand* has been particularly vital to Germany's export success, referring to the *Mittelstand* as 'the main motor of Germany's growth'.²⁷

Interviews with MSBs that the CBI has conducted suggest that five factors can help explain low export capability amongst this group of businesses:

- **Business contacts** – firms simply lack the networks of business contacts in target markets to give them the confidence to start exporting
- **Experience** – many firms have never exported before and do not employ staff with any experience of exporting
- **Language skills** – many firms do not employ staff with the right foreign language skills, which inhibits their confidence to explore international markets
- **Awareness of legislation** – firms often struggle to understand legislation in different markets, and lack the resources that larger firms have to acquire this expertise
- **Market characteristics** – many firms lacked the resources to fully scope out the opportunity in a target market.

These challenges hardly differ from those that the UK's smallest firms encounter, because they are generally associated with exporting for the first time. Government's trade and investment strategy has begun to recognise that it needs to help a greater number of small firms to export – eg by providing more practical assistance to SMEs and by improving the trade finance and insurance products it offers. To date however, only three companies have taken advantage of the Export Enterprise Finance Guarantee scheme: so the government must concentrate on ensuring that help is targeted at MSBs as well as small firms and that businesses know what help is available.

The rewards of successfully implementing an exporting strategy for a mid-sized firm are significant as the case study on the next page indicates.



Case study: Benoy Ltd – UK architectural firm with a growing international presence

The architects firm Benoy Ltd is a prominent business in the UK having been responsible for projects such as Birmingham's Bullring and London's Westfield shopping centres. But it has now become a major international player having taken the decision in 2002 to expand the practice overseas.

Benoy took the decision to go global because it could not ignore the business case: emerging markets were demonstrating a robust economic trajectory; stable rates of growth; higher disposable incomes; emerging, consumer-driven middle classes; and vast, untapped opportunities. The company started putting down roots in China in 2000 winning its first contract a year later. Since then it has expanded dramatically in the country and has been responsible for the design of a number of contemporary and innovative urban landmarks. Benoy has also expanded into Abu Dhabi, Mumbai and Singapore as well as recently securing its first contract in Brazil.

Before entering a new market, Benoy embarks on a sustained period of research and due diligence, including identifying potential competition. It seeks out expertise and advice from sources such as UKTI and business networks as well as international legal experts. It has also set up an international team of design professionals within the business who meet monthly or bi-monthly via video conferencing to update the team on projects, trends, clients and market leads.

The company's willingness to break new markets meant that it was able to grow in spite of a global recession that put the brakes on a number of building projects. In 2010 the company ranked 29th in the Sunday Times International Track 100 having grown its international sales by 91% and its international work now accounts for over 80% of turnover.

Managing Director of the company, David Coyne attributes this success to a solid structure which enables the senior management team to build international networks. "It's important that members of the board have confidence in those responsible for managing the business day-to-day. Our senior management team have good experience and understanding of international trading and can dedicate the time needed to drive the business forward in new markets."

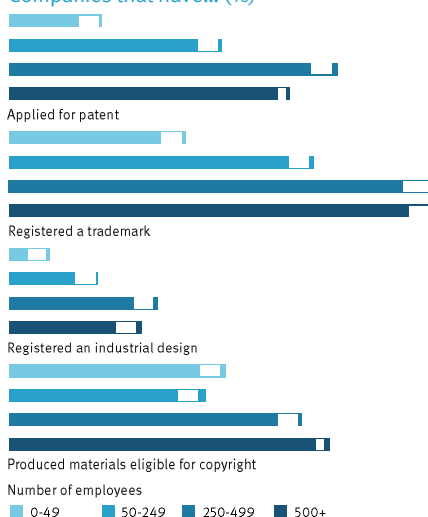
Increasing the focus on innovation

UK MSBs recognise that they need to innovate to remain competitive and are responsible for a substantial proportion of innovative activity in the UK. They see the value in investing in R&D even when not in profit and are active in protecting their intellectual property. However, conditions for innovation in the UK could be improved to encourage greater numbers of mid-sized businesses to develop their products and services, enabling them to compete on an international scale.

Innovation is already important to MSBs

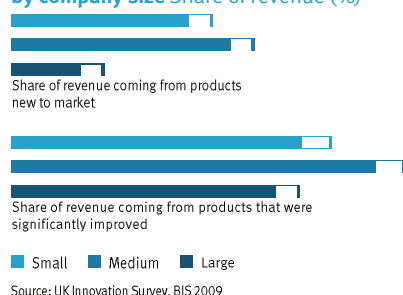
Mid-sized businesses in the UK put a great deal of emphasis on innovation and overall, a higher proportion of MSBs (63%) report they are innovation active, compared with both large (60%) and small firm (57%) populations.²⁸ Larger MSBs (those with 250-499 employees) are significantly more active in protecting their IP than smaller firms across every category of IP protection and are even outperforming large businesses in some measures (see exhibit 14). They also obtain a greater percentage of revenues from innovation²⁹ than either smaller or larger firms (see exhibit 15 on page 26), which shows they are effective at deriving value from these investments.

Exhibit 14 Measures of innovation by company size Companies that have... (%)



Source: UK Innovation Survey, BIS 2009

Exhibit 15 Revenue derived from innovation by company size Share of revenue (%)



MSBs must look to collaborate with partner firms on innovation

Mid-sized businesses are at the forefront of innovation in the UK, responsible for a considerable proportion of innovative activity.³⁰ Indeed, the UK could transform its international standing on innovation if larger and smaller companies followed the lead of MSBs. Yet there is still room to boost innovation in this sector and raise the international competitiveness of the companies within it.

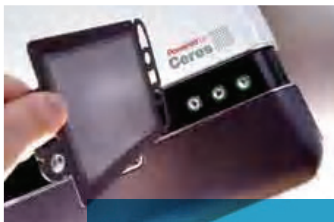
The 2008 Community Innovation Survey reveals that only 62.5% of UK MSBs describe themselves as innovating, compared with 84% in Germany and 67% in France³¹ and in absolute terms they spend less on R&D than their counterparts in other leading European economies. One of the reasons for this could be that the ecosystem around these businesses does not support them as it could. In particular, mid-sized businesses do not make use of potential external partners on innovation.

Thirty-seven percent of companies in the CBI mid-sized firms survey said that 'collaboration with others to innovate' was an important driver of growth. But relatively few MSBs are collaborating with wider innovation partners such as universities, government labs and private research organisations. They are also much less likely to seek partners across Europe compared with larger companies.³²

Interviews with MSBs indicate that while most of them have some form of relationship with their local university around innovation and research, they struggle to reach a point where they can collaborate and derive commercially valuable research from that relationship.

By contrast MSBs in Germany have very productive relationships with research organisations called Fraunhofer Institutes. Their collaborative research is directly intended to be commercially viable and help grow those companies. The UK has recently started to roll out Technology Innovation Centres to mirror the success of the Fraunhofer model and, while this is a positive step that MSBs should be able to benefit from, it is too early to tell whether they will be a success, and able to help increase the number of innovating MSBs in the UK.



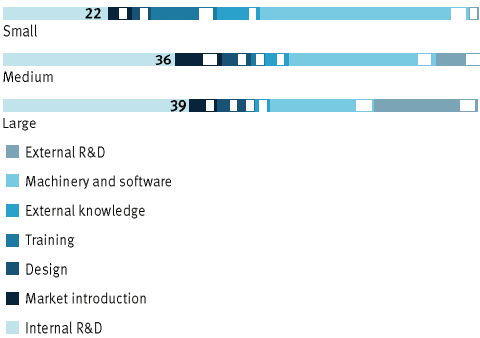


Targeted tax incentives are needed to encourage MSBs to invest in R&D

The makeup of expenditure made by MSBs on innovation shows that tax incentives could be better targeted at their needs and more effective at stimulating further innovation. MSBs spend a greater proportion on introducing their products to market than larger and smaller firms do (see exhibit 16). But government support for innovation, through the Research and Development Tax Credit, only assists firms with the cost of pure research.

The case study opposite clearly shows that other parts of the innovation story, such as buying machinery or software, product testing, production and marketing activities are just as important in using innovation to grow a business. While this is a challenge that is common for all firms, it is particularly crucial for MSBs, because of their dependence on innovation for revenue generation.

Exhibit 16 Share of innovation expenditure (%)



Source: UK Innovation Survey, BIS 2009

Case study: Ceres Power overcomes innovation challenges

Success for high-tech manufacturer Ceres Power means being able to bring its innovative fuel cell technology to the mass market. Founded in 2001, AIM-listed alternative energy company Ceres Power has developed the technology for a new generation of in-home electricity generators that promises significantly better fuel efficiency than traditional centralised power stations.

UK government support for innovation is biased towards funding research, but this stage is only a small fraction of the cost of bringing a new product to market. Ceres Power has received approximately £9m in grants and R&D tax credits, mostly in support of the basic R&D needed to produce the technology, but this represents only 10% of the money spent so far bringing the product to market. This contrasts with similar companies in Germany and Asia for example, where up to 50% of the costs may be covered.

For Bob Flint, Commercial Director for Ceres Power, other essential parts of the innovation process include: “designing and developing manufacturing processes; investing in high tech manufacturing equipment; helping our suppliers develop the components we need; and building, testing and trialling units ahead of a mass market launch.”

“With software or services, innovations can often be brought to market more cheaply and scaled more quickly. Engineered products can have very high intrinsic value and generate manufacturing jobs, but take longer and are more expensive to bring to market. We need innovation support policies that recognise this difference.”

Plugging the finance gap

A number of MSBs that want to grow, and have the capabilities to do so, struggle to find development capital to fund their expansion. Having the skills and knowledge to seek the right source of finance to grow a business is one hurdle to overcome (as explored earlier in the chapter), but we believe there is also a gap in the supply of long-term growth finance.

The reliance of most MSBs on bank lending to find long-term investment is unsustainable given the shorter terms on which banks are now offering loans, which heightens the need for MSBs to start broadening their finance options. Yet the availability of long-term capital for companies of this size, seeking either second or third round funding, is restricted and has become more so in the wake of the financial crisis. In addition there are significant barriers to MSBs accessing non-bank forms of debt finance such as bonds and private placements.

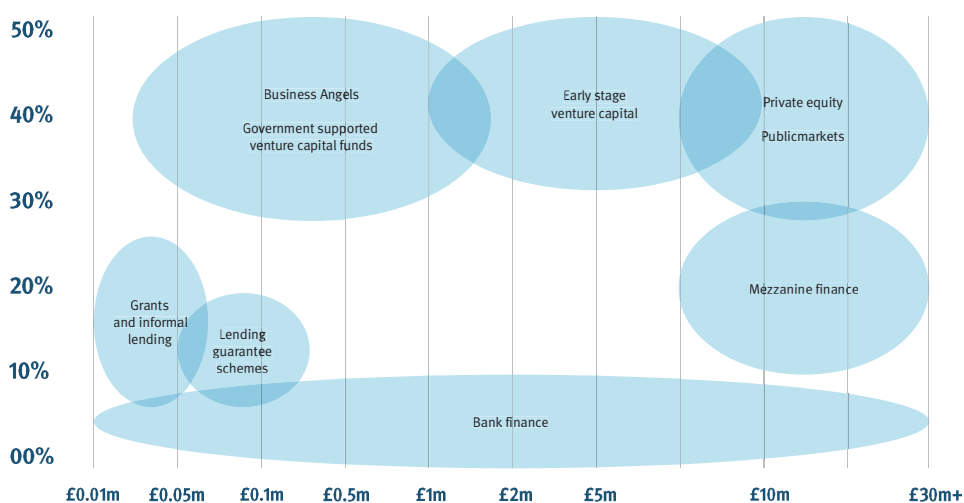
- Barriers to equity markets
- Barriers to debt markets

Barriers to equity markets

Attracting equity investment should be a viable option for mid-sized business seeking to grow. Raising finance by selling a stake of the business either to private investors or through the public markets can have a real impact on growth performance and has some key benefits for mid-sized business owners. It enables them to realise some reward for the past success of the business and share the risk of attempting to grow the business further. It can also be an opportunity to bring new skills to the senior management team, often people with the experience to help deliver transformational growth. Yet there seems to be a gap in the supply of long-term equity capital for medium-sized businesses.

The UK venture capital market is strong for start-ups investing in as many as Silicon Valley each year (200-250),³³ but deals for medium-sized firms seeking second and third rounds of funding are far less available, particularly in contrast to the much stronger VC market in the United States (see case study). In fact Silicon Valley funds around 300 mid to late growth companies each year at levels of £5m to £20m, whereas the UK only funds about 60.³⁴ The Rowlands Report³⁵ suggested that this gap in the provision of growth capital for medium sized firms lies specifically in the range of £2m-£10m of investment. (see exhibit 17)

Exhibit 17 Illustrative mapping of expected return profile against amount sought



“The UK needs a stronger venture capital market so that we can help grow and retain our best innovative MSBs without necessarily resorting to foreign trade sales”

David Kerr, *chief executive Bird & Bird*

Case study: the strengths of the US venture capital market

The venture capital (VC) market in the US is more developed than the UK and VC investment makes up a larger proportion of GDP. The market has grown to over \$30bn, 85% of which is dedicated to hi tech investments, in software, medical technology and biotechnology for example.³⁶ Average VC fund size is much bigger in the US than in continental Europe, which allows for larger amounts to be invested in portfolio companies but also greater numbers of investments to be made. Over 1990-2005, US funds invested in follow-up rounds in roughly 40% of their portfolio companies, in the UK this figure was closer to 20%.³⁷

Case study:

In the early 1990s, a team from Queen Mary University led by Professor William Bonfield developed a synthetic bone graft material and took out patents before publishing the results of their experiments. With their intellectual property secure, they established ApaTech to exploit the commercial possibilities of the material using £3m in seed capital provided by London based private equity firm 3i plc.

By 2004 Apatech was ready to move to full scale production. The finances to support this came from a £6.6m investment from UK venture capitalist firm MTI, together with a further investment from 3i. At this point, sales grew quickly, with the introduction of a range of new products and expansion into international markets. By 2007, annual sales had reached £3.1m.

The next stage of growth, beginning in summer 2008, was even more dramatic: recruiting an additional 100 staff in an 18 month period and building a second manufacturing plant at a cost of some £8m prompted annual sales to rise to £40m by November 2009. For the first time there was an international component to the financing for this growth. In addition to continued support from 3i, US-based HealthCor Partners provided the lion's share of the £30m received.

By 2010, Apatech had established itself as one of the world's fastest growing medical technology companies, and had made a name for itself in the vibrant American market with the help of its new private investors. But to enhance the market penetration for its technology even further and more quickly, it needed greater scale and global outreach. US healthcare giant Baxter could provide these in abundance, and recognising Apatech's impressive technology and potential for further international growth, it acquired the business for \$330m in March that year.

While many equity investors disagree with the conclusions of the Rowlands report, pointing out that private equity houses do make investments in MSBs at this stage of funding, many others agree with Rowlands and point to the number of foreign trade sales as evidence that growing MSBs can't access the right finance in the UK (see case study). Although the amount of takeover activity fluctuates year on year, there is no doubt that British companies are attracting attention from larger ones abroad – between 2004 and 2010 foreign acquisitions of British businesses outstripped UK purchases abroad by £160bn.³⁸

A public listing on one of the growth markets is also a viable option for firms that need to find capital to grow their business. The Alternative Investment Market (AIM) has helped more than 3000 firms raise the capital they need to expand their business since it launched in 1995. For IP-rich innovative firms that can't source next stage venture capital, and are unlikely to be able to raise debt because they lack tangible assets to borrow against, AIM is a good solution. It also provides the company with a public profile and association with a strong brand that they might not have previously enjoyed. Listing on a growth market, therefore should remain a workable option for companies seeking development capital, but it is unlikely to become a more common solution for MSBs, while the costs of listing can be prohibitive and the move to a shorter-term outlook can limit the ability of the management to plan for long-term growth.

Equity finance will remain a vital source of growth capital for many MSBs, whether private or public, but broadening the range of equity investment available to MSBs could help open up new opportunities for firms to grow. The Business Growth Fund (BGF), set up by the five major banks earlier this year as a solution to the equity gap that the Rowlands report identified, should help provide a broader range of equity capital. The BGF occupies a unique place in the market more akin to the 3i model than to established private equity houses. Its intention is to make returns through long-term yields rather than medium-term returns through exits, which could see the BGF invest in a company for ten years or more. The BGF also intends to take minority stakes in a company rather than the majority stake that most PE houses insist on. In theory the fund could therefore help a new swathe of firms raise external equity capital to finance their growth, reassured that the investment will be long-term and that the existing owners could retain a majority share in their company. However with only one deal agreed in its first six months it is too early to tell yet whether the BGF will help plug the finance gap for MSBs.

Another potential source of equity investment for MSBs is direct from larger firms. While many large and medium-sized firms have collaborated as a means of getting through the economic downturn,

“The UK risks being left behind by not having a public debt market that medium-sized businesses can access. By addressing these challenges the UK could open a new and reliable form of funding to growing firms.”

Tim Ward, *chief executive, Quoted Companies Alliance*

this could be a longer term way of providing MSBs with growth capital, not least because large firms should be in a good position to spot growth potential from amongst their supply chain. Some MSBs may not wish to take investment from just one of their customers, for others this could provide a good solution to the lack of growth capital in the market.

Government must also help ensure that any equity investments are attractive by looking at the tax incentives for corporate venturing, and entrepreneurs' relief, as well as the scope for making the costs of equity investments tax deductible on a par with debt investments.

Barriers to debt markets

MSBs need to access to long-term capital to grow their business, but many of those that are privately owned, particularly family-owned firms, are reluctant to seek external equity finance because it will dilute their ownership, believing that they can maintain a longer-term outlook by retaining ownership of the company.

Such firms therefore need access to long-term debt finance, but find it difficult and expensive to source long-term loans from their banks. The terms on which firms can borrow from banks have changed, with borrowing becoming shorter-term and more expensive, principally as a result of recent banking regulation and efforts to repair bank balance sheets. Under Project Merlin five of the UK's largest banks have committed to making £190bn of credit available in 2011 to firms of all sizes including MSBs. However this scheme is still in its infancy so it is difficult to tell whether it is having a positive effect, and in any case is designed to provide short-term working capital rather than growth capital.

Other forms of debt finance such as bonds or private placements should be an option. Many large firms have found that issuing debt, either through a private placement or through the public bond markets, has a number of advantages; they can make a return on investment over long time periods and choose investors that share in their objectives, all without reducing the equity stake of existing shareholders. However the market for MSB bonds is far less developed than in other countries, particularly the US and increasingly Germany. The minimum issuance size in the UK corporate bond market is around £100m,³⁹ and a number of barriers prevent this figure coming down to a level that would make issuing debt a more feasible prospect for MSBs. The costs of raising finance through the debt capital markets are such that it is rarely a viable solution for such firms, for example full credit ratings are expensive relative to the amount of money they are looking to raise. There is also a lack of demand for mid-sized company bonds, partly because they would not be rated at investment grade and would therefore

present too high a risk, and partly because they would be too small to attract institutional investors.

Debt markets in the US are much more easily accessed by MSBs. Such firms in the US benefit from being able to issue debt through private placements with a wide range of institutional investors with experience of investing in local mid-sized companies. The market is liquid and volumes are high, with over \$25bn raised in this way so far this year. Meanwhile mid-sized businesses in Germany are increasingly taking advantage of the Stuttgart Stock Exchange's Bondm initiative which will attract debt issuance from companies with turnovers as low as €50m. Since its establishment in May last year, it has seen 20 separate issues made by German companies with volumes ranging from as low as €25m up to €200m.

Case study:

Bondm initiative

Like British MSBs, companies in the German Mittelstand have largely relied on bank loan facilities to secure finance to support their growth ambitions. However, as in the UK, constraints on lending post-crash have turned attentions towards alternative sources of finance with new funding options being developed to meet this demand.

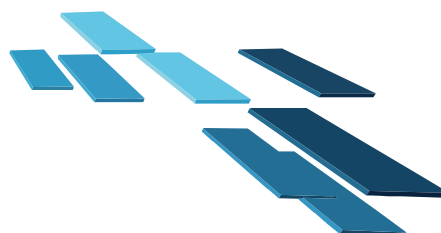
One such option is the Börse Stuttgart's Bondm initiative, a corporate bond trading segment targeted at Mittelstand companies and launched in May 2010. Companies can issue bonds directly to a stable base of private investors in denominations of €1000 and in volumes that may go as low as €25m. They benefit from enhanced market profile as well as from a more diverse financing mix. In preparing for the issue they are obliged to professionalise their governance structures and processes, instilling disciplines that can prepare them for growth.

The initiative has proven extremely popular with both issuing companies and investors. Twenty separate issues have been made by German companies to date, many of which have been massively oversubscribed by investors buoyed by a highly liquid secondary market. The initiative looks set to grow dramatically in years to come, as more companies become accustomed to issuing their own debt – a recent survey⁴⁰ indicated that as many as one in four medium-sized companies is planning to issue at some point in the future.

Establishing debt capital markets that can meet the financing requirements of mid-sized businesses could therefore be a key step in improving the growth prospects of MSBs in the UK. International examples suggest it should be feasible and sustainable, but government could act as a helpful catalyst to get the ball rolling. The first step would be to bring industry together to set up the processes for a mid-sized bond market; the infrastructure to attract bond issues, assess risk, offer affordable credit ratings to MSBs and develop a process of securitisation. Once this process is established, and depending on the economic circumstances at the time, government could also help stimulate the market by purchasing MSBs' bonds. This would need to be done through an independent body, equipped with the skills and knowledge to assess the risks and potential gains of investing in MSBs. Such an institution could also establish a way of packaging up MSB bonds to produce securities that have the right risk profile for institutional investors. However the final aim of any government assistance must be to attract a wide range of institutional investors to join the market and replace the role played by the public sector.

In the future government could also help generate retail interest in MSB bonds by setting up tax-free savings, to help ensure the longer-term sustainability of the market. The London Stock Exchange's ORB market would provide a platform for MSBs to issue bonds to the retail market, and tax-free savings via an ISA (Individual Savings Account) would help generate interest from individual investors.

A more liquid private placement market would provide a further option for larger mid-sized businesses seeking to raise development capital without the need to look to the US. Standardising documentation and encouraging the development of tax efficient investment vehicles for mid-sized corporate bonds will be important steps in developing the UK market.





Unlocking growth: conclusions and recommendations

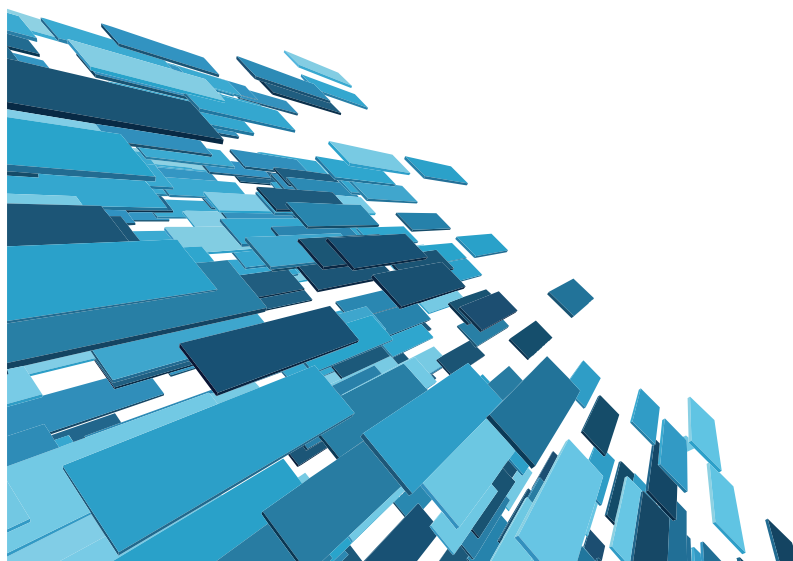
The UK faces a clear choice. Settling for the status quo would mean that a large number of MSBs in the UK would remain virtually static, with either declining, or very marginal growth. The alternative means championing MSBs and developing a plan for growth so that they can thrive, and make a dramatic impact on the growth of the UK economy.

Our vision is of a mid-sized sector that is internationally competitive, strong at exporting, innovative and growing; in other words an indispensable part of the economy. In the medium term the growth of MSBs could start to rebalance the economy, by increasing their export activity and creating jobs throughout the UK. In the longer term a strong mid-sized sector will help make the economy more resilient to future shocks, not least by providing a larger and more robust UK supply chain on which larger firms can rely.

The potential benefit to the UK economy is enormous. Our economic modelling suggests that the size of the economy could be increased by between £20bn and £50bn or by an additional 0.1% to 0.26% of GDP a year by 2020. To achieve the bottom end of our range we would need to increase the number of gazelles in the economy by 1%, and to help 25% of stagnant firms reach a steady level of growth. To reach the top end of our range we would need to increase the number of gazelles by 3% and help 50% of those in the other two groups reach a steady growth rate.

We believe that:

- Championing MSBs will increase their ambition
- MSBs must scale up their capabilities
- Repairing the finance gap will help nurture the UK's future champions



Championing MSBs will increase their ambition

The first step to ensuring we can unlock growth is by championing rather than neglecting MSBs. We know that these firms lack the sense of identity that the Mittelstand gives German firms, and tend to have a much lower profile as a result. To turn this round we want to celebrate successful MSBs and make it aspirational for those firms to carry on growing. To do so will help instil a culture of confidence and ambition that is lacking amongst many businesses. While the CBI will play its part in celebrating and give a strong voice to this segment there is also a significant role for government.

Recommendations to champion MSBs:

1. Government to recruit three more MSBs to the Prime Minister's Business Advisory Council to ensure that their needs are at the heart of government
2. UKTI to take more MSBs on trade delegations, showing other countries that the UK has a strong mid-sized sector that can compete internationally
3. BIS to improve the data that government collects on MSBs to influence future policy decisions

MSBs must broaden their skills base

MSBs must be given support to improve and extend the new skills and competencies they will need to foster growth. This will require MSBs themselves making major changes to how they manage their business. It will also involve the government removing any obstacles to MSBs building up their capabilities, and will rely on the professional networks of businesses, advisers, universities and trade bodies ensuring they are focused on delivering assistance to this sector. MSBs will also acquire a greater sense of confidence and ambition in the process.

Working across the five areas we identified in chapter 3 (management, recruitment and new ideas, choosing the right finance, exporting and innovation) we believe the solutions could lie in the following five areas:

1. Helping MSBs improve their management skills by learning from the best

Helping firms understand their own management performance and learn from best practice (see case study), could make a big difference to the way that MSBs are managed and ultimately grown. We believe that MSBs could benefit from a programme that allows them to understand their own management capabilities better and how they could improve that performance by using best practice across all firms. The British Quality Foundation runs such a programme and the case study below shows how a leading MSB has taken advantage of its service. This approach could be targeted at MSBs within a certain sector to establish interest in the scheme and demonstrate workability.

Case study: AESSEAL plc – Manufacturing firm uses management framework to benchmark and improve performance

Specialists in the design and manufacture of mechanical seals, AESSEAL is a company that is continually looking to test and improve its own performance. In recent years it has implemented the EFQM Excellence model, a framework that enables the senior management team to grade the business against a range of different criteria, from leadership and strategy to the results it delivers to customers, its workforce and the local community. To help build a rounded picture of the business AESSEAL conducts regular surveys with its stakeholders, which help guide the strategy set by the senior management team.

"The EFQM Excellence model has brought a discipline to the business that wasn't there before," says CEO Jonathan Wilkinson. "We get clear feedback, which helps us to learn more about the business's strengths and weaknesses and enables us to set a strategy to improve."

In 2009 the company won the British Quality Foundation's UK Excellence Award in recognition of its continued commitment to improving performance. The award was won after an external assessment, which has allowed the company to benchmark itself against similar companies across Europe. And although this process required the dedication of a lot of internal resource, Wilkinson believes that the benefits of it have far outweighed the costs: "The assessment process is intensive but it provides a clear and impartial appraisal of the company – we know exactly where we stand in relation to similar firms in the UK and abroad."

2. Showcasing corporate venturing through the supply chain

Many large firms already work with MSBs in their supply chain and there are strong incentives to do so as the case study on JCB shows. By nurturing the interests of MSBs, large firms can help grow their suppliers and reduce the risk that they will disappear. Areas of collaboration could include providing secondees and non-executive directors to MSBs, sharing research facilities, and taking MSBs on trade visits. Taking the idea one step further large firms could also be incentivised to invest in MSBs where they have a good sense of which of the firms in their supply chain could have significant growth potential.

3. Enabling MSBs to share best practice

Owners and managers of MSBs rarely get the opportunity to network with their peers, provide advice to others and learn from the best performers. We believe that providing opportunities for MSBs to meet each other on specific topics such as financing options, exporting and leadership could help them get an injection of new ideas that could make a difference to their growth strategies.

4. Targeting export advice at MSBs

While MSBs that use UKTI services tend to be very satisfied with the support that they provide,⁴¹ we know that more MSBs could be exporting. UKTI could do more to market itself to this segment and proactively look to target MSBs with opportunities in the emerging economies.

5. Incentivising MSBs to grow their business

MSBs are good at translating their innovation spending into revenue, creating new to market products and services or making significant improvements to old ones. We believe that creating broader incentives for innovation investment could encourage more companies in the segment to prioritise this activity, which could have a real impact on their growth. As a first step the small companies' R&D tax credit should be extended to make all aspects of design spend eligible for relief, when fiscal conditions allow.

Case study: JCB looks to invest in its

Supplying components to construction equipment manufacturer JCB should be big business for UK mid-sized companies. The company employs over 9,500 staff worldwide and exports 80% of the machines it produces in its UK factories to over 150 countries. In 1979, 96% of the components in JCB's famous yellow digger were supplied by local companies.

"JCB is very keen to use as many British components as possible", says John Kavanagh, Group Communications Director at JCB.

But there has been a very significant decline in British suppliers to JCB over the past 30 years. Many of them have ceased to exist altogether as recessions have taken their toll, while many others were bought out by foreign companies. The net result is that only 36% of the components in the current JCB backhoe loader come from UK companies.

JCB has worked hard to attract more UK suppliers. "We've actively sought out more UK manufacturers who might be able to supply JCB", says John. "We've worked with regional authorities to identify contenders and have even held supplier open days in our factories to encourage companies to bid for our business, but it remains very difficult to find new suppliers. Unfortunately, in certain areas, the expertise no longer exists in this country."

JCB prides itself on encouraging long-term partnerships with suppliers. One such example is Thomas Storey, a Manchester-based metal fabrications company from whom they have bought continuously for the last 40 years. "We also have development teams who work with our smaller suppliers to help them develop their processes so that we can be sure that they produce top quality components for us", says John.



Recommendations to boost MSBs' skills and competencies:

- 4.** Department for Business, Innovation and Skills (BIS) and trade bodies to identify sectors to pilot management surveys, working with specialists such as the British Quality Foundation to establish a cost effective method of helping MSBs identify ways of improving their management capability.
- 5.** BIS and CBI to encourage large firms to work with MSBs in their supply chain to impart best practice in leadership, innovations, recruitment, exporting and even financing, in turn strengthening their supply chain.
- 6.** CBI to bring firms together to share experiences of management challenges, financing options and exporting to help them plan for growth by learning from other MSBs and industry experts.
- 7.** BIS to promote the Export Enterprise Finance Guarantee Scheme to MSBs that qualify, so that more firms can access the finance they need to export.
- 8.** UKTI to proactively target MSBs that should be exporting and help them by signposting private and public sector providers of legal services for export, and providing an overview of their international competitors.
- 9.** HM Treasury to explore the cost and feasibility of:
 - restructuring Entrepreneurs' Relief to provide greater relief for long-term investments in companies and reduce the threshold for qualifying for the relief to below the current 5%; and
 - broadening the scope of the R&D tax credit by allowing all aspects of design to be included in the small companies' R&D tax credit.

Plugging the finance gap will nurture the UK's future champions

MSBs that want to grow and have the skills base to manage that growth need to be able to raise capital to fund their expansion. Ensuring both that MSBs can access a broad range of equity capital, for example by making it feasible for large firms to make investments in their supply chain, and that the right tax incentives are in place to make equity investment a viable prospect for business shareholders, would help unlock growth in MSBs. Finding ways to make it more feasible for MSBs to issue debt either via a private placement or via a public debt market would also help such firms access longer term capital to help grow their business. In the longer term government should also promote MSB bonds to the retail market for example through a new ISA savings type.

Recommendations to plug the finance gap:

Recommendations to plug the finance gap:

- 10.** HM Treasury to explore the cost and feasibility of:
 - reinstating a Corporate Venturing Incentive, enabling large firms to offset the cost of investing in smaller companies against their corporation tax liabilities
 - making equity investments tax deductible so they are on a par with debt investments
- 11.** BIS to set up an industry working group to develop the necessary infrastructure, systems and standards so that MSBs can issue bonds either via private placements or via the public debt markets
- 12.** HM Treasury to explore the feasibility of introducing an additional ISA savings type, once the institutional market is established, to help develop a retail market for bonds issued by MSBs in the long term

References

- 1 £10m-£100m roughly equates to firms that employ 50-499 people
- 2 Analysis based on Department for Business, Innovation & Skills data and the FAME database
- 3 *Firm growth dynamics across countries: Evidence from a new database*, NESTA-FORA working paper, Bravo Biosca, A., 2011.
- 4 Analysis based on Department for Business, Innovation & Skills data and the FAME database
- 5 Firms with 50-249 employees
- 6 *Firm growth dynamics across countries: Evidence from a new database*, Bravo Biosca, A., NESTA-FORA working paper, 2011.
- 7 Ibid.
- 8 *The German miracle keeps running: How Germany's hidden champions stay ahead in the global economy*, Venohr, B. & Meyer, K. E., 2007.
- 9 *Regional Labour Market Statistical Bulletin*, Office for National Statistics, October 2011
- 10 *Workforce job statistics*, NOMIS, September 2011
- 11 *Banks behind the curve*, Financial Times, June 26 2011
- 12 *EU to promote SME exports*, EurActiv, 21 February 2011
- 13 A survey of mid-cap companies conducted by ComRes on behalf of the CBI, July 2011.
- 14 *Management Matters* survey, conducted by the London School of Economics and McKinsey & Company, 2011
- 15 *Who should – and shouldn't – run the family business*, Stephen J Morgan, John J Dowdy, & Thomas M Rippin, McKinsey Quarterly, 2006
- 16 *Family Business Stewardship*, Institute for Family Business, June 2011.
- 17 *Management Matters* survey, conducted by the London School of Economics and McKinsey & Company, 2011
- 18 *UK Graduates Career Survey 2011*, High Fliers Research, May 2011.
- 19 *CBI Education and Skills Survey 2011*, CBI, 2011
- 20 A survey of mid-cap companies conducted by ComRes on behalf of the CBI, July 2011.
- 21 Ibid
- 22 Results from the 2010 finance survey of mid-cap businesses, Department for Business, Innovation and Skills, December 2010.
- 23 *The UK's export performance over the past decade*, ITEM Club Special Report, 2011.
- 24 Ibid
- 25 Calculations from Department for Business Education & Skills data (2011)
- 26 *German business: A machine running smoothly*, The Economist, 3rd February 2011
- 27 Ibid
- 28 *UK Innovation Survey*, Department for Business Innovation and Skills, 2009.
- 29 Ibid. – Innovation is defined as taking a new, or significantly improved, products to market.
- 30 *Community Innovation Survey*, Eurostat, 2008 – In fact MSBs in the UK are responsible for a greater proportion of R&D spending than similar sized firms in Germany
- 31 Ibid.
- 32 *UK Innovation Survey*, Department for Business Innovation and Skills, 2009.
- 33 Dow Jones, VentureSource and DFJ Esprit analysis (2011)
- 34 Ibid
- 35 *The Provision of Growth Capital to Small and Medium Sized Enterprises*, Review by Chris Rowlands on behalf of the Department for Business, Innovation & Skills, November 2009.
- 36 *Benchmarking UK Venture Capital to the US and Israel: What lessons can be learned?*, Claysse B., Knockaert M. & Wright M., British Venture Capital Association, May 2009.
- 37 *Atlantic Drift: Venture capital performance in the UK and the US*, Bravo Biosca A., Collins L., Lerner J. & Pierrakis Y., NESTA, June 2011.
- 38 *Mergers and acquisitions involving UK companies*, Office of National Statistics Statistical Bulletins, 2005-2010.
- 39 *Financing a private sector recovery*, BIS, 2010
- 40 *Bonds of Medium-sized Companies Established in German Market*, www.gtnews.com, 29th September 2011
- 41 *UKTI Quarterly Performance and Impact Monitoring Survey*, UKTI, June 2011 – 79% of firms with 100-249 employees were satisfied with the service they received from UKTI.

Glossary

Bondm

Boerse Stuttgart's trading segment specialising in bond issues for Germany's mid-sized companies

Business Advisory Council

Group of business leaders assembled by the Prime Minister to offer guidance and advice on critical business and economic issues affecting the country

Business Growth Fund

The £2.5bn fund financed by the UK's largest banks that will provide equity investments of between £2m and £10m

Entrepreneurs' Relief

Capital Gains Tax relief which can be claimed by individuals and some trustees on qualifying gains on the disposal of a business or of shares in a company

Family business

A company where the majority of votes are held by the person who established or acquired it or members of their family and where at least one family members is involved in the management or administration of the firm.

Fraunhofer

Europe's largest application-oriented research organisation, with over 60 institutes across Germany undertaking applied research of direct utility to private and public enterprise

Gazelle

A rapidly growing business: OECD defines this as a company that has recorded average annual growth rates of more than 20% over a three-year period, regardless of age

Growth Capital

Growth capital is finance that is positioned between high-risk/high-return pure equity investment and lower-risk, usually fully-secured, bank lending

Management Matters

Long-running international survey of business management compiled by McKinsey & Company and the London School of Economics

Mittelstand

MSBs that form the backbone of the German economy, at least partly responsible for the country's strong trade performance. These companies are usually defined by their qualitative rather than quantitative characteristics

Non-Executive Director

An external director of the company that sits on its board but is not part of its executive management team

Private placement

The private sale of securities, usually to a small number of chosen investors, without an initial public offering

Project Merlin

Range of commitments made by the UK's largest banks in February 2011, including to increase lending to SMEs by over 15%

Private equity

Equity capital that is not listed on a public exchange. Private equity consists of investors and funds that make investments directly into private companies or undertake buyouts of publicly listed companies that result in delisting

Public equity

Equity invested in a company that is listed on a public exchange.

STEM subjects

Science, technology, engineering and mathematics

Technology and Innovation Centres

£200m programme to establish centres that can create a critical mass of business and research innovation by focusing on a specific technology where there is a potentially large global market and a significant UK capability

Venture Capital

Capital invested in a project in which there is a substantial element of risk, typically a new or expanding business

Acknowledgements

We would like to thank the following MSBs who have helped us to understand more about their business, the challenges that they face and how these might be overcome:

Adnams	Manganese Bronze
AESSEAL	Marshall Group
Arena Group	Midas Group
ARM Holdings	Mint Hotel
ATB Morley	Muntions plc
Avesco	NRG
Benoy	Park Group
Bio Group	Pickerings Lifts
Brian Hyde Ltd	Powervamp
British Engines	Potter Group
Browne Jacobson LLP	Radio Taxis Group
Bruntwood	Renolit Cramlington
Ceres Power	Ringtons
Cogent	Rubery Owen
Cumbrian Seafoods	Soil Machine Dynamics
Daisy Group	Speedo
Dickinson Dees LLP	STV
Driver Hire	thebigword
Eco Plastics	Toye Kenning & Spencer
Edwards Vacuum	Traidcraft
Egbert H Taylor & Co	Treatt plc
Elizabeth Shaw	Unipres
Ensafe Consultants	Waterstons
Esh Group	Weidenhammer
Grant Instruments Ltd	WT Burdens
Hadley Group	
Heathcoat	
M1 Engineering	

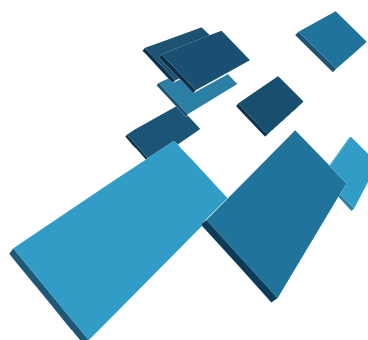
The CBI would also like to thank all those that have helped to contribute to this report and in particular Lucy Armstrong, Jyoti Banerjee, Professor William Bonfield, Albert Bravo-Biosca, David Callaghan, John Collier, Andy Cosh, Sir Michael Darrington, Gary Deans, David Dickson, Jan Alexander Ernst, Paul Everitt, Prof Clifford Friend, Joe Goasdoué, Grant Gordon, Professor Paul Gough, Irene Graham, John Grout, Geeta Gupta, Dr Jane Harrington, Trevor Harrison, Alan Hughes, Nick Hoffman, Gerhard Janßen, John Kavanagh, Douglas Kerr, Ian Knight, Wol Kolade, Paul Lambton, Christine Larkin Peter, Edward Lock, Rohan Malhotra, Hans-Dietrich Metge, Tim McEvoy, Professor McKellar, Tony Nash, Michelle Price, Steve Proctor, Kevin Sneader, Marcus Stuttard, Fraser Thompson, Tassula Tillberg, Tim Ward, Kieran West, Stian Westlake, for contributing their time and expertise to assist with research for this report.



For further information on this report
or a copy in large format contact:

Emma Wild
T: +44 (0)20 7395 8131
E: emma.wild@cbi.org.uk

Tom Thackray
T: +44 (0)20 7395 8152
E: tom.thackray@cbi.org.uk



October 2011

© Copyright CBI 2011
The content may not be copied,
distributed, reported or
dealt with in whole or in part
without prior consent of the CBI.

Product code: CAG_EBU_194

CBI

The CBI helps create and sustain the conditions in which businesses in the United Kingdom can compete and prosper for the benefit of all.

We are the premier lobbying organisation for UK business on national and international issues. We work with the UK government, international legislators and policymakers to help UK businesses compete effectively.

Our members benefit from our influence, a wealth of expertise, business services and events.

www.cbi.org.uk

Annex 1

Framework 7 Assessors:
An analysis of participants 2007-09 in comparison to UK and ROI

Sector	Year	UK	Ireland (ROI)	N. Ireland
Co-operation				
Energy	2007	10	1	0
	2008	33	6	0
	2009	23	6	0
Environment	2007	18	9	1
	2008	33	7	0
	2009	29	0	0
ERANET	2008	2	0	0
	2009	1	0	0
Food, Agriculture and Bio technologies	2007	44	9	0
	2008	38	8	1
	2009	30	5	0
Health	2007	173	22	2
	2008	62	6	1
	2009	71	6	1
ICT	2007	156	23	2
	2008	42	7	1
	2009	176	22	0
Nanosciences	2007	54	17	1
	2008	39	14	0
	2009	25	6	1
Security	2007	10	2	0
	2008	10	4	0
	2009	11	4	0
Socio-Economic Sciences and Humanities	2008	19	6	0
	2009	20	4	1
Space	2008	18	6	1
	2009	20	4	1
Transport	2007	51	5	0
	2008	34	2	0

Sector	Year	UK	Ireland (ROI)	N. Ireland
Ideas				
European Research Council	2007	126	13	0
	2008	135	8	0
	2009	316	20	2
People				
Marie-Curie	2007	72	17	3
	2008	112	33	3
	2009	64	22	2
Capabilities				
Research Infrastructure	2007	10	4	0
	2008	12	3	0
	2009	6	0	0
Research for benefit of SME	2007	33	5	0
	2008	30	9	1
	2009	14	6	0
Regions of knowledge	2007	4	2	0
	2008	5	1	0
	2009	1	0	0
Research Potential	2007	4	3	0
	2008	4	3	0
	2009	4	1	0
Science in Society	2007	9	4	0
	2008	10	2	0
	2009	5	0	0
EURATOM		7	0	0

Response from Cirdan Imaging Ltd

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Cirdan Imaging Ltd	028 9266 0880			
Organisation Address	Organisation Type (Include one or more X)			
Unit 4 Crescent Business Park Ballinderry Road Lisburn BT28 2GN	Business	X	University	
	Business Support		FE College	
	Government		Research	
	Other (Please Specify)			

Please provide some background information on the organisation

Cirdan Imaging Ltd is an SME that was founded on the 25th May 2010 and is engaged in the design, manufacture and supply of innovative medical imaging solutions for the diagnosis and treatment of cancer in surgery, radiology and pathology. The company currently has 7 employees.

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

Invest Programmes

- Proof of Concept
- R&D grant support
- Innovation vouchers

Intertrade Ireland

- Innova
- Fusion

TSB

- KTP
- Proof of Concept
- SBRI competitions

EU

- Eurostars
- FP7

R&D Tax credits

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

They are not very appropriate for micro-businesses <25 employees which make up over half of the businesses in NI. They only work for larger companies or the very small number of smaller companies focused on receiving them. The systems are too bureaucratic, micro businesses have difficulty with cashflow constraints, showing matching funding and the

grants are often too low a level to sufficiently cover the real cost of innovation, hence they are not attractive for many small business.

3. What support is available to assist organisations to access opportunities for research and development?

Very little I am aware of – Possibly Innovation vouchers but they really need to be larger and more flexible in allowing companies to develop R&D strategy plans, write grant applications.

4. How beneficial is the available support in assisting organisations?

I don't know I have seen very little evidence of it.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

Most business in NI are micro businesses with less than 25 employees. The grants are not well suited to or managed well for businesses this small.

- Cashflow is a big problem – the local grants typically are not paid until 60-90 days after submission and typically 120 days after the major expenditure – this cripples micro businesses.
- Grants do not cover overheads and makes the support close to a nil gain.
- Rarely do micro businesses get over 40% grant and in real terms this equates to less than 25% of the real costs.
- The way they are administered they are excessively bureaucratic and eat up too much time of the business.
- It is difficult for Micro businesses to prepare the necessary support documentation that Invest NI typically expects.
- Difficult for micro businesses to achieve balancing private funding – not clear how much is needed for micro businesses.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Provide better support for developing a business strategy and developing and submitting grants.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

Insist that public bodies set aside a portion of their budget to conduct R&D in conjunction with SME's. There should also be incentives for the staff in public bodies to encourage them to commission R&D from SME is to promote efficiency and cost effectiveness. Basically an expanded and regional version of the TSB - SBRI program.

Ensure we have an effective grant assistance program for micro-businesses. Pay some of the grant up front to ease the cashflow problems. Make grants really competitive – award only the best 40% - 50% of projects but give them real incentives > 60% grant and allow overheads. Competition will drive up quality and the high level of support will be a real incentive.

Award grants to prepare grant claims and submissions.

Ease the pressure on grant bodies to reduce the oversight and audit burden – make it proportional to the grant!

8. How can business and academia work to support research and development opportunities?

Revisit and expand the CAST studentships and let business be the driver in deciding how they are allocated not the other way round.

There still needs to more incentives for university to collaborate with SME's, especially micro businesses. Link HEIF funding to real results for SME's.

Universities need to address their overheads – paying full economic costs was a mistake, it didn't encourage efficiency savings.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Committee for Employment & Learning



Committee for Employment and Learning
Room 283
Parliament Buildings

Tel: +44 (0)28 9052 1653
Fax: +44 (0)28 9052 1433

To: Jim McManus, Clerk to the Committee for Enterprise, Trade and Investment
From: Cathie White, Clerk to the Committee for Employment and Learning
Date: 14 December 2011
Subject: Inquiry into Research and Development in Northern Ireland

Jim,

At its meeting on 14 December 2011 the Committee for Employment and Learning considered correspondence from the Department of Employment and Learning regarding your inquiry into research and development in Northern Ireland.

I should be grateful if you would bring the attached correspondence to the attention of your Chairperson and Committee.

Regards,

Cathie White

Enc.



Mrs Cathie White
Clerk to the Committee
Committee for Employment and Learning
Room 283, Parliament Buildings
Ballymiscaw
Stormont
BELFAST
BT4 3XX

Adelaide House
39/49 Adelaide Street
Belfast
BT2 8FD
Tel: 028 9025 7777
Fax: 028 9025 7778
email: private.office@delni.gov.uk

Our Ref: COR/1341/11

13 December 2011

Dear Cathie,

WRITTEN EVIDENCE – INQUIRY INTO RESEARCH AND DEVELOPMENT IN NORTHERN IRELAND

At its meeting of 23 November 2011, Members agreed to forward a request from the DETI Committee seeking a submission of written evidence from DEL in relation to the above Inquiry.

I attach the written evidence that the Minister has approved for submission via the DEL Committee to the DETI Committee. This submission provides details of the context of DEL's work and its engagement with the important issue of promoting Research and Development (R&D) in Northern Ireland.

DEL is committed fully to supporting and promoting R&D by the higher and further education sectors in Northern Ireland and, also, to the effective exploitation of the local research base for the benefit of the economy and also society at large.

I would ask that you forward this paper to the Chair of the DETI Committee by the deadline of 16 December 2011.

Yours sincerely,

FIONA STANLEY
Departmental Assembly Liaison Officer



ANNEX A

DETI COMMITTEE INQUIRY INTO RESEARCH AND DEVELOPMENT

Evidence from Department for Employment and Learning

Summary

The purpose of this memorandum is to provide written evidence to the Northern Ireland Assembly Committee for Enterprise, Trade and Investment on the Department for Employment and Learning's roles and responsibilities with regard to research and development in Northern Ireland.

The memorandum serves to demonstrate the Department's commitment to supporting and promoting research by the higher and further education sectors in Northern Ireland and, also, to the effective exploitation of the local research base for the benefit of the economy and society at large.

The memorandum provides information on how the Department currently supports research in the sectors and sets out the current policies, programmes and opportunities available to support innovation, research and development at Departmental, UK, EU and cross-border levels. Its focus is on higher education research but it also includes information on the very important role played by the Department in supporting the further education sector to deliver skills support to companies for research and development and innovation.

The memorandum also provides information, where possible, on comparative levels of support provided at regional level in England, in the other devolved administrations and the Republic of Ireland. This information provides evidence which demonstrates that, contrary to the statement in the published call for evidence, higher education expenditure on R&D in Northern Ireland is not the lowest of all UK regions by a considerable margin.

The content of the memorandum is arranged as per the contents page overleaf.

DETI COMMITTEE INQUIRY INTO RESEARCH AND DEVELOPMENT

Evidence from Department for Employment and Learning

Contents

1. Summary of the Department's aim, strategic objectives and key areas of activity
2. Strategic context of the Department's work in relation to this inquiry
3. DEL funding of research
4. Sources of external funding
5. Exploiting the Northern Ireland research base – DEL's Knowledge Transfer funding and outcomes
6. Conclusions

1. DEPARTMENT FOR EMPLOYMENT AND LEARNING

Departmental Aim

- 1.1 The aim of the Department for Employment and Learning (DEL) is:
- to promote learning and skills, to prepare people for work and to support the economy.

Departmental Objectives

- 1.2 The Department has two strategic objectives:
- to promote economic, social and personal development through high quality learning, research and skills training; and
 - to help people into employment and promote good employment practices.

Department's key areas of activity

- 1.3 The Department's key areas of activity are:
- enhancing the provision of learning and skills, including entrepreneurship, enterprise, management and leadership;
 - increasing the level of research and development, creativity and innovation in the Northern Ireland economy;
 - helping individuals to acquire jobs, including self employment, and improving the linkages between employment programmes and skills development; and
 - the development and maintenance of the framework of employment rights and responsibilities.

Key Business Areas in DEL relevant to the Inquiry

- 1.4 There are two Business Areas relevant to this Inquiry, namely Higher Education (HE) and Further Education, , which are administered through two separate Divisions.
- 1.5 The aim of Higher Education Division is to promote and sustain the development of an internationally competitive HE sector, accessible to all who are able to benefit, and which meets the needs of the Northern Ireland economy and wider society. The Division seeks to deliver its aim through the development of policy for the planning, funding and

administration of HE. This includes the three missions of HE: Teaching & Learning, Research, and Knowledge Transfer.

- 1.6 As well as the development of research policy, the Division has responsibility for directing and administering funding that encourages and supports research and knowledge transfer (KT) in a way that benefits the Northern Ireland economy and society. The Division also has responsibility for the policy for student loans and awards, education maintenance allowances and the payment of postgraduate awards.
- 1.7 Further Education Means Business', which was published in 2004, sets out the Department's overarching strategy for the Northern Ireland further education sector. In line with this strategy, the aim of Further Education Division is to ensure that the further education sector is at the heart of lifelong learning, in order to strengthen economic development, enhance social cohesion, and advance the individual's skills and learning.
- 1.8 Further Education Division is responsible for setting the strategic direction of the NI further education sector and its funding.

The objectives of the Division are to:

- develop and implement policy for the statutory further education sector;
- finance the further education sector;
- develop, implement and fund the Essential Skills Strategy, which is designed to improve the literacy, numeracy and ICT skills of adults;
- exercise responsibility for curriculum and qualifications below degree level;
- create new strategic partnerships between the sector and other institutions, employers and voluntary and community organisations;
- ensure adequate governance and accountability arrangements are in place;
- monitor the financial health of the further education sector; and
- provide a modern fit-for-purpose education estate which enhances the skills and employability of Northern Ireland's workforce.

Department's Main Partners - DETI/Invest NI

- 1.9 The Department works closely with the Department of Enterprise, Trade and Investment (DETI) and Invest NI in delivering key elements of Northern Ireland's Economic Vision in particular: funding research and development; promoting innovation and creativity; supporting entrepreneurship and enterprise; facilitating knowledge and technology transfer between further and higher education and industry; and ensuring that people are equipped with the skills needed by employers, both local and further afield. DEL has been closely involved in the formulation of the new Northern Ireland Executive Economic Strategy and will continue to play a key delivery role in similar areas.

Universities

- 1.10 The Northern Ireland universities are autonomous institutions, responsible for their own policies and practices. The two main institutions (Queen's University Belfast and the University of Ulster) are both considered to be research-intensive and have gained an international reputation for successful dissemination and application of cutting-edge research, knowledge transfer and the commercialisation of research ideas and innovations. They each have institutional research strategies which identify major international and national research priorities and focus their investment on future research themes.
- 1.11 They utilise the funding provided by DEL to enhance and strengthen research quality, maintain their international standing and produce research which is of benefit to the regional economy. This in turn enables them to secure external funding from a variety of sources, including business/industry, charities, the EU, UK Research Councils and other government departments, such as DHSSPS. In the majority of cases this external funding is used to support specific projects/distinct areas of work.

Further Education Colleges

- 1.12 The further education sector is made up of six area based colleges as follows:

Belfast Metropolitan College:	Belfast
North West Regional College:	Londonderry, Limavady, Strabane
Southern Regional College:	Newry, Armagh, Banbridge, Lurgan, Portadown, Kilkeel
Northern Regional College:	Coleraine, Ballymena, Ballymoney, Antrim, Newtownabbey, Magherafelt, Larne

South Eastern Regional College: Bangor, Lisburn, Newtownards,
Downpatrick, Ballynahinch

South West College: Omagh, Dungannon, Enniskillen,
Cookstown

- 1.13 The Department's implementation of FE Means Business has ensured the establishment of six large regional colleges and positioned them at the heart of workforce and economic development.

2. STRATEGIC CONTEXT OF DEL'S WORK IN RELATION TO INQUIRY

- 2.1 Growing a sustainable economy and investing in the future continues to be the central theme of the draft Programme for Government 2011-2015 and the first priority of the Executive as it was in the previous Programme.
- 2.2 This is underpinned by the draft Northern Ireland Executive Economic Strategy, the overarching goal of which is to improve the economic competitiveness of the Northern Ireland economy. The key drivers of this will be innovation, R&D and the skills of our workforce.
- 2.3 As the major providers of research in Northern Ireland, our universities make an important contribution to R&D, creativity and innovation in the Northern Ireland economy, as evidenced clearly in the Government's response to the MATRIX Report published in November 2009. The contribution of Queen's University Belfast and the University of Ulster will, therefore, continue to be central to Northern Ireland's economic development. Their R&D and wider international networks are indispensable to the further development of the Industry-led Innovation Communities proposed in MATRIX as indeed are the further education colleges' responsiveness, capacity and expertise to deliver skills support to companies for R&D and innovation.
- 2.4 However, the recent economic downturn has significantly affected Northern Ireland. Public finances are under pressure - DEL's budget for HE is reducing over the Spending Review period and while the Department has committed to funding research at an appropriate level to enable our universities to fulfil their central role to develop and sustain a world-class research base in Northern Ireland, there will be an increasing onus on our universities to use the Department's investment to maximise the income they generate from other sources.
- 2.5 There are no DEL targets relevant to R&D or KT in the Programme for Government 2011-2015. However, the draft Economic Strategy contains two targets related to KT under the heading of "Key Rebalancing Measures - Innovation, R&D and Creativity". These are to:
 - support our universities and further education colleges to undertake 155 knowledge transfer projects on behalf of local businesses by 2014; and
 - support our universities to establish 8 spin-out companies by 2013.
- 2.6 These targets are underpinned by a commitment to:
 - provide £54m funding for University research and investing in collaborative HE/FE engagement with business in 2011/12.

3. DEL FUNDING OF RESEARCH

Higher Education

- 3.1 DEL is responsible for developing and maintaining HE research policy in Northern Ireland and for funding research in the Northern Ireland universities, drawing its powers from Article 30 of the Education and Libraries (Northern Ireland) order 1993. This differs from the GB position where the policy and funding functions are carried out separately by Government Departments and their delivery bodies, the Higher Education Funding Councils. The funding provided, which is described in detail later in the memorandum is primarily designed to underpin research infrastructure in the universities.
- 3.2 DEL's aim in providing research funding is to develop and sustain a HE research sector that holds a strong position within the UK and beyond and makes a major contribution to economic and social well-being. The Department directs and administers funding in a way that encourages and supports research which is appropriate to our region and makes a meaningful contribution to the economy and the wider community. In addition the Department develops Northern Ireland policy for university knowledge transfer to ensure that knowledge derived from university research is transferred to industry and the community in a way that benefits the Northern Ireland economy and society, while also contributing to the sustainability of the research base.

Higher Education Expenditure on Research and Development (HERD)

- 3.3 The Department is the core funder of HERD in Northern Ireland. HERD comprises all research and development expenditure made by the universities. This core funding contributes to NI's highly competitive R&D sector.
- 3.4 The DETI Committee's published call for evidence states that "*Higher Education expenditure on R&D is the lowest of all UK regions by a considerable margin*". In absolute monetary terms, this statement may be correct given the small size of the region. However, a more appropriate comparator is HERD expressed as a percentage of Gross Domestic Product (GDP). On this basis, with a figure of 0.52%, Northern Ireland is performing above the UK average of 0.51%. Appendix 1 provides a detailed breakdown of Higher Education R&D spend throughout the United Kingdom. Appendix 2 provides the most recent similar information relating to the Republic of Ireland (ROI) and confirms that Northern Ireland is also performing above the ROI level.

- 3.4 DEL provides funding for the Northern Ireland universities through a number of mechanisms. The table below sets out what these are and their associated funding for academic year 2011/12.

DEL Research and Knowledge Exchange Funding – Academic Year 2011/12	
	£ million
Quality-related research (QR) funding	50.73
Higher education Research Capital (HERC)	1.63 ¹
Postgraduate (PG) Awards	23.8
US/Ireland R&D Partnership	0.5 ¹
Higher Education Innovation Fund (HEIF)	3.0
Connected	1.0
TOTAL	80.66

Quality-related Research (QR) Funding

- 3.5 As elsewhere in the UK, the majority of recurrent research funding is distributed by reference to quality, as assessed by performance in the most recent (2008) Research Assessment Exercise (RAE). RAE 2008 used research quality profiles to measure the distribution of research quality across given disciplines or subject groupings known as Units of Assessment. QR funding is used to cover the essential costs necessary to carry out research and whilst there is broad commonality of approach across the UK, each funding body has its own unique QR funding formula.
- 3.6 QR funding supports the research infrastructure necessary for the Northern Ireland universities to conduct research, including permanent academic staff salaries, premises, libraries and central computing costs. It also contributes to the costs of postgraduate research training. QR also enables the higher education institutions to conduct their own directed research, much of which is supported later by bids for funding for specific projects from external funders. This is known as the Dual Support System.
- 3.7 The plurality of funding for university-based research, from public and other sources, is a major strength of the UK system. The quality-related research funding provided by the Department, as one 'leg' of the dual support system, enables our institutions to maintain a dynamic and responsive research base of world-leading quality. This encourages ground-breaking basic research, with the potential to drive future innovation and respond quickly to changes in the external environment.

¹ These are provisional figures.

- 3.8 A report² published jointly by the four UK funding bodies and Universities UK in November 2009 examined the impact of QR funding and concluded that it plays a vital role in sustaining the research base, providing the flexibility to respond to emerging societal challenges, and supporting the next generation of researchers who will go on to deploy their skills in a whole range of sectors. The impact of this funding is wide-ranging and it is vital to sustaining our knowledge economy and supporting economic growth. The impact of QR funding was endorsed again in the UK Innovation and Research Strategy for Growth published recently by the Department for Business, Innovation and Skills (BIS).
- 3.9 QR is paid as part of the block grant to the institutions, which includes funds for learning and teaching and widening participation and, as such, can be distributed internally by the recipient university according to its own strategic priorities. The total QR funding allocation for academic year (AY) 2011/12 is £50.7m. This represents a six percent reduction on last year's funding and a similar reduction will be applied in AY 2012/13 to meet the reductions required in DEL's HE budget as a result of the Spending Review. However, the QR allocation for 2011/12 should be viewed in the context of this funding having almost doubled between AYs 02/03 (£26.7m) and 10/11 (£52m).
- 3.10 There are two main variables affecting the allocation of QR funds to each institution: quality and the number of full-time equivalent research active staff as assessed by the RAE. The outcome of RAE 2008 can be viewed in full at the following link: [Research Assessment Exercise \(RAE\)](#). However, the main highlights for Northern Ireland were strong performances over a range of subjects from Law to Art and Design, with world class performance highlighted in a number of areas including Civil Engineering, Nursing and Midwifery, Electrical and Electronic Engineering and Biomedical Sciences.
- 3.11 In addition, the 2008 results show that the proportion of research graded at the highest level has increased since the last RAE in 2001. Half the assessed research in Northern Ireland is either internationally excellent or world-leading and more than 98 per cent of our researchers are working in disciplines where world leading research is taking place.

Quality

- 3.12 As mentioned in paragraph 3.5, research quality in RAE 2008 was presented as a quality profile which enabled evaluation panels to exercise a finer degree of judgment, especially at grade boundaries. These profiles are awarded a rating, on a scale of 1* (one star) to 4* (four star). The following table shows how these ratings relate to funding multipliers. A

² Securing world-class research in UK universities – Exploring the impact of block grant funding

rating of 1* attracts no funding, while a rating of 4* attracts 7 times as much funding as a rating of 2* for the same volume of research activity.

2008 RAE rating (definition)	Funding weights in QR model
1* (recognised nationally)	0
2* (recognised internationally)	1.0
3* (internationally excellent)	3.0
4* (world-leading)	7.0

- 3.13 Using the above mechanism means that the Department has the flexibility to underpin a particular policy direction by applying a funding premium to certain research areas, for example, in STEM or economically relevant subjects, or it could pursue greater research excellence by increasing the weighting given to 3* and 4* research. So far, the Department has chosen not to go down this route as it has taken the view that as the universities are the main providers of research in Northern Ireland, it is important to maintain a broad research base. We therefore provide funding for research quality of 2* and above.
- 3.14 The quality weightings enable the Department to direct funding at pockets of excellence within our universities. However, experience has shown that with only two universities carrying out a significant level of research, final allocations remain fairly constant regardless of the weighting that we apply to each quality level.

Charities Support Element

- 3.15 An initiative in place since 2006, the Northern Ireland Charities Support Element, within the Department's block grant for research, supplements university research income received from charities. This initiative is an integral part of the wider UK Government policy to ensure long term sustainability of the research base through Full Economic Costing and is in keeping with the commitment made by Government, in its Science & Innovation Framework 2004-14, to close the gap between the full cost of charity-sponsored research and the funds currently available from universities and charities. It also mirrors the charities initiative operated by the Higher Education Funding Council for England (HEFCE) and brings the NI universities broadly into line with their English counterparts.

Research Excellence Framework

- 3.16 The RAE will be replaced in 2014 by a new framework for the assessment and funding of research, known as the Research Excellence Framework

(REF), the development of which is being led by HEFCE in liaison with the other UK Higher Education funding bodies. Research quality will be assessed using three criteria, each with its own weighting, namely outputs (65%), environment (15%) and impact (20%). The inclusion of impact reflects the policy aims across the UK to maintain and improve the achievements of the HE sector both in undertaking excellent research and building on this research to achieve demonstrable benefits to the wider economy and society. By incorporating impact as a distinct element within REF complements the approach taken by the UK Research Councils.

- 3.17 The new system will recognise and reward institutions for having achieved impact from their past research while the Research Councils focus on exploring pathways to realising the impact of new research programmes. This approach will provide the Department with the opportunity in the future to direct QR funding towards research that achieves clear benefits to economy and society and will assist DEL to deliver the commitment in the draft Economic Strategy to “progress the alignment of publically funded research with our economic priorities to increase the potential for greater knowledge exchange between business and academia”.

Other Higher Education Research funding provided by DEL

- 3.18 In addition to its QR funding, DEL also provides other smaller amounts of research funding to specific initiatives. Currently, these are as follows:

Higher Education Research Capital Funding

- 3.19 The Department allocates capital funds to support the physical infrastructure of HE. These funds are designed to recognise that good-quality buildings, equipment and information technology are essential to academic excellence in teaching and research.
- 3.20 In terms of research, the HE Capital programme aims to:
- contribute to addressing the remaining past underinvestment in a Higher Education Institutions's (HEI) infrastructure for and research; and
 - promote world-leading research capability in all disciplines with the capacity to respond to developing national/regional priorities.
- 3.21 A minimum of £7.57m has been allocated through the Higher Education Research Capital fund (HERC) for the four financial years 2011-12 to 2014-15. This is jointly financed 50:50 by the Department and the Department for Business Innovation & Skills (BIS).

- 3.22 In making its contribution, BIS requires the Department, through a Memorandum of Understanding, to ensure that HERC funding is focused on maintaining excellent departments with the critical mass to compete globally and the expertise to work closely with business, charities and public services.

Postgraduate Awards

- 3.23 The Department funds 495 postgraduate awards annually which are allocated to the universities in proportion to the amount of QR funding they receive. The unit cost for these PhD students is approximately £28k per annum (including fee, stipend, transferable skills training and supervision costs).
- 3.24 The universities allocate these places according to their own strategic priorities and they have confirmed that 70% of the awards are allocated in STEM subjects. The Department has no plans currently to reduce this allocation.
- 3.25 The Department is also funding the run-out of 300 additional PhD places introduced under the last Programme for Government. These places were directed at areas of economic relevance as agreed with DETI.
- 3.26 The Department's continuing support for the 495 postgraduate awards, 70% of which are allocated in STEM subjects, will ensure that an adequate supply of highly qualified graduates is available to the workforce. It should, however, be noted that this represents only a small proportion of the total PhD places accommodated by the universities. In any one year, this stands at around 2,000 which are supported from a wide variety of sources including UK Research Councils, charities and business, while some are self-funded.

US-Ireland R&D Partnership

- 3.27 The US-Ireland R&D Partnership represents an ongoing and ideal opportunity for research collaboration between US universities and the Northern Ireland universities in the eligible areas of nanotechnology, sensor technology, diabetes and cystic fibrosis. Following an approach from the US-Ireland Steering Group, DEL has also agreed to extend the areas for collaboration to include energy / sustainability and telecoms.
- 3.28 Announced in 2006, the aim of the Partnership is to increase the level of collaborative R&D among researchers and industry across the US, Ireland and Northern Ireland, that will generate valuable discoveries and innovations which are transferable to the marketplace, or will lead to enhancements in health promotions, disease prevention and healthcare.

- 3.29 All project proposals are subjected to the "gold standard" international peer review processes operated by the US agencies i.e. the National Science Foundation (NSF) and National Institutes of Health (NIH).
- 3.30 Eight projects are currently being supported in the four original areas representing an investment across the three jurisdictions of circa £13m/€15m/\$21m. Six of these are supported by DEL (4 Queen's / 2 Ulster) and two by the Health and Social Care R&D Office of the DHSSPS (both Queen's).

Further Education

- 3.31 Further Education Division's Employer Support Programme, which commenced in the current financial year (2011/12) and will run until 2014/15, has been introduced to improve the further education colleges' responsiveness, capacity and expertise to deliver skills support to companies for research & development (R&D) and innovation. This earmarked fund equates to approximately £6.7m over the next four years and while not focusing exclusively on R&D activities, offers the potential to support bespoke college R&D projects, in collaboration with local businesses.

4. SOURCES OF EXTERNAL FUNDING FOR HE RESEARCH

- 4.1 The universities have a responsibility to supplement the QR funding provided by DEL by applying for research funding for specific projects from external bodies such as the UK Research Councils, Invest NI, industry, charities and the EU. This is known as the Dual Support System. The key external funding sources are described below.

UK Research Councils

- 4.2 About 10-20% of the research income to the Northern Ireland universities is secured from the UK Research Councils. In 2009/10, this amounted to just over £89m.
- 4.3 Each year, the seven Research Councils invest around £3 billion in UK research covering the full spectrum of academic disciplines from the medical and biological sciences to astronomy, physics, chemistry and engineering, social sciences, economics, environmental sciences and the arts and humanities.
- 4.4 Their focus is on excellence with impact. They aim to nurture the highest quality research, as judged by international peer review and so provide the UK with a competitive advantage.
- 4.5 The global research arena in which universities operate today requires the Research Councils to offer a diversity of funding approaches, including fostering international collaborations, providing access to the best facilities and infrastructure, and locating skilled researchers in stimulating environments.
- 4.6 Going forward, it is the stated intention of all Research Councils that funding generally will be further concentrated on research centres (known as Doctoral Training Centres) of proven excellence and with the critical mass and multi-disciplinary capacity to address national challenges and compete internationally. Increased emphasis will also be placed on bringing people together so that researchers have access to a wider range of facilities and equipment through pooling resources and expertise.
- 4.7 To date, Queen's University Belfast has been successful in obtaining Doctoral Training Centre status with the Engineering and Physical Sciences Research Council but unsuccessful with in its application to the Economic and Social Research Council.

European Commission

- 4.8 The European Framework Programme for Research and Technological Development (FP7) is the principal instrument for funding European research to promote excellence in scientific and technological research, enhance the EU's international competitiveness, and promote research in accordance with EU policy. FP7 will run from 2007-2013.
- 4.9 FP7 represents a particular opportunity for research funding for our universities. Northern Ireland has a drawdown target of €50m for FP7. As at 31 March 2011, €30m had been drawn down of which 72% (£21.5m) is attributable to the two universities. The percentage drawdown by the Northern Ireland universities is higher than the average (66%) for UK HEIs and is a significantly larger share than that obtained by HEIs across FP7 as a whole (42%). To date, UK HEIs have received an average of €397K for participation in FP7, 21% above the HEI average of €327K.³
- 4.10 Under the Barroso Taskforce, the Northern Ireland Executive has set a target to achieve a 20% increase in the drawdown of overall European funding by 2015. While Invest NI / DETI is the policy-lead with respect to promoting the European Framework Programme to Northern Ireland companies and universities, DEL has established an EU Framework Support Fund of £80k per annum to encourage greater participation in and hopefully, drawdown by the universities from FP7 and its successor, Horizon 2020, which will have a budget of €80billion available across all Member States.

Technology Strategy Board

- 4.11 A more recent UK initiative (emanating from BIS) is the Technology Strategy Board (TSB).
- 4.12 The TSB is the UK's national innovation agency, charged with accelerating economic growth by stimulating and supporting business-led innovation. As such, its vision is for the UK to be a global leader in innovation and a magnet for innovative businesses, where technology is applied rapidly, effectively and sustainably to create wealth and enhance quality of life.
- 4.13 The TSB offers a range of innovation support programmes, some of which can involve universities. The most recent and high profile example is its new £200m programme to establish a network of six world-leading Technology and Innovation Centres, operating under the brand name of Catapult Centres, which will to transform the UK's capability for innovation in specific technology areas and help drive future economic growth.

³ Source: The impact of the EU RTD Framework Programme on the UK, Technopolis, May 2010.

- 4.14 Catapult Centres will be charged with creating critical mass for business and research innovation by focusing on a specific technology where there is a potentially large global market and a significant UK capability. These centres will be an important part of the UK's innovation system, making a major long-term contribution to UK economic growth. They will allow businesses to access equipment and expertise that would otherwise be out of reach, as well as conducting their own in-house R&D. They will also help businesses access new funding streams and point them towards the potential of emerging technologies.
- 4.15 The first Catapult – in High Value Manufacturing – was launched in October 2011. Catapults in Cell Therapy and Offshore Renewables will be launched in 2012 with all six being operational in 2013.
- 4.16 It is envisaged by BIS that these Centres will further bridge the gap between universities and businesses, helping to commercialise the outputs of the UK's world-class research base.

Invest NI

- 4.17 Invest NI offers a number of programmes, such as Knowledge Transfer Partnerships, Innovation Vouchers and Proof of Concept, which fall within the dual support system and also support links between business and academia. Details of these are not provided in the memorandum as it is assumed that the Committee for Enterprise, Trade and Investment will already be familiar with them.

5. EXPLOITING THE NORTHERN IRELAND RESEARCH BASE – DEL'S KNOWLEDGE TRANSFER FUNDING AND OUTCOMES

- 5.1 KT is the universities' "Third Mission" after teaching and research. KT refers to the universities' interaction with business and the wider community, and also to the commercial exploitation of the research base through licensing, through other commercial agreements and spinning out new companies (usually owned or part owned by the university).
- 5.2 In Northern Ireland, DEL is responsible for providing the underlying core funding for these important activities through the Higher Education Innovation Fund (HEIF). This core funding is particularly important as it is not only aimed at enabling the universities to support the wider economy, but also at ensuring their sustainability through supporting activities which enable them to lever income from business and other organisations.
- 5.3 The core funding delivered through HEIF is supplemented by DEL's Higher and Further Education Collaboration Fund ("Connected").

HEIF

- 5.4 The objective of HEIF is to encourage the higher education sector to increase its capability to respond to the needs of business (including companies of all sizes) and the wider community, with a clear focus on the promotion of wealth creation. The long term aim of this funding is to improve Northern Ireland's innovation performance as a key element in raising productivity and delivering economic growth.
- 5.5 The first two rounds of NI HEIF (which commenced in 2004) were a joint initiative of the Department and Invest NI. However, following a full evaluation of the programme commissioned in 2009/10, NI HEIF 3 is now being taken forward solely by the DEL having become part of the Department's core funding.
- 5.6 The funding for NI HEIF 3 has been maintained at £3m per annum for the current three year programme which commenced in 2010/11 and has been allocated to Queen's University Belfast and the University of Ulster on the following basis:
 - 20% - Foundation Funding which is split equally between the two institutions and focused on strategic / longer-term planning;
 - 80% - Formula Funding which is allocated on the basis of the performance metrics for the two most recent Academic Years for which published data is available. These metrics are the same metrics as used for NI HEIF 2, thereby, critically, facilitating a degree of continuity between NI HEIF 2 and NI HEIF 3.

- 5.7 This metrics-based or formulaic approach reflects wider UK Government policy which supports the establishment of permanent and predictable funding streams for university-based KT activities thus allowing universities to plan strategically and retain experienced key staff and KT practitioners.
- 5.8 The funding for NI HEIF 3 was predicated on the submission by the universities of Knowledge Transfer Strategies which were agreed with the Department in consultation with the DETI and Invest NI.
- 5.9 Given the underpinning role of HEIF in supporting the universities' KT infrastructure (i.e. the Knowledge Exploitation Unit at Queen's and the Office of Innovation and Enterprise at Ulster), these KT Strategies are required to cover all the universities business and community facing activities, not only those funded directly by HEIF, or indeed by DEL.
- 5.10 However, the types of activities to which the universities allocate their HEIF funding include:-
- promoting enterprise in the universities and networking between the universities, business and other communities who use the outputs of research
 - supporting the infrastructure and capability to transfer knowledge from the universities into business and the community through applied research, technology and knowledge development, expertise in continuing professional development and consultancy, linking with the full range of business
 - acquiring new technology and the generation of solutions to real world problems, the provision of training in the application of these technologies, and the transfer of knowledge through communities of practice
 - improving communication with regional, national and international businesses
 - making it easier for the business community to find out about and gain access to the full range of expertise/facilities the universities have to offer
 - creating the capacity to transfer knowledge and higher level skills training to local SMEs
 - training and education for university staff targeted at making them more aware of business needs and opportunities for knowledge transfer, including enhanced programmes of staff exchange between the universities and business

- creating the capability to protect and exploit intellectual property, both through licensing and the mentoring/support of new innovation-centric spinout companies
- closer engagement with the public and voluntary sector, particularly through the successful (joint Queen's/Ulster) NI Science Shop
- Internationalisation of research with a view to transferring the acquired know-how into the local business arena

Connected

- 5.11 In Northern Ireland, HEIF is complemented by the "Connected" programme which enables the HE and FE sectors to join together in order to identify and meet, in a coordinated and holistic fashion, the KT needs of businesses in particular, and also the wider community.
- 5.12 The programme was originally launched by the Department in 2007 following extensive consultations with key stakeholders; and was re-launched as Connected 2 in 2010 for a further four years until March 2014 following a very positive independent evaluation.
- 5.13 Like its predecessor, Connected 2 has a budget of £1 million per annum and is delivered by Queen's University Belfast and the University of Ulster, in partnership with Colleges Northern Ireland.
- 5.14 This joint HE/FE initiative is the first of its kind in the UK and the Funding Councils in GB are looking at it closely to see if it is something which could be rolled out in England, Scotland or Wales.
- 5.15 The evaluation report highlighted, in particular, the step change which Connected had achieved in terms of coordinated interaction between the HE and FE sectors with respect to their business facing activities. Before Connected, the HE and FE sectors had generally worked independently of each other.
- 5.16 In essence, Connected provides a "one-stop-shop" for companies wishing to access the technology/training expertise within Queen's, Ulster and the six Regional Colleges. However, it doesn't just provide a referral service - it will discuss the company's R&D/training needs, facilitate the appropriate introductions and monitor any resulting projects in order to ensure the company is getting the service it requires at each stage.
- 5.17 In addition to the 437 company-based projects completed between 2007 and 2010 (representing an income to the universities and colleges of just under £1m and an estimated Net Present Value – i.e. benefit - per project of £20k), Connected 1 has also established an impressive cadre of

sectoral initiatives which are designed to address the future needs of business and the wider community and utilising the distinctive provision of the Connected partners.

- 5.18 Fifteen such initiatives were established under Connected 1 including the highly successful 'Polymer Technician Apprenticeship Programme' (led by the Polymer Processing Research Centre at Queen's and the South Eastern Regional College and a recipient of a prestigious Business Eye award), a major 'Open Source Software' initiative introducing SMEs to the benefits of Free & Open Source Software (led by the University of Ulster and the Southern Regional College) and the "PACE" programme which links online courses with face to face delivery seminars for local employers (led by Belfast Metropolitan College and recipient of a *Learndirect's* Working with Employers Award).
- 5.19 Fifteen new sectoral initiatives are currently being delivered by Connected 2 ranging from Computer Integrated Engineering, Sustainability and Renewable Technology, through to Green Construction, Digital Mapping and Composites.
- 5.20 These sectoral initiatives very much complement and support the overarching MATRIX recommendation for the creation of cross-sectoral and cross-disciplinary Industry-led Innovation Communities (IICs). These communities aim to explore clearly identified emerging market opportunities. By working within the MATRIX sectors, Connected will continue to position itself to complement and add value to these future IICs.
- 5.21 Connected also has an international dimension. For example, through its Creative Industries" sectoral initiative, Connected has been able to establish and develop excellent links with industry and academia in California. These links include Stanford University, Lucas Film, Disney Pixar, IDEO (an award-winning global design firm) and the University of Central California.

KT and Spin-Out Performance

- 5.22 The outcomes from this ongoing investment, through HEIF in particular, is reflected in the latest UK-wide Higher Education – Business & Community Interaction (HE-BCI) survey which showed that Queen's University and the University of Ulster leveraged investment from companies and non-commercial organisations of circa £50m during 08/09 for key Knowledge Transfer services (such as consultancy and contract research etc). This represents an excellent performance, particularly in the current economic climate.

- 5.23 The critical importance of DEL's core investment in innovation and Knowledge Transfer is further reflected in the success of Queen's University in the prestigious "Entrepreneurial University of the Year" category in the 2009 Times Higher Education Awards, the continued progress of QUBIS Limited as one of the UK's top university spin-out agents, and the recognition in the recent Kitson Report that Northern Ireland is now the leading UK region for links between business and academia.
- 5.24 This progress reflects the success of the Department's policy of providing a dedicated stream of predictable and permanent core funding for Knowledge Transfer. This approach is enabling both Queen's and Ulster to ever more fully embed "Third Mission" priorities within their wider strategic thinking and is underpinning their ongoing and growing commitment to enterprise and to the stimulation of economic growth and job creation in Northern Ireland.
- 5.25 In Northern Ireland, we are fortunate to have two leading, research intensive universities which are wholly committed to the successful commercial exploitation of the local research base, through both effective Knowledge Transfer and spin-out activity.
- 5.26 In 2009/10 and compared to other UK countries, Northern Ireland (i.e. Queen's University Belfast and the University of Ulster) had the highest number (20) of spin-outs per institution (with some university ownership and which are still active after 3 years) (i.e. 40 overall). This per institution figure of 20 is almost four times more than the UK average of 5 per HEI.
- 5.27 A major factor in this success is QUBIS Ltd which, over the past 25 years, has created more than 50 high technology companies and over 1000 jobs, and is continuing to make a very significant contribution to the local economy generating an expected turnover of £104m in 2010.
- 5.28 QUBIS' current portfolio of 27 companies includes names such as Kainos, Andor, Lagan Technologies and Fusion Antibodies all of which are bywords for international success. Furthermore, over 90% of QUBIS companies' products and services are exported around the world with total sales for 2011 expected to be in the region of £116m. In this way QUBIS, which is supported by HEIF, is providing a global platform highlighting to the rest of the world both the excellence and relevance of the Northern Ireland research base.
- 5.29 Through its venture capital fund, QUBIS Ltd can invest cash amounts, usually of between £10,000 to £50,000, in each project at the time of start-up. In return QUBIS looks for an equity (normally ordinary shares) stake in the new venture. In addition, projects which require additional funding can

also approach the Queen's University Innovation Fund (QUBIF), a £1 million venture capital fund, set-up by Invest NI to invest in post Proof of Concept, pre-commercialisation spin-out companies. The Fund will make a number of 'seed' and early stage investments over the four year period leading up to March 2014.

- 5.30 The Fund Manager, E-Synergy, will principally be looking for companies with compelling, scalable high growth business propositions. Funding rounds will be typically in the range of £50k to £200k and investments must be strongly related to the QUB research base.
- 5.31 The nearest equivalent to QUBIS at the University of Ulster is Innovation Ulster Ltd which is a legally constituted vehicle through which the University engages commercially with the business community and investors. Profits and surpluses from commercial activity are brought back into the University for distribution to the academic community and associated faculties and schools.
- 5.32 Innovation Ulster Ltd is a 100% wholly owned subsidiary of the University of Ulster. The spin-out companies it supports can also apply to the Ulster Innovation Fund, the University of Ulster equivalent to QUBIF.

6. CONCLUSION

- 6.1 R&D and knowledge transfer undertaken by our universities and further education colleges have an important role to play in successfully rebuilding our economy. DEL is committed to supporting and promoting research by the higher and further education sectors in Northern Ireland and, also, to the effective exploitation of the local research base for the benefit of the economy and society at large.
- 6.2 The plurality of the current funding system for higher education works well and it will be important that, looking to the future, funding is maintained at appropriate levels by all funders to ensure that the universities fulfil their central role to develop and sustain a world-class research base in Northern Ireland.
- 6.3 Moving forward, DEL's priorities for HE research will be to:
- maintain a balance in funding between blue skies, curiosity-driven research and applied research targeted at supporting identified national and regional needs and priorities, in line with the commitment in the draft Economic Strategy for greater alignment of publically funded research with our economic priorities;
 - complete the development of the new Research Excellence Framework to assess the quality of research outputs, their impact on the economy and society, and the vibrancy and professionalism of the research environment;
 - continue to develop the infrastructure and human capital required to support industry collaborations, knowledge transfer and inward investment;
 - encourage full engagement by our universities in UK funding opportunities, in particular, those offered by the UK Research Councils and Technology Strategy Board; and
 - support our universities to maximise their contribution to the achievement of the Barroso Taskforce target of increasing the drawdown of European funding by 20% by 2015.

**Department for Employment and Learning
December 2011**

APPENDIX 1

**Expenditure on R&D performed in Higher Education by Government Office Region:
Current prices & as a percentage of GDP,
1999 to 2009**

	Higher Education R&D Expenditure (£million)											% of total	% of GDP ¹										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Scotland	411	440	525	608	618	641	689	772	870	939	984	13.6	0.54	0.56	0.65	0.71	0.68	0.67	0.69	0.72	0.77	0.82	0.86
London	837	895	1,007	1,108	1,148	1,188	1,356	1,458	1,559	1,647 ^r	1,732	24.0	0.46	0.47	0.51	0.52	0.50	0.49	0.53	0.54	0.53 ^r	0.55 ^r	0.58
North East	113	122	146	166	170	176	189	206	222	231	242	3.3	0.36	0.38	0.43	0.47	0.45	0.45	0.46	0.48	0.49	0.51	0.54
Yorkshire & Humber	270	284	326	356	373	388	419	457	493	501	527	7.3	0.39	0.40	0.44	0.45	0.45	0.45	0.47	0.49	0.50	0.51	0.54
Wales	129	139	159	188	188	198	221	235	254	261	263	3.6	0.36	0.38	0.42	0.47	0.44	0.45	0.48	0.49	0.50	0.52	0.53
Northern Ireland	64	70	75	88	107	124	134	139	139	146	163	2.3	0.30	0.32	0.33	0.36	0.42	0.45	0.47	0.46	0.43 ^r	0.46	0.52
East of England	255	324	376	421	442	464	506	520	580	590	617	8.5	0.32	0.39	0.44	0.46	0.45	0.45	0.46	0.45	0.47	0.48	0.51
South East	493	515	578	636	659	678	772	836	912	955	1,016	14.1	0.37	0.37	0.39	0.40 ^r	0.40	0.39	0.42 ^r	0.44	0.45	0.48	0.51
North West	260	287	331	370	390	416	475	531	560	569	611	8.5	0.28	0.29	0.33	0.35	0.35	0.35	0.39	0.42	0.42	0.43	0.46
East Midlands	182	204	230	246	239	244	271	289	307	311	362	5.0	0.31	0.33	0.36	0.36	0.33	0.32	0.34	0.35 ^r	0.35	0.35	0.42
West Midlands	180	192	213	231	245	269	293	303	322	334	361	5.0	0.24	0.25	0.26	0.27	0.27	0.29	0.31	0.30	0.31	0.32	0.35
South West	148	160	183	200	206	218	255	278	300	315	350	4.8	0.21	0.22	0.24	0.24	0.23	0.24	0.26	0.27	0.28	0.29	0.33
UK	3,324	3,691	4,149	4,618	4,785	5,004	5,580	6,022	6,519	6,798 ^r	7,228	100.0	0.35	0.37	0.40	0.42	0.41	0.41	0.44	0.45	0.46	0.47	0.51

Source: ONS and
Scottish Government

Notes:

1. Market price GDP estimated for the regions based on the UK GVA to GDP ratio.
2. r denotes revised figures.
3. Ranked by percentage of GDP 2009.

APPENDIX B

Republic of Ireland – HERD as a percentage of GDP						
	1998	2000	2002	2004	2006	2008
HE expenditure on R&D	N/K	N/K	€322m	€492m	€601m	€750m
HERD GDP Ireland	0.26%	0.23%	0.25%	0.33%	0.34%	0.39%

Source: OECD Main Science and Technology Indicators, May 2010 and Forfás data

Response from Committee for OFMDFM



Committee for the Office of First Minister
and deputy First Minister
Room 435
Parliament Buildings
Tel: +44 (0)28 9052 1903

From: Alyn Hicks
Clerk to the Committee for the Office of the
First Minister and Deputy First Minister

Date: 16 February 2012

To: Jim McManus
Committee for Enterprise, Trade and Investment

Subject: Response to Inquiry into Research and Development

Jim,

At its meeting of 15 February 2012, the Committee for the Office of the First Minister and deputy First Minister agreed to forward to the Committee for Enterprise, Trade and Investment the attached response from the Office of the First Minister and deputy First Minister to the Inquiry into Research and Development.

Alyn Hicks
Committee Clerk

Mr Jim McManus
Committee Clerk
Committee for Enterprise, Trade and Investment
Room 424
Parliament Buildings
Ballymiscaw
Stormont
BELFAST BT4 3XX



06 February 2012

Dear Jim

Committee for Enterprise, Trade and Investment Inquiry into Research and Development

You recently sought views by way of written evidence to the Committee for ETI's inquiry on the subject of Research and Development.

The Executive has set out its position and actions on R&D and innovation in the draft Economic Strategy which includes a theme entitled 'Stimulating Innovation R&D and Creativity'. The Departments should reply to your inquiry with the detailed measures they plan to undertake in support of this.

You have indicated that the Committee considers it essential that we maximise our potential to access all available opportunities for R&D support for business. While the Department is not primarily involved in promoting R&D in the business sector, and the degree to which the Department can answer the information is therefore more limited than other Departments, it should be noted that we have sought to prioritise R&D by including a commitment to support £300 million investment by businesses in R&D, with at least 20% coming from small and medium sized enterprises.

In addition, research being led by OFMDFM and supported by DEL and DSD is based on evidence that vulnerable families can be assisted into work if they are given sufficient support structures. We would suggest that when providing assistance to companies to improve R&D that the company give due consideration to working with organisations which specialise in individual placement and support in employment. Companies should also be encouraged to

provide employer supported childcare as it is known that such provision can help parents to enter the labour market.

The R&D support given to companies, if even partly linked to efforts to draw in unskilled workers and train them, can help the Executive to fulfil its statutory obligation to demonstrate how the measures it is taking contribute to the 2020 child poverty reduction targets.

It is important that while growing the economy we do not unintentionally contribute to social exclusion. Assisting companies to develop their R&D activities provides the Executive possibly also with an opportunity to encourage wider social access to potentially highly paid jobs. To our knowledge DEL looks to have one of the best records in the UK for assisting students from low income backgrounds to stay in higher education. Collaboration between DEL and DETI in this important R&D initiative may go some way to improving social mobility and creating a more just society. We would support such initiative whole-heartedly and would encourage policies being put in place that will support low income groups in sharing in the benefits that are expected to result.

Yours sincerely

Signed Gail McKibbin

GAIL MCKIBBIN

Departmental Assembly Liaison Officer

Response from Craigavon Borough Council

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Craigavon Borough Council	028 3831 2400			
Organisation Address	Organisation Type (Include one or more X)			
Craigavon Civic and Conferencing Centre Lakeview Road Craigavon BT64 1AL	Business		University	
	Business Support		FE College	
	Government	X	Research	
	Other (Please Specify)			

Please provide some background information on the organisation

The Council spends £21 million providing a wide range of quality services to the 90,000+ people living in the area - evidence in itself that the Council play an important role in many aspects of the Borough and the life of its residents.

The Council provides over 80 services to the local population. Key services include refuse collection and disposal, street cleansing, community development, economic development, environmental health, leisure services, parks provision, arts, tourism development and sports development.

Our Vision is to "serve and lead people in Craigavon". To continuously improve and develop our services and our leadership so that by working together we improve our quality of life, develop pride in our community and shape our future.

Main Council Functions

The Council is responsible for three main functions;

- Service Provision
- Advocacy - The Council represents all the residents in the Borough and lobbies Government Agencies and other bodies to acquire benefits for the Borough through both a consultative and representative role. Councillors can also influence education, planning, roads, health & social services by representing local people's interests. However, the Council does not have any direct responsibility for these areas.
- Development - The Council acts as the main body in attracting investment for further developments throughout the Borough and helps other organisations to do likewise.

Section 2 Questions to Consider

1. **What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**

TSB Grant for Research and Development

The Technology Strategy Board provide R & D grants to small businesses for the following

- **Proof of Market** - funding market research and testing, competitor analysis, intellectual property issues and planning costs associated with taking the product or service to market. A grant of up to £25,000 is available as long as this accounts for no more than 60 per cent of the total project cost. The project must last no longer than nine months.
- **Proof of Concept** - funding feasibility studies, prototyping, testing, protection of intellectual property and analysis of likely production techniques. A grant of up to £100,000 is available as long as this accounts for no more than 60 per cent of the total project cost. The project must last no longer than 18 months.
- **Development of Prototype** - funding demonstration models, protection of intellectual property, any trials or testing (including market testing) required. A grant of up to £250,000 is available as long as this accounts for no more than 35 per cent of the total project cost for medium-sized businesses, and no more than 45 per cent for small businesses. The project must last no longer than two years.

In order to qualify, the research and development (R&D) project you want to fund must be in the area of science, technology or engineering, and you must be able to show that the project is likely to produce significant returns. Funding is only open to single companies.

Invest NI

INI offers both advisory and financial support to businesses in terms of:

- workshops on issues related to research and development.
- Signposting to other sources of advice and assistance.
- One-to-one advice on planning an R&D project.

They may also provide funding to help with:

- scoping, defining and planning an R&D project
- research or critical investigation aimed at producing new scientific or technical knowledge
- product or process development or improvements
- exceptional development of leading edge technology
- contracted research
- linking to a college or university to carry out specific projects.

The EU Framework Programme for Research and Innovation through Intertrade Ireland

InterTradeIreland is responsible for the promotion of North/South collaboration in relation to FP7 European funding.

Around €20bn worth of European funding is available for research and innovation projects through the FP7 programme and some €80bn anticipated funding will be available through its successor, Horizon 2020 launching in 2014.

Their FP7 support programme aims to help companies and academics in Ireland and Northern Ireland access the expertise they need for their research application and develop partnerships on an all-island basis. This assistance includes:

- A notice board service designed to help you identify partners for your collaborative EU FP7 projects on a cross-border basis. Here you'll find projects looking for a partner to play a specific role within their proposed application.
- Focus on FP7 series - this series of events will help to provide you with a better understanding of specific FP7 calls.
- Financial support to develop research partnerships, with the new InterTradeIreland Cross-border Collaboration Voucher which can be redeemed against the cost of travel or accommodation for up to £500 / €550 when meeting with partners, or potential partners, of FP7 projects.
- Free FP7 information and advice service to help you identify North/South partners for FP7 programme applications, through our dedicated EU Coordinator – Dr Simon Grattan.

FP7 Funding is available to:

- An academic, researcher or small company;
- To be eligible, small companies must have less than 50 employees and an annual turnover of less than €10 million;
- Part of a consortia engaging in a European funding application process (within the FP7 programme) with partners on both sides of the border or trying to establish a partnership with the objective to engage in FP7 funding applications/projects.

Intertrade's Innova programme helps ambitious businesses across the island to collaborate and form a strategic innovation partnership with another company - to get great products, services or processes off the ground.

Companies can claim up to £250,000/€285,000 per partnership to cover staff, equipment, consultancy and operating costs of the innovation project. Partners must be based in the other jurisdiction.

Craigavon Borough Council's You Can Develop It Programme

You can Develop It works to encourage and support Craigavon companies to implement significant improvements that will help accelerate their growth, develop their capacity to compete in an increasingly competitive marketplace. Companies are guided on how to think strategically and plan and behave innovatively to take their product/service forward. This will mean the concurrent development of new products and the development of the human capital managing the SME resulting in the companies accelerated growth.

The You Can Develop It Innovation Programme provides:

1. Mentoring and coaching to:
 - Assist the participating companies to develop an Innovation Strategy Roadmap
 - Assist the companies in implementing significant improvements that will help accelerate their growth;
 - Encourage the businesses to develop their capacity to compete in an increasingly competitive market place;
 - Assist the businesses to think, plan and behave innovatively in relation to the stage their product / service is at in its life cycle and to the preparation needed for bringing into being the next product generation;

- Assist local businesses achieve appropriate accreditations such as, ISO 9001, and Investors in People, should they be deemed necessary to compete in their sector;
 - Assist the local enterprises to eradicate deficiencies in their NPD processes;
2. In-depth research & development and mentoring to:
 - Assist with the identification of opportunities for new product design, prototyping, testing and research & development.
 - Assist local businesses, through appropriate research and development processes, to develop their new product / service to a “ready for market” stage where funding for full manufacturing and market launch is required
 3. Mentoring to:
 - Encourage and enable the businesses to develop their capacity to compete in an increasingly competitive market place; resulting in significantly increased business activity, new sales and the need to create new jobs

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

Innovation and the development of new products, processes, services and technologies for businesses across all sectors and of all sizes are essential to the future growth of the Northern Ireland Economy. Equally supporting the export of new products and services is essential to future growth. We welcome the diversity of the programmes currently available and that they target SMEs as well larger businesses. Anecdotal evidence and feedback from local companies however suggests that the process of achieving support and funding for research and development is very slow, cumbersome and bureaucratic. We would suggest that the process of achieving funding should better match the capacity / needs of our existing SMEs to ensure that the funding support available is fully utilised and the benefit to the local economy is maximised.

3. What support is available to assist organisations to access opportunities for research and development?

As discussed above INI and Intertrade Ireland provide a range of supports including awareness raising and mentoring and identifying research partners. Craigavon Borough Council has also provided a similar service to local companies as part of the You Can Develop It programme.

4. How beneficial is the available support in assisting organisations?

As discussed above the majority of businesses we receive feedback from identify the complexity of the process of receiving funding and support for research as a significant barrier. However Craigavon Borough Council's recent You Can Develop It project has generated positive feedback with participants identifying that the support provided has made a significant difference to their R & D projects. We are not aware of results of evaluations of the other projects discussed above and it is therefore difficult to comment on this question other than to say that the experience of the ‘You Can Develop It’ project indicates there is a huge potential for support projects to benefit organisations in R & D where that support is accessible and tailored to the individual needs and situation of the organisation.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

From feedback from local companies the main barriers to becoming involved in research and development are:

- Cost – the initial costs of researching a new product or service is a barrier to many especially when the returns on that investment may not be realised for a long time while the product is tested and eventually brought to market.
- Awareness - Many companies are not aware of the supports available to businesses and therefore do not consider the research and development of new products as an option available to them.
- Capacity – Many companies do not have enough knowledge of the R & D process or have the resources to pursue R & D.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Feedback from local companies suggest that the Government could do more to either simplify the application process for local companies to achieve funding for R & D or provide more hands on support / mentoring for companies going through this process.

In addition local feedback indicates a low level of awareness from SMEs with regard to the opportunities available to them which would suggest there is an opportunity to create more awareness of the programmes on offer and how they might be accessed by local SMEs.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

As discussed above greater awareness raising and direct mentoring / application support would help to ensure that more local companies are able to avail of research and development opportunities.

Given that awareness is an issue a programme that would introduce the basics of R & D to companies embarking on this for the first time or who have never considered R & D may be beneficial. Following on from this support in identifying R & D programmes and working through the application process may also be beneficial.

8. How can business and academia work to support research and development opportunities?

Academia has a wealth of knowledge in terms of the research and development process and also in terms of gaining funding and support to implement research projects. Academia can therefore provide an invaluable source of mentoring to businesses interested in research and development and new product development.

Equally for businesses already engaging in R & D academia can provide a beneficial R & D / consultancy service.

The sourcing of businesses and matching of businesses to academic institutions will however require facilitators such as local Councils and enterprise agencies etc to ensure that local business have the information they need to avail of these opportunities.

Partnership projects between academic institutions and economic development organisations such as local councils will therefore be an important part of ensuring research and development has a broader uptake amongst local business and also in ensuring more advanced businesses are aware of opportunities within academia and vice versa.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Councils are uniquely placed to work alongside our businesses to help overcome barriers in accessing opportunities to be involved in research and development.

CBC's successful 'You Can Develop It' Programme demonstrates Councils' evolving role in action enabling local businesses to overcome the barriers of cost, awareness, capacity and confidence to bring R & D into their business and develop an Innovation Strategy Roadmap for the future.

Given the opportunity and funding Councils can add real value to the work of central government and really develop the NI economy through true innovation, research and development.

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Department for Agriculture & Rural Development



Corporate Policy Division
Central Management Branch
Dundonald House
Upper Newtownards Road
Ballymiscaw
Belfast BT4 3SB

Tel: 028 9052 4331
Fax: 028 9052 4884
Email: joe.cassells@dardni.gov.uk

Jim McManus
Clerk to the Committee for Enterprise, Trade and Investment
Room 375
Parliament Buildings
Ballymiscaw
Belfast
BT4 3XX

Our Ref:
Your Ref:

Date: 15 December 2011

Dear Jim

Written Evidence to the Northern Ireland Assembly Committee for Enterprise, Trade & Investment Inquiry into Developing the Northern Ireland Economy through Innovation, Research & Development (R&D)

Thank you for the opportunity to contribute evidence to the Committee's Inquiry on Innovation and R&D.

Please see below evidence submitted on behalf of the Department of Agriculture and Rural Development (DARD). You will note that this focuses largely on DARD's role in support on research and innovation in the agri-food sector and wider rural economy.

I am copying this response to the Clerk of the Committee for Agriculture and Rural Development for information.

1. DARD Role

1.1 The vision of the Department of Agriculture and Rural Development (DARD) is a thriving and sustainable rural community and environment in Northern Ireland. The Department has 5 associated strategic objectives as follows:-

- To help the agri-food industry prepare for future market opportunities and economic challenges;
- To promote the economic and social wellbeing and self-reliance of the rural community;
- To enhance animal, fish and plant health and welfare;
- To help deliver improved sustainable environmental outcomes; and
- To manage our business and deliver services to our customers in a cost effective way.

- 1.2 DARD's powers to fund research are drawn from Section 5 of the Agriculture Act (NI) 1949 as amended which permit us to:-
- (a) undertake research in agriculture and related subjects for such purposes as the Department thinks appropriate;
 - (b) assist such research in any manner it thinks fit, including by the provision of financial assistance.

Assistance in (b) can be by loan or grant and is subject to DFP approval.

2. Current DARD policies and programmes in support of research and development and innovation

R&D

- 2.1 DARD's Evidence and Innovation Strategy¹, published in 2009, provides a framework for our R&D activities. A specific principle of the Strategy is that research will be policy-led and aligned to meet the our strategic policy needs in order to provide a robust evidence base for policy development, implementation and review, as well as supporting industry innovation within the scope of our policy interests.
- 2.2 DARD invests around £8-9 million per year to support a range of strategic and applied R&D activity, delivered primarily by our arms-length science provider, the Agri-Food and Biosciences Institute (AFBI) as part of its annually agreed work programme². Since April 2011, DARD funded research at AFBI from 2011/12 includes work on optimising biological and financial efficiency of farm businesses; assessment of the needs for, and returns from education and skills attainment within the land-based, food and other rural sectors; new techniques/ approaches to disease prevention and control; mitigation of greenhouse gas emissions; and optimisation of the environmental credentials of local agri-food produce and renewable energy.

Postgraduate Studentships

- 2.3 The Department invests around £0.5 m each year in its postgraduate research programme. We award 8 new studentships per year. Students are funded for 3 years, normally leading to a PhD. Postgraduate research themes are aligned to our evidence and innovation needs and contribute to the evidence base for policy development and support for a competitive and sustainable local agri-food sector. In addition, they represent an investment in the future scientific skills base of the sector.

Innovation

- 2.4 DARD supports innovation in the agri-food sector by funding and disseminating R&D relevant to the sector's needs. In addition, under the DARD Research Challenge Fund, we provide up to 50% grant aid for industry-led, collaborative R&D projects. Eligible projects must involve collaboration between industry and public sector research partners and benefit the primary production sector in the north. The first Tranche of the scheme (T1) was launched in April 2010 and we are currently providing almost £500k of grant aid to 4 industry-led consortia, which is match-funded by the industry partners³. Tranche 2 of the scheme was launched in October 2011 and up to £800k funding will be available for projects starting in April 2012. A further £2m has been allocated to the Fund over the next 3 years. Grant is awarded on a competitive basis until current funding is exhausted.

1 http://www.dardni.gov.uk/e_i_strategy_2009-2013_final.pdf-2.pdf

2 For details of DARD's requirements for 2012/13, see <http://www.dardni.gov.uk/index/strategies-reports-accounts/dard-research-section/dard-directed-agri-food-and-biosciences-institute-afbi-research-work-programme-2012-13.htm>

3 For details of T1 projects see http://www.dardni.gov.uk/index/strategies-reports-accounts/dard-research-section/dard_research_challenge_fund__rcf_.htm

Knowledge Transfer

- 2.5 The DARD Evidence and Innovation Strategy recognises that the benefits of DARD-funded R&D must be harnessed through effective knowledge transfer. CAFRE has the lead role within DARD in delivering the Knowledge and Technology Transfer (KTT) Programme. This programme aims to investigate, initiate, demonstrate and ensure adoption of relevant technologies for the NI agri-food industry emanating from R&D programmes throughout the globe. The programme aims to assist farm, commercial horticulture and food processing businesses to increase their knowledge and, thereby, maximise the benefits to be gained from adopting new technology.
- 2.6 The current structures, established post-O'Hare, bring together CAFRE, other branches within DARD's Service Delivery Group, DARD policy leads and AFBI with the aim of ensuring cohesive and comprehensive delivery of the KTT programme. At operational level, staff from CAFRE and AFBI co-ordinate work programmes through a series of link groups across all types of enterprise i.e. beef and sheep, dairy, pigs, crops etc. Following the introduction of new arrangements for research prioritisation and management, knowledge transfer arrangements form an integral part of the planning and delivery of our research programmes. We also plan to initiate a review of our current knowledge transfer arrangements by the end of this financial year.
- 2.7 The demonstration of new technologies and systems to the industry at CAFRE is achieved mainly through technology projects and initiatives. Dissemination activities include press articles, farms walks and seminars and a network of Focus Farms.

Local and International Collaboration

- 2.8 DARD pursues opportunities for collaboration and engagement with local, national and international research partners and seeks to encourage similar collaborations among rural businesses and public sector research organisations. As our Strategy becomes further embedded, we have been seeking to deepen collaboration with Defra, other Devolved Administrations and the Republic of Ireland in areas of mutual interest and benefit. Examples of existing collaboration include the Defra-led Agricultural GHG Inventory R&D platform where DARD is contributing £0.61million (5% of the total cost) over 5 years; the Food and Agriculture Policy Research Institute – UK project; and Defra / BBSRC / FSA-led research and development aimed at reducing levels of *Campylobacter* in the food chain.
- 2.9 Given current constraints on national public sector funding and, in line with the re-invigorated Barroso Taskforce initiative, we are working with other partners on a number of cross-government and cross-sectoral steering groups to increase drawdown of EU research funding. We will achieve this primarily through successful AFBI applications to these programmes. Starting from April 2012, we will ring-fence around £300k of AFBI's annual grant-in-aid for match-funding of EU and other AFBI directed bids. We are also exploring separately what further support we can provide.

3. Other opportunities at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development.

- 3.1 Other opportunities for agri-food R&D and innovation support that DARD is aware of include the following:-

EU

- Framework Programme and, from 2014, Horizon 2020;
- Interreg;
- LIFE+;
- CAP 2007-13 and 2014-2020;
- Enterprise Europe Network.

UK

- Government- funded research programmes sponsored by Defra, the Scottish and Welsh Devolved Administrations;
- Technology Strategy Board competitions and Biosciences Knowledge Transfer Network (KTN);
- Research Councils UK, chiefly NERC and BBSRC funding for Higher Education Institutes;
- Higher Education Funding Councils for England and Wales , Scottish Funding Council and DEL research funding for universities;
- Higher Education Innovation Fund.

Cross-border

- InterTradelreland (ITI) Cross-border Collaboration Vouchers;
- ITI All-island Innovation Programme;
- ITI FUSION;
- ITI INNOVA;
- Department of Agriculture, Food and the Marine (DAFM) FIRM;
- DAFM Research Stimulus Fund.

Local

- MATRIX Industry-led Innovation Communities;
- InvestNI (INI) grants including Innovation Vouchers, Grant for R&D; Competence Centres and Framework Mentoring Scheme;
- INI Innovation Advisers;
- INI Knowledge Transfer Partnerships;
- INI Collaborative Networks;
- DEL Connected 2 Knowledge Transfer Programme.

- 3.2 Through its participation on cross-government innovation working groups, DARD maintains a watching brief on other government support programmes and our programmes aim to complement or target gaps in other provision. Where possible, we also seek to ensure that there are effective linkages between DARD and other government support programmes. For example, an InvestNI innovation adviser may assist RCF applicants with project definition and an INI representative sits on the Assessment Panel.

4. DARD Support available to assist organisations to access opportunities for research and development

Stakeholder Engagement

- 4.1 Informal and formal stakeholder engagement forms an integral part of our new arrangements for research prioritisation and management. We held our second Annual Evidence & Innovation (E&I) Stakeholder Forum⁴ on 28 September 2011. The Forum provided stakeholders with the opportunity to comment on proposed priorities, seek clarification, suggest changes and put forward additional knowledge gaps for consideration.
- 4.2 Views received, both on the day, and subsequently, informed development of DARD's final list of research priorities for 2012/13. Research proposals have been invited from AFBI to address these.

4 http://www.dardni.gov.uk/index/strategies-reports-accounts/dard-research-section/dard_evidence_and_innovation_stakeholder_forum_2011.htm

5. Main barriers faced by organisations in accessing opportunities to be involved in research and development

5.1 The main barriers faced by agri-food businesses, particularly in the primary production sector which is fragmented and dominated by sole traders, include:-

- Understanding what support is available and from whom;
- Access to finance and other, specialist resources;
- Time;
- Risk;
- Lack of absorptive capacity.

6. Action by government to improve opportunities for research and development

6.1 In DARD's view, it is important to ensure a joined up approach across government departments, collaboration on research of mutual benefit and sharing of data-sets and research findings. This would be facilitated by development of a science and innovation strategy for the north, led by a Chief Scientist.

6.2 We also need to ensure that the agri-food sector and other rural businesses have access to R&D and innovation support from other government departments and that relevant delivery organisations, such as AFBI and CAFRE, are included in innovation support initiatives, where possible.

7. Business and academia work to support research and development opportunities

7.1 In our view, one of the most important actions is to increase business to business and business to researcher collaboration so that organisations can pool resources and skills for their mutual benefit. Businesses also need to exploit the wealth of research already available in the local, national and international research arena.

I would be grateful if you would bring this to the attention of the Committee.

Yours sincerely

Joe Cassells

Departmental Assembly Liaison Officer

Response from Department for Enterprise Trade and Investment

Written submission from The Department of Enterprise Trade and Investment to the Committee for Enterprise Trade and Investment Inquiry into Innovation and Research & Development

Introduction

The Vision for the Northern Ireland in 2030 is one of:

'An economy characterised by a sustainable and growing private sector, where a greater number of firms compete in global markets and there is growing employment and prosperity for all' [NI Economic Strategy, March 2012]

To deliver on this vision we need an economy in which Northern Ireland firms:

- are more innovative than they are at present
- there are more of them;
- they invest more in R&D; and
- they export more.

Innovation and R&D therefore underpin the recently published Northern Ireland Economic Strategy since they are recognised as key drivers of productivity; productivity drives competitiveness in the form of exporting, which in turn drives economic growth. The Strategy therefore sets out a number of key objectives around future investment in R&D and Innovation.

Role of DETI

DETI, through Invest NI and Intertrade Ireland, has a pivotal role to play in encouraging and supporting businesses to be more innovative and to invest in R&D. As outlined in the recently published Economic Strategy, there is a clear need to rebalance the economy. The private sector needs to grow and in doing so we need to encourage more companies to invest in R&D. To support companies invest in Innovation and R&D and to help maximise the return on public sector investment in R&D some of the key actions to be undertaken by the Executive over the next four years include;

- Supporting £300m investment by businesses in R&D, with at least 20% coming from SMEs
- Supporting 500 businesses to undertake R&D for the first time and secure 120 Collaborative Projects in R&D
- Supporting 200 projects through the Creative Industries Innovation Fund by 2015
- Supporting our Universities to establish 8 spin-out companies by 2013
- Supporting our Universities and Further Education colleges to undertake 155 knowledge transfer projects on behalf of local businesses by 2014

In the long term there is a target that by 2030 annual expenditure by businesses on R&D (BERD), as a percentage of GVA, will exceed the UK average. In terms of wider innovation, one of the longer-term key targets will be to increase the percentage of NI firms who engage in innovation activities to exceed the rest of the UK. Currently 55% of NI firms are considered to be innovative against a UK average of 58%.

These and other targets, including key milestones, will be set out in greater detail in the Innovation Strategy which will be published later in 2012. Within this plan more emphasis will be placed on the prioritisation of resources where we have existing strengths as well as new emerging opportunities.

Prioritisation

To grow the economy more firms need to engage in R&D, particularly in those sectors where MATRIX, the NI Science Industry Panel, has identified a number of market opportunities in which local companies have the potential to compete on global basis. These include:

- Telecommunications & ICT
- Life & Health Sciences
- Agrifood
- Advanced Materials
- Advanced Engineering

These MATRIX identified markets are estimated to account for almost 80% of NI manufacturing exports and 77% of Business Expenditure on R&D (BERD). Through provision of further investment in these markets, as well as new markets which will emerge, we will better support companies to grasp the opportunities these markets present. This will also require building greater trade alliances with the fast growing emerging economies such as Brazil, Russia, India and China.

Support for R&D

To support and encourage businesses to engage in R&D there is a wide range of support available from a range of public and private providers. These include various Government Departments, local authorities Invest NI, universities, colleges, independent research establishments, Intertrade Ireland and private providers such as consultants. Academia can also benefit from support from investment in R&D from a variety of sources including DEL, Research Councils, charities, Invest NI as well as the private sector. Further detail of the key avenues of support available at both UK and EU level are set out in **Annex A**.

More detail on the R&D and Innovation support provided by DETI, through Invest NI is set out below:

Support for R&D from Invest NI

Invest NI plays a key role in enhancing business capability and capacity within firms and within Universities. Through its various R&D support programmes it seeks to

- incentivise businesses to undertake R&D by sharing in the risk
 - provide businesses with a resource to undertake R&D
 - facilitate knowledge and innovation transfer

It supports R&D activity at all stages of business growth through financial and non financial measures. Through a cadre of innovation advisers it helps businesses identify opportunities for R&D, scope out potential projects and advise on the appropriate support mechanisms to deliver a successful R&D project.

Invest NI offer a range of R&D support interventions from Innovation Vouchers through to Design Development programmes to Grant for R&D. These can cover relatively small projects up to very large strategic R&D undertakings. The key programmes include

- Proof of Concept;
- Innovation Vouchers;

- Knowledge Transfer Programme;
- Design Programme and
- Competence Centres.

The suite of R&D support programmes in NI is broadly similar to those operated by Scottish Enterprise, Enterprise Ireland and the UK Technology Strategy Board. There are also large scale initiatives such as TSB's Technology and Innovation Centres (TIC's) which due to the scale will be difficult for a N.I. to access, but can be accessed by linking existing smaller scale local centres with GB based TIC's e.g. NIACE.

Invest NI support for EU R&D funding

European funding for R&D is provided primarily through the Framework 7 programme (FP7). From 2014 this programme will be replaced by Horizon 2020. Invest NI offers both financial and non financial support to companies and research organisations who wish to apply for FP7, and other EU R&D funding programmes.

In terms of specific support to companies Invest can help;

- Identify the most appropriate funding scheme for business needs
- Advise on programme funding rules, regulations and eligibility criteria
- Assist businesses to find the right partners through the Enterprise Europe Network
- Signpost businesses to further specialist events and advice
- Provide financial support for proposal preparation

Invest NI also hosts the European Enterprise Network (EEN). This service provides an important support mechanism for NI companies who want to apply for FP7 funding. The EEN helps companies find R&D partners across Europe. While its services are designed primarily for SME's they are also available to all businesses, research centres and universities across Europe. There are nearly 30 contact points in the UK network, and almost 600 partner organizations in more than 40 countries in Europe and beyond.

Enterprise Europe Northern Ireland activities are complemented by other programmes and services offered by Invest NI's Innovation and Capability Development Group. It works with the key business support organizations throughout Northern Ireland. This ensures that any member of the business community in Northern Ireland can quickly find the most suitable business development solution for their requirements.

Support for R&D from Intertrade Ireland

With a focus on small and medium sized enterprise, InterTrade Ireland's (ITI) key innovation programmes facilitate greater connections and collaborations across both jurisdictions to assist innovation activity.

These programmes strike a balance between supporting research & technological development and also supporting other important aspects of innovation, particularly capability development.

The key ITI support for research & technological development is through the Innova Programme: which supports Strategic R&D collaboration with other firms and the Fusion Programme which promotes Higher Education and Business linkages. The Business Value realised to date by companies participating on the Fusion (Technology Transfer) Programme is £148M, while £35.8M has been realised from the Innova (Collaborative R&D) Programme

In terms of supporting innovation capability within firms the key ITI programmes are.

- Equity Network Programme: Access venture capital finance
- Challenge Programme: Build capabilities to expand into or reach new markets

- All-Island Innovation Programme: Information on international best practices in innovation

Intertrade Ireland support for EU R&D funding

InterTrade Ireland has devoted resources to the area of European funding to further stimulate North/South collaboration. InterTrade Ireland is working to:

- increase the number of North/South applications being submitted;
- see a resulting increase in the number of successful applications; and
- see an increase in the funds being drawn down by applicants from the schemes available

In order to achieve this, InterTrade Ireland offers the following supports:

- EU Notice Board: For partner matching;
- Travel voucher: For early stage partnership building;
- Focus on FP7 Series;
- Website (<http://www.intertradeireland.com/fp7support>); and
- Advice/support

In further support of international R&D cooperation, InterTrade Ireland also provides the secretariat for the US-Ireland R&D Partnership. With a focus on internationally excellent research, the Partnership aims to generate valuable discoveries and innovations which are transferable to the marketplace, or will lead to enhancements in health promotions, disease prevention and healthcare. To date, 8 projects have been supported through the Partnership in areas including Nanotechnology, Sensor technology, Diabetes and Cystic Fibrosis. The scope of the Partnership has recently expanded to include Telecommunications research and Energy & Sustainability research.

Key Statistics on R&D investment

The most recent information on the level of Research & Development (R&D) activity in

Northern Ireland is detailed in The Northern Ireland Research and Development Statistics 2010 (DETI December 2011). The key findings from that survey include;

- Total expenditure on Research and Development in Northern Ireland in 2010 was £521.4 million. This was an increase of £38.6m (8%) on the 2009 figure
- £344m (66%) was spent by Businesses, £161.8m (31%) by the Higher Education sector and the remainder £15.6m (3%) was Government expenditure.
- Business R&D expenditure in 2010 was up 6% (£20.3m) on 2009.
- Between 2005 and 2010, overall Business R&D expenditure has risen by 123%
- The percentage increase in Northern Ireland (inhouse) business R&D expenditure (9.1%) between 2009 and 2010 was the second biggest of the 12 UK regions.
- Northern Ireland 2010 in-house R&D as a proportion of GVA was 1.2% and was the sixth highest of the twelve UK regions. R&D as a proportion of GVA is the same as the UK average rate (1.2%).
- Externally owned companies accounted for 68% of Business R&D expenditure compared to 32% by locally owned companies. However, R&D spend by locally owned companies reported an annual increase of 27%.
- Expenditure by businesses with less than 250 employees fell by £10.9m (-8%) from 2009 to 2010, in cash terms. However, since 2005 such expenditure has increased by 78% to £133.4m.

Benefits of R&D Investment.

A number of econometric studies have concluded that social rates of return from R&D investment are 50% to 100% larger than private rates of return. Social rates in these studies vary from 20% to 160% of the investment. There are three types of spillovers;

Knowledge spillovers occur when a company uses knowledge generated by another at a cost lower than the market value of the knowledge. Obvious examples include “reverse engineering” by companies and publications by research organisations. Other less obvious examples include the transfer of tacit knowledge when researchers leave a company to take a job at another company or unintentional knowledge transfer through personal or business networks.

Market Spillovers occur only through commercialisation of the R&D. They occur when the operation of the market for a new product or process causes some of the benefits created to flow to market participants other than the innovating company. Due to competition innovative products will generally be sold at prices that do not fully capture their superiority. As a result consumers will be made better off by the introduction of the new product. Similarly, if a company does R&D to lower its production cost, it will typically lower its selling price as a result. Again the benefits are not fully captured by the innovator.

Network Spillovers result when the commercial or economic value of a new technology is strongly dependant on the development of a set of related technologies. An example of network spillovers exists between different developers of application software for use with a new operating system. People will buy the application software only if there are sufficient other applications that the platform is widely used.

Main Barriers to R&D

There are number of barriers to firms investing in R&D across most developed economies. These include

- Finance (access to and cost)
- Time
- People and Skills (Capacity of firms to use R&D)
- Risk aversion

In addition, with respect to the Northern Ireland economy a number of other factors need to be borne in mind in relation to examining the reasons for low level investment by firms in R&D. These include

- NI is an SME dominated economy and SME's generally have limited capacity to undertake R&D.
- Historically low levels of innovation and entrepreneurship
- Companies' short term focus.

(Innovation and R&D is viewed as a cost not an investment. Risk aversion in the public and private sectors to R&D projects with high risk outcomes.)

- Lack of product management expertise and R, D & I technical capability in the private sector.

Barriers to securing EU R&D Funding

The barriers outlined above also inhibit greater success from NI companies and organisations in securing EU Framework funding. Across Europe, it is recognised that industry, and in particular SME, participation is low and actually considerably lower in the UK than the EU average. In the UK the total industry participation has fallen to around 18% against an EU average of 23% whereas HE/FE participation is 68% against an EU average of 43%.

Northern Ireland's historically, low-levels of Business Expenditure in R&D has meant companies, particularly SME's, have limited capability to apply to FP7. Furthermore, NI's large companies have not always been as successful as might have been anticipated or do not attempt to participate at an appropriate level. These failings not only have a disproportionately high negative impact upon the NI drawdown, but additionally the opportunity for SME's to cooperate with them in FP7 is not afforded. Further reasons for lower FP7 drawdown include;

- In the UK, FP7 tends to be dominated by academia. Academia can help bring companies into FP7 projects as partners or end-users. Northern Ireland however has the fewest numbers of universities of any region in the UK and Ireland.
- Participation is competitive, and the cost of entry in terms of up-front resource commitment is high with no guarantee of success. Locally sourced R&D funding has much lower entry barriers and historically offered attractive rates of assistance to Large Companies unlike in many UK regions where Grant for R&D is often restricted to SME's.
- Time: EU applications generally take around 300 man-hours of input (this is for an experienced researcher). There is also time required to find and build relationships with partners in other member states prior to calls being announced. Combined with the competitive element of FP7, small companies are not prepared to take the risk.
- SME's tend to have a short-term focus, particularly in the prevailing economic climate. The FP7 application process is long, in excess of a year from the time the call is announced until receiving funding. This is too long for many companies.
- The peripheral nature of NI and the lack of direct flights to Brussels is a barrier to networking. Networking (in terms of developing relationships with partners, the European Commission project officers and lobbying groups) is a key criterion to ensure success in FP7.
- Collaboration criteria – companies are not convinced of the benefits of a collaborative approach. There is need therefore to convince companies of the benefits of collaboration before we can expect to see tangible outcomes with respect to increased participation and funding.

Plans to encourage increase investment by companies in R&D and Innovation

The NI Economic Strategy published in March 2012 details a number of actions to encourage more companies to be innovative and to invest in R&D. An Innovation Strategy is currently being prepared which will set out in more detail a raft of actions designed stimulate innovation and R&D, as well as attract FDI into the region and in so doing help rebalance the economy. The ETI Committee will be engaged in the preparation of this Strategy. These actions will include:

- Providing increased levels of support as an incentive to undertake more R&D and innovation.
- Increasing a awareness of the benefits of Innovation and R&D through for example, more regular and effective promotional events.
- Improved access to information on R&D support programmes.
- Increased emphasis on networking and collaboration.
- Strengthening the links between academia and industry.
- Delivering programmes to address cultural impediments to innovation – paradigm shift is required to move SME's from a 'production led' mindset to being 'knowledge driven'.
- Enhancing the support infrastructure for companies and organisations which wish to engage in EU R&D funding programmes

Opportunities for UK and EU level for business to become involved in R&D**UK Opportunities**

At a UK level DETI and Invest NI also support companies to secure funding from the Technology Strategy Board and other funding sources. The TSB's objective is to drive business innovation in the UK via a variety of delivery mechanisms including:

1. Knowledge Transfer Networks
2. Collaborative research and development
3. Small Business Research Initiative (SBRI)
4. Knowledge Transfer Partnerships
5. Technology and Innovation Centres
6. International programmers

Each of these programmes of support has different levels of support and applications process. Further details can be accessed at: <http://www.innovateuk.org/deliveringinnovation.ashx>

Research Councils UK (RCUK) are also an important source of funding for Nin Universities

Each year the Research Councils invest around £3 billion in research covering the full spectrum of academic disciplines from the medical and biological sciences to astronomy, physics, chemistry and engineering, social sciences, economics, environmental sciences and the arts and humanities.

EU Opportunities

The following EU opportunities exist for R&D:

EU 7th Framework Programme (FP7) (2007 – 2013) - 50 billion Euros available

FP7 bundles all research related EU initiatives under a common umbrella. Grants are determined based on calls for proposals and a peer review process, which is highly competitive. In order to complement national research programmes, activities funded from FP7 must have a "European added value". One key aspect of the European added-value is the transnationality of many actions: research projects are carried out by consortia which include participants from different European (and other) countries; fellowships in FP7 require mobility over national borders.

Other R&D funding opportunities are:

ERANETS

A specific FP initiative targeted at research-funding agencies, rather than researchers. European Research Area Networks (ERA-Nets) provide a means of coordinating regional or national research programmes, with funding from the European Commission.

EUREKA Eurostars

The Eurostars Programme involves Collaborative R&D projects between a minimum of 2 SMEs from different member states. All sectors are eligible.

The European Commission is not part of the implementation structure but contributes with a substantial financial support (25%) that is granted on the basis of article 169 of the EC treaty. 50% of project funding is available up to a maximum of Euro 300k per participant.

Competitiveness and Innovation Programme (CIP)

CIP is a framework for European Union support actions in the following areas:

- Entrepreneurship and Innovation (Invest NI accesses support for EEN – See below)
- Information and Communication Technology
- Intelligent Energy Europe

It has a total budget of €3.6 billion

EIB Risk Sharing Finance Facility (RSFF)

The aim of RSFF is to improve access to debt financing for promoters of research and innovation. The facility is open to SMEs and the finance is in the form of “Risk Sharing Line of Credit” through intermediary banks.

Project size >€15 direct from EIB

Project size <€15 via intermediaries, e.g., for SMEs: National Banks such as: Barclays, Santander, RBS and Lloyds

RSFF Financing can be:

Direct , e.g., Corporate Debt, Project Financing and Mezzanine Financing

Intermediated, e.g., Risk-Sharing Lines of Credit and Guarantees

INTERREG (Capitalisation projects) can help develop policies or support services for R&D and innovation.

Cross Border Opportunities:

InterTradelreland

InterTradelreland offer a number of support programmes to boost cross-border R&D (e.g. Fusion). Further details can be accessed at: <http://www.intertradeireland.com/innovate/>

Jim McManus
Clerk to the ETI Committee
Parliament Building
Stormont
Belfast
BT4 3SW

16 April 2012

Dear Jim

ETI Committee Inquiry into Innovation and R&D

Please find attached additional information as requested by the Committee as part of its inquiry into Innovation and R&D.

Yours sincerely

David McCune

1. Does the prioritisation of resources (as listed at the bottom of page 2) mean that organisations in other sectors will be excluded or have greater difficulties in securing support for R&D?

The recently published Economic Strategy makes it clear that for the economy to grow we must encourage companies across all sectors to be more innovative. The Department and its NDPBs therefore remain committed to ensuring that companies across all sectors in Northern Ireland have the opportunity to access wide ranging support for Innovation and R&D.

The Economic Strategy also recognises that through the work of Matrix we have identified a number of key global market opportunities in which Northern Ireland already has a competitive advantage to exploit. These markets remain of considerable importance and currently account for 73% of business investment in R&D and 79% of Northern Ireland's manufacturing exports. These are therefore areas of strength upon which we will be seeking to further build our Innovation, R&D and export base.

It is important to bear in mind that the European Union's EU2020 Strategy encourages the adoption of Regional Smart Specialisation strategies which will include the prioritisation of resources towards key markets, sectors and technologies where regions have both competitive capability and the scope to capture market share. The forthcoming Innovation Strategy will therefore build on the market opportunities outlined in the Economic Strategy (including the potential presented by securing the powers to lower the rate of corporation tax in NI) to provide further detail on the strategic direction and incentives for companies to target markets in which Northern Ireland has or can develop a competitive advantage.

2. The Department acknowledges that there is a wide range of support available from a range of public and private providers. Does this have the potential to cause confusion among organisations and is there a danger that it can lead to a perception that there is no overall holistic approach to R&D?

One of the key objectives of the forthcoming Innovation Strategy is to ensure that companies and research organisations have a clear understanding of the support which is provided across the public and indeed private sector, to stimulate Innovation and Research and Development and ultimately to bring new ideas to market.

There are already examples of web portals, such as www.nibusinessinfo.co.uk where companies can access information on the wide range of support that is provided by Invest NI and other providers,. However, we recognise that more needs to be done in this area. That is why an exercise is currently underway to map the key programmes and support available for companies who want to engage in Innovation and R&D. This will form a key element of the forthcoming Innovation Strategy

3. What are Invest NI and InterTradelreland doing to promote R&D and to encourage more organisations (especially non-Invest NI clients) to become involved?

InvestNI

In the Economic Strategy, DETI and Invest NI has a target to support 500 businesses to engage in R&D for first time. This will be achieved through:

- i. **Innovation Vouchers** - Invest NI has a target of 800 in 2011/2015.
The key benefits of this scheme are:
 - Open to wider business community (uptake to date Invest NI clients 60%, wider business community 40%)
 - Up to 100% funding. Client pays the VAT
 - Simple application process – does not require a business plan or accounts
 - Quick response time – 3 weeks from close of call for applications
- ii. **Provision of Project Definition support** for SMEs to help plan their R&D projects. This is available to InvestNI Client companies
- iii. **“Boosting Business through R&D” open call:**
 - These are regular calls targeted at New to R&D businesses through web, television, radio and press advertising. As a result of the two calls to date there have been 153 enquiries– 57 applications resulting in £1,106,121 in grant issued.
- iv. **Promoting R&D - Advice and guidance**
In addition to financial support for businesses, a cadre of 16 Specialist advisers offers a wide range of advice, guidance and support in the areas of innovation such as for technical issues, product development, IP, lean, design and collaborative ‘R&D’ working closely with businesses to make them aware of the support available and if necessary helping them complete application forms.
- v. **The NI Business Info portal** also provides businesses with a valuable source of self serve advice and guidance across a range of business areas. The site has over 52,000 visits monthly across a wide range of subject matters.
- vi. **The NISPO Fund**
This fund sponsored by Invest NI provides Proof of Concept grants in the form of mini grants (up to £10,000) and full grants (up to £40,000) to businesses to help develop their concept, technology platform or business model.
- vii. **Design Development Programme**
To help companies identify and address design issues within their business, Invest NI offers Design clinics and Design Advice for the wider business base.

InterTradelreland

InterTradelreland runs 5 Programmes in the areas of R&D and Innovation. The Programmes are based on its innovation ecosystem model which focuses on a highly connected web of resources, (new capabilities, finance, markets, research institutions, international research institutions and other firms) with enterprise at its centre.

All programmes are actively promoted within the corporate communications policy using the following media: The InterTradelreland website; Social media - Facebook and Twitter; local and national press in both jurisdictions; on and off line advertising; promotional material; events; and direct mail marketing. In Northern Ireland and Ireland InterTradelreland also works with

other agencies, local councils, universities, chambers of commerce, incubation centres and our managing agents to identify potential participants. No distinction is made in promotion between InvestNI and non InvestNI clients as the programmes are promoted to all companies in Northern Ireland and Ireland and are publically advertised.

- i. **Fusion** is a technology transfer programme which provides companies with technology – based needs, a three way partnership that includes a third-level research institution with specialist expertise and a high – calibre science or technology graduate.

Eligibility criteria: Located in the Northern Ireland and Ireland; financially viable; able to demonstrate the need for InterTradelreland; and demonstrate the capacity and commitment to support a Fusion project at senior management level.

- ii. **Challenge** is a programme designed to help ambitious SMEs go from ideas to sales with less time, money and risk. It works in 3 stages, briefing event, workshop event and in-company mentoring.

Eligibility criteria: Ambitious SMEs with between 10 and 250 employees who are currently exporting or considering exporting; and participants must be the strategic decision maker in the company (i.e. CEO/MD etc) and committed to business development and growth.

- iii. **Innova** is a unique cross-border collaborative Research & Development programme offering companies the opportunity to accelerate new product, process or service developments through partnering with a company in the other jurisdiction.

Eligibility criteria: Ideally, businesses should have identified a suitable innovation partner to work on the project from the other jurisdiction; projects should have clear demonstrable benefits to the companies involved and represent a fundamental part of their strategic business plans; applicants are particularly welcome from the following sectors: life and health sciences, polymers and plastics, environmental, agri-food and ICT connected health/Proposals must be able to demonstrate strong commercial potential.

- iv. **Framework Programme 7 (FP7)** InterTradelreland offers a number of support mechanisms for those wishing to engage in FP7 in both jurisdictions, as formally presented to the committee prior to giving evidence. These supports are available to all and are not limited to solely either Invest NI or Enterprise Ireland clients. InterTradelreland acts to provide timely information and assist with partner identification on a North/South basis for FP7 projects. FP7 is targeted at those companies, academics, individuals etc who are looking to perform research which can be defined as excellent or leading within its sphere. As a result, FP7 is not an ideal vehicle to use for encouraging those new to R&D to become involved, however it presents an excellent opportunity for researchers and companies with more experience with funded R&D projects.

Eligibility criteria: An academic, researcher or small company; to be eligible, small companies must have less than 50 employees and an annual turnover of less than €10 million; part of a consortia engaging in a European funding application process (within the FP7 programme) with partners on both sides of the border or trying to establish a partnership with the objective to engage in FP7 funding applications/projects.

- v. **EquityNetwork** offers a range of supports to help companies improve their ability to develop investor-ready business plans to attract equity investment to fund growth.

Eligibility criteria for Seedcorn Competition (main Equity Network Programme): Incorporated company; less than 3 or 5 years old; have a minimum new equity requirement; and projected sales targets depending on category the company enters.

4. Figures are provided (page 9) for the level of SME and HE/FE participation in R&D at UK level and EU average. What are the equivalent figures for Northern Ireland?

It should be noted that the UK Statistics are to May 2011 and Northern Ireland specific statistics are up to October 2011.

Up until October 2011, the proportionate drawdown of FP7 to Northern Ireland was as follows:

- 21% business (9% to SMEs 12% to larger firms)
- 79% was received by HE/FE and Public Sector Research Establishments (such as AFBI).

5. Is it within the Department's power to do anything to ease the regulatory burden on venture capitalists and angel investors?

The regulation of Venture Capital and investment is managed by the Financial Services Authority and is not a devolved matter. However, DETI - via InvestNI, InterTradeIreland and its support of NISP Connect - is committed to growing a flourishing VC environment in Northern Ireland.

Response from Department for Enterprise Trade and Investment

Recommendations to encourage increased participation in FP7 and Horizon 2020

Introduction

1. To ensure that Northern Ireland is best placed to draw down increased funding from the existing FP7 programme and importantly the forthcoming Horizon 2020 programme, DETI established a steering group to identify actions required to support increased participation in these programmes. In particular the focus was on encouraging increased participation by the private sector. Membership of the steering group included DETI, Matrix, DOE, DARD, DEL, Queens Belfast, University of Ulster, Invest NI, InterTradeIreland, NISP and CBI. Full details are attached at Annex A
2. The Group reviewed the current support mechanisms for organisations who wish to engage in FP7 and also engaged the views of both industry and the higher education sector. With support of NISP, CBI and Matrix two workshops were held with a number of companies, some with and some without previous experience of Framework funding. The workshops highlighted some of the main barriers for firms engaging in Framework and also provided insights into the potential solutions to address those barriers. The views of industry, combined with analysis of best practice elsewhere and supported by advice from the Technology Strategy Board and Enterprise Ireland have provided the basis for the recommendations in this report.

Context

3. Framework 7 is the world's largest Research Programme – 52 billion Euros has been made available between 2007 and 2013. It is a competitive programme therefore Member states are not allocated any specific budget. The competition for funding is extremely high with a success rate of only 20%. The Framework programme requires that applications must demonstrate collaboration by at least 3 member states, and its focus is on research excellence. The most recent figures (NOV11) has NI drawdown at close to €36.million. The target is to draw down €50 million by end 2013.
4. Invest NI runs a programme of workshops across Northern Ireland on opportunities for FP7 funding and has a dedicated support team in place to help companies with the process. It also hosts the Enterprise Europe Network (EEN) in Northern Ireland which service offers support and advice to help NI businesses them make the most of the opportunities in the European Union.

Horizon 2020

5. On 30 November the Commission published its proposals for Horizon 2020. This will replace the current Seventh Framework Programme, which expires at the end of 2013. Horizon 2020 will run from 2014 -2020 and it is proposed to have a budget of €80 billion .It will be organised round a number of pillars;
 - **excellent science** (which includes funding for the European Research Council, the Marie Curie mobility programmes, research infrastructures and key emerging technologies);
 - **industrial leadership** (focused on research and innovation with a clear market orientation);
 - **societal challenges** (structured round a number of “grand challenges” facing Europe and the wider world such as aging populations and climate change), along with the EIT and the work of the Joint Research Centre (the Commission’s “in house” research facilities).

6. A Summary of the recommendations is illustrated below:

Recommendation 1	Appoint a) A NICS representative for Europe2020; and b) A Horizon 2020 champion
Recommendation 2	Consideration to be given to the appointment of Horizon 2020 thematic leads.
Recommendation 3	The current DETI led Framework Steering Group should be widened to include representation from Local Government.
Recommendation 4	MATRIX, government departments and agencies in NI need to focus activities and align support to offer a targeted and complementary strategy towards European and regional thematic priorities
Recommendation 5	Increase NI research groups participation in National, All-Island, and European wide research and interest groups
Recommendation 6	Explore new methods of marketing to increase engagement with industry and research organisations on Framework, potentially reaching outside NI to include All-island events.
Recommendation 7	Create a specific website “Horizon2020 as the single point for which all information necessary in relation to Framework (gradually changing to Horizon2020) could be hosted.
Recommendation 8	(i) Subject to positive evaluation of current Invest NI pilot mentoring scheme, expand the scheme to all NI research institutions and (ii) Examine potential for industry-facing mentoring scheme with possibility of CollegesNI to fulfil Framework application mentoring role.
Recommendation 9	Consider additional support that could be provided to academics participating in Framework applications
Recommendation10	Increase number of NI evaluators for Framework
Recommendation 11	DETI to set a target for Horizon 2020 drawdown.
Recommendation12	Promote the assistance available to post-application staged support and connections available for project delivery.
Recommendation 13	Offer an alternative source of funding support to finance application writing for Framework participation for non Invest NI Clients and third party organisations.
Recommendation 14	QUB and UU to engage with ROI based research institutions to establish how they maximise support from Enterprise Ireland and other economic development Agencies

Recommendations

Recommendation 1:

Appoint

i) **A NICS representative for Europe2020; and**

ii) **A Horizon 2020 champion**

Owner: OFMDFM to appointment a single representative for Europe2020; DETI to appoint a Horizon 2020 champion.

7. Participation in Framework 7 and the proposed Horizon 2020 not only provides an external source of funding for research and development, but it provides a vehicle to promote NI to the rest of Europe. Building closer relations with European partners provides excellent opportunities to learn from our neighbours, and to highlight Northern Ireland as a partner of choice for Framework Research projects. Framework Programme brings together researchers from many disciplines which can result in additional benefits including building critical mass to validate and apply emerging technologies and set standards.
8. Evidence from benchmarking best practice highlights the value in having a single point of contact for EU matters. There are two key EU strategies - Europe2020 and Horizon 2020 - where we need to increase Northern Ireland engagement and participation with the European Commission. Northern Ireland would benefit from having recognised contact points that would act as a conduit to relevant committees and interest groups.
9. EU 2020

There is already considerable and positive engagement between government, industry and the various departments within the Commission and that should continue on project by project basis. However, at a strategic level it is considered that there would be benefit in improved coordination of Northern Ireland interaction to ensure there is an alignment to the strategic goals and objectives for NI as a region. In addition, there is a need to coordinate NI Executive actions and response to the EU 2020 strategy. The appointment of someone from within OFM/DFM, which has responsibility for lead engagement with Europe and coordinates the work of the Barroso Task force, could fulfil this role.
10. Horizon 2020

Horizon 2020, which will run from 2014-2020, will have an estimated budget of over €80 billion Euros. As with EU 2020, it will be important to have a single focal point for strategic engagement with the European Commission but also, importantly, a single point of contact for key stakeholders in Northern Ireland and also the UK Government.

It is therefore recommended that a Horizon 2020 contact point or 'champion' should be appointed. This role would act as a conduit to identify and avoid duplication of activity within various strands of government. It should also ensure that efforts to draw down Framework and Horizon 2020 funding across both the public and private sector are coordinated. As DETI is currently the policy lead in respect to Framework, it should take responsibility for appointing the Horizon 2020 champion. The Horizon 2020 champion should work alongside the existing NI Framework Steering Group. Consideration should be given to alternative forms of appointment including utilising existing board members of departments and agencies, secondments or interchange opportunities from appropriate bodies or agencies.

Recommendation 2:

Consideration to be given to the appointment of Horizon 2020 thematic leads.

Owner: DETI to appoint

11. Northern Ireland researchers need to be more active in UK and EU networks in order to participate fully in high-level collaborative R&D that will bring external funding into the region. NI companies and researchers therefore need to increase their engagement with the UK National Contact Point Network. To support this, consideration should be given to the appointment of a number of 'Horizon Thematic leads'. The thematic leads would provide formal sector representation to the UK and Europe potentially lobby and influence calls and offer sector-specific learning back from Brussels to NI. Importantly, they would also act as an intermediary between the UK NCP and NI businesses in relation to developments within industry and academia, feeding back from All-Island interest groups, national research groups and European committees and groups. These Thematic leads should complement existing support and be co-ordinated ongoing activity with European focus such the Barroso task force.
12. The thematic leads should represent Northern Ireland interests on EU and UK steering committees and sub-committees and benefit from a national and indeed an international standing within their area of expertise. Up to date market and technical knowledge is imperative to offer a quality and reliable view point at pan-European discussions.
13. The Horizon thematic leads would also have a direct responsibility to be active within the Technology Strategy Board's Knowledge Transfer Networks through their Connect platform (<https://ktn.innovateuk.org/web/guest>); EC Advisory Groups and Technology Platforms and attend brokerage events.
14. Thematic leads should be appointed on a phased and piloted basis. Priority will be given to those sectors which MATRIX considers offer the best future market opportunities for NI. Economic analysis of companies involved in the MATRIX process provided sub-sectoral analysis which indicated the following broad summary:
 - **Advanced engineering** is the largest of the MATRIX sectors, with companies focused on external markets, spending large amounts on R&D and offering high salaries;
 - **Advanced materials** is made up of relatively large companies that are highly export-intensive, have high R&D expenditure and offer relatively high wages;
 - **ICT** is made up of a large number of relatively smaller companies which have high average wages and are R&D intensive but are not heavily focused on export markets;
 - **Life & health science** is the smallest MATRIX sector but is very export and R&D intensive; and
 - **Agri-food** is made up of larger companies which account for many jobs and mainly sell outside NI, but have a limited focus on export markets (taking into account their total sales), spend very little on R&D and offer relatively low wages in comparison with the other areas listed
15. The appointment of any thematic lead should be timed after the appointment of the co-ordinating and champion role. The lead for Horizon2020 should assist the decision of the extent of the role of the thematic lead, their responsibility and the range of activity they would be involved in.
16. After a pilot phase, an evaluation should be carried out to examine the added value of the posts and if appropriate, build positions into a permanent support structure. The thematic leads could be part-time appointments and responsibilities should also include visits to Brussels, UK networks (inc TSB) and other relevant regions (a minimum of 2-3 days per month initially in order to become familiarised with the Commission), to start to make contacts and connections and how they can integrate effectively with all NI funded appointments based in Brussels.

Recommendation 3: The current DETI led Framework Steering Group should be widened to include representation from Local Government.

Owner: DETI

17. The role of the existing NI Framework Steering group is to offer a mechanism to share information among stakeholders on Framework and Horizon 2020 opportunities. Information is a 2-way process enabling operational issues and problems to be escalated at Regional, National or European level.
18. The Group should provide a mechanism for the Horizon 2020 champion to report back to the group, information and learning from Horizon 2020 activities. Membership of the Steering Group should be extended to include representation from Local Government, in particular Belfast City Council which is currently heavily involved in EU issues.

Recommendation 4: MATRIX, government departments and agencies in NI need to focus activities and align support to offer a targeted and complementary strategy towards European and regional thematic priorities

Owner: MATRIX and all associated departments across government and agencies to deliver

19. European based funding is designed to reflect long-term European wide needs including employment, competitiveness and trading with the rest of the world, and quality of life offered to its citizens. R&D funding makes up a significant proportion of all EU funding. NI should focus its approach to R&D&I calls and related activities to target in areas that will have a direct and significant benefit to our indigenous business and research institutes.
20. These thematic areas reflect the outlined priorities for EU2020 of Smart Growth; Sustainable Growth and Inclusive Growth. The Commission have suggested a draft outline of areas of funding under Horizon 2020, they are as follows:

Funding area in Horizon 2020

Meeting societal challenges	Public Welfare	Strengthening competitiveness – Key technologies
Sustainability, Energy and a resource-conserving lifestyle	Health	Advanced materials
Energy	Bio-economy	Nanotechnology
Environment	Demographic change	Production technology
Resources	Society	Photonics
Mobility	Security	Micro and nanoelectronics
		Microsystems engineering
		IT systems
		Communication systems
		Biotechnology
		Space technology
		Aeronautical engineering

Recommendation 5: Increase NI research groups participation in National, All-Island, and European wide research and interest groups.

Owner: Led by Horizon Thematic leads and Universities, supported with activity carried out in Invest NI Competence Centres, Trade Associations, NISP, CBI, and MATRIX.

21. To support growth and focus on the key thematic areas, interest groups should be supported to enable industry and academia to share research knowledge, discuss potential consortia and discuss draft competition calls. These groups should initially try to link to ROI-based groups to forge All-Island interest groups. Some of these are already in place via other means, for example, ICT supported by the All-Island Software Network. This can be an example of how a single sector can collaborate and in so doing increase the profile of the sector and the members of the network.
22. NI researchers, in both the public and private sector should be encouraged to participate in UK wide networks such as the Technology Strategy Board's Knowledge Transfer Networks through their Connect platform (<https://ktn.innovateuk.org/web/guest>). Interested participants in extending their research network should join EC Advisory Groups and Technology Platforms and attend brokerage events organised by ERRIN (<http://www.errin.eu/en/>), COST (<http://www.cost.esf.org/>) and the Enterprise Europe Network (<http://www.enterpriseeuropeni.com/inx/>).

Recommendation 6: Explore new methods of marketing to increase engagement with industry and research organisations on Framework, potentially reaching outside NI to include All-island events.

Owner: Invest NI, InterTradelreland, CBI, NISP, Universities.

23. Promotion of Framework should continue to be targeted, thematic and co-ordinated with external partners and interested bodies. Stakeholders should be encouraged to work closely with each other to provide an effective way of sharing information and raising awareness of calls, events, etc.
24. Marketing material and communication portals should be updated with success stories from NI to inform stakeholders of those who are active in Europe and the types of projects that are being undertaken. This gives the successful project some marketing and promotion and also gives other non-participating businesses the challenge to become active and increase their capability and presence within Europe.
25. Invest NI Executives, Innovation Advisors and Technology Executives should continue to inform and feed into the existing Collaborative R&D Team to maintain a support to businesses participating in innovative activities.

Recommendation 7: Create a specific website "Horizon2020 as the single point for which all information necessary in relation to Framework (gradually changing to Horizon2020) could be hosted.

Owner: DETI/ Invest NI

26. A primary point of contact for Horizon2020 should be towards a dedicated and framework specific website "Horizon2020NI". This catch-all site should be the single point for which all information necessary in relation to Framework should be hosted. The site should follow the nature of the recommendations in this paper and be formatted in a thematic approach, have clear sections for business, academics, lobbying, evaluating and used to advertise events. It should also include links to CORDIS, UK FP7 platform on connect <https://ktn.innovateuk.org/web/guest/networks>, offer key contact points and link to other appropriate collaborative R&D sites such as Enterprise Europe Network; InterTradelreland NIbusinessinfo.com. The functionality of "Horizon2020NI" should complement existing electronic communication tools.

27. The site should include a section that hosts research capabilities, skills and expertise that are available within NI. During the course of the preparation of this report a mapping study of the research capabilities of NI was carried out. This study should be hosted on this site to improve understanding of NI's strengths and to allow collaboration to be informed freely through sharing of information. The information could be presented under thematic areas and would help encourage industry-academia links for small scale R&D and help build relationships to support larger scale R&D activity over time.
28. The extent of website functionality and appropriate owner of the website can be determined following the appointment of the Horizon 2020 champion.

Recommendation 8:

- 1. Subject to positive evaluation of current Invest NI pilot mentoring scheme, expand the scheme to all NI research institutions.**
- 2. Examine potential for industry-facing mentoring scheme with possibility of CollegesNI to fulfil Framework application mentoring role.**

Owner: Invest NI and CollegesNI.

29. The Framework application process is particularly complex and lengthy with an average success rate of just over 20%. It is essential that standard of drafting is as high as possible to ensure the application sufficiently promotes the research project and meets the Commission's criteria. There is, therefore, a need to strengthen the capacity of indigenous businesses and researchers to submit quality applications to Framework. It is important that this skill set is created and maintained within NI so NI can exploit this expertise. It also needs to be borne in mind that assistance in proposal writing needs to be supported with quality projects, coupled with high calibre and appropriate collaborative partners which all impact on the outcome of the evaluation.
30. Application writing and mentoring schemes are essential to support people who wish to participate in Framework. Mentoring which encourages the triple helix approach has been proven by comparable regions to be highly successful with a return on investment in mentoring of a 1:12 return (for example, the ROI's experience showed that an investment in mentoring of £250k returned projects to the value of £3million).
31. Mentoring also reinforces the benefits of collaboration between government, industry and academia. A pilot mentoring scheme supporting our research institutions has recently been started by Invest NI. This is to be welcomed and should be expanded to incorporate businesses.
32. A number of Further education Colleges have been active within Framework and this willingness to collaborate is to be welcomed. Colleges though their engagement with businesses, particularly SME's, and their involvement in collaborative R&D programmes, could be in a position to provide a more consultative role of mentoring and assisting SME's in application writing.

Recommendation 9: Consider additional support that could be provided to academics participating in Framework applications.

Owner: Invest NI.

33. The needs of Business and Academia differ in relation to support. The support offered should be clearly defined to each group and consideration should be given as to how best we can support academics wishing to explore participation.
34. Evidence from other countries, including the Republic of Ireland shows that there is specific support provided to academics participating in Framework applications; support includes

funding for travel expenses to help scope a potential project, meeting partners to form a consortia etc. A NI version of this type of support should be explored.

Recommendation 10: Increase number of NI evaluators for Framework.

Owner: Invest NI, Universities, AFBI and MATRIX other Government Departments with specialist skills

35. NI needs to increase the number of indigenous evaluators taking part in the evaluation process for Framework funding. An analysis of the current level of NI representation on evaluation panels (Annex B) illustrates the relatively low number of evaluators from NI (although it is recognised that NI researchers may have offered their services but have not yet been called upon by the Commission). The benefits of being an evaluator include the ability to understand fully how the evaluation and assessment process works and gaining insight into the types and level of applications which are being submitted. Having a European presence will help build the profile of the individual involved but also indicate the regions interest and desire to get involved in Horizon 2020.
36. There is a need to continue to actively promote the importance of an NI presence on Framework evaluation panels. Industry and research institutions need to encourage employees to participate. This can be presented as an opportunity for continued professional development and maintaining awareness of change within their area of expertise. Appropriate Government departments and Agencies should also encourage their employees to be more active, and MATRIX should encourage their member companies to support participation.
37. To increase evaluation participation, Invest NI should continue to monitor evaluation participation levels and continue to advise people how to become involved. Lessons learnt from the process (generic) should be taken on board and build into continual development and improvement of the service provided. Informal networking sessions could be hosted by Invest NI and others to allow learning to be shared and exchange of knowledge amongst evaluators vis-à-vis industry, academia, Invest NI and others.

Recommendation 11: DETI to set a target for Horizon 2020 drawdown.

Owner: DETI in agreement with relevant stakeholders

38. A target for funding drawdown from Horizon 2020 should be set. This target needs to be set in collaboration with industry and academia. The importance of industry being involved or consulted on the setting of R&D funding targets is to place emphasis on the value to business. The target should be a challenge for academia, government and industry to work together. DETI should take the lead in facilitating discussion on the target.
39. Creating a baseline is imperative to establish a fair and reflective starting point for future comparison and analysis of Framework participation. With the increasing focus on European activity, it is suggested that existing economic calculations and performance are used to provide a new target baseline; some of the current methods are BERD/HERD based on GDP. An agreed baseline for Framework will allow NI stakeholders to agree targets for Horizon2020 to produce a challenge to stimulate R&D activity in NI.

Recommendation 12: Promote the assistance available to post-application staged support and connections available for project delivery.

Owner: Invest NI, supported by Horizon Thematic leads

40. There is a need for support to a business to help manage the process after an FP application has been approved. This would ensure that assistance, in whatever form, is available to it throughout the lifecycle of a project. A 'cradle to grave' approach is already in place by Invest NI but this needs to be promoted further. Reinforcing this longer term support will encourage businesses and academia to re-apply and continue to participate in appropriate collaborative European research.

41. Support would include availing of the existing UK National Contact Point network but it should also include support from more NI 'actors' within Europe. People that are well connected in Europe could offer their knowledge of 'who is who' to help businesses navigate to the relevant staff within the Commission.

Recommendation 13: Creation of an alternative source of funding support to finance application writing for Framework participation for non Invest NI Clients and third party organisations.

Owner: DETI

42. While Invest NI provides advice and guidance to all NI companies, funding to support Framework applications is only available to Invest Clients or potential Invest NI clients. There is a gap therefore in financial support for those companies or organisations who are not Invest NI clients. Consideration is needed for an alternative funding stream. Such a funding stream must not displace the support offered by Invest NI but rather act as a 'net' to capture any potential participation that falls between existing eligibility criteria, for example third sector organisations.
43. Offering an alternative funding stream will need to have the appropriate governance and monitoring of funds placed on the management of the funding to ensure appropriate use and return on public sector finance. DETI, in its role as lead Department in respect of Horizon 2020, is best placed to explore options for this.

Recommendation 14: QUB and UU to engage with ROI based research institutions to establish how they maximise support from Enterprise Ireland and other economic development Agencies.

Owner: Queens Belfast and University of Ulster

44. In ROI there appears to be a high level of interaction between economic support agencies such as Enterprise Ireland and ROI's research institutions. It is an area where there may be scope for learning for Northern Ireland's Research organisations. It is suggested therefore that Queens Belfast and University of Ulster engage with Research Offices in UCD and/or Trinity to understand the relationship between the ROI research offices and Enterprise Ireland and investigate how NI based institutions could make more use of the potential support that is available in Invest and InterTradeIreland.
45. If any needs within NI are identified these perceived gaps in support should be highlighted with the Framework Steering Group to explore if and how measures could be put in place to address the gap.

Framework Working Group Membership

Annex A

Name	Organisation represented	Role
Ciaran McGarrity	DETI	Chair
Norman Black	University of Ulster	
Scott Rutherford	Queens University Belfast	
Rodgers, Sheila	DEL	
Brendan Forde	DOE	
Elaine McCrory	DARD	
Janice Bailie	DHSPSS	
Kirsty McManus	CBI	

Name	Organisation represented	Role
Steve Orr	NI Science Park	
Joanne Coyle	Invest NI	
Simon Grattan	InterTradeIreland	
Claire McCafferty	DETI/MATRIX	

Annex B**Framework Assessors: An analysis of current participants**

Sector	Year	UK	Ireland	N. Ireland	NI participant
Co-operation					
Energy	2007	10	1	0	
	2008	33	6	0	
	2009	23	6	0	
Environment	2007	18	9	1	Derek Jackson, UU
	2008	33	7	0	
	2009	29	0	0	
ERANET	2008	2	0	0	
	2009	1	0	0	
Food, Agriculture and Bio technologies	2007	44	9	0	
	2008	38	8	1	Andrew Crangle, UU
	2009	30	5	0	
Health	2007	173	22	2	James Dooley, UU Madeline Ennis, QUB
	2008	62	6	1	Gavin Reynolds, QUB
	2009	71	6	1	Gavin Reynolds, QUB
ICT	2007	156	23	2	William Kernohan, UU Mark Reilly, Enterprise Ireland
	2008	42	7	1	Martin McGinnity, UU
	2009	176	22	0	
Nanosciences	2007	54	17	1	Eileen Harkin-Jones, QUB
	2008	39	14	0	
	2009	25	6	1	Eileen Harkin-Jones, QUB
Security	2007	10	2	0	
	2008	10	4	0	
	2009	11	4	0	

Sector	Year	UK	Ireland	N. Ireland	NI participant
Socio-Economic Sciences and Humanities	2008	19	6	0	
	2009	20	4	1	Richard O'Leary, QUB
Space	2008	18	6	1	Ruth McAreavey, QUB
	2009	20	4	1	Richard O'Leary, QUB
Transport	2007	51	5	0	
	2008	34	2	0	
Ideas					
European Research Council	2007	126	13	0	
	2008	135	8	0	
	2009	316	20	2	Adrian Long, QUB Karl Zepf, QUB
People					
Marie-Curie	2007	72	17	3	Eileen Harkin-Jones, QUB Karen McMenemy, QUB Irene Rea, QUB
	2008	112	33	3	Heather Anderson, QUB Karen McMenemy, QUB Irene Rea, QUB
	2009	64	22	2	Karen McMenemy, QUB Irene Rea, QUB
Capabilities					
Research Infrastructure	2007	10	4	0	
	2008	12	3	0	
	2009	6	0	0	
Research for benefit of SME	2007	33	5	0	
	2008	30	9	1	Robert Bunn
	2009	14	6	0	
Regions of knowledge	2007	4	2	0	
	2008	5	1	0	
	2009	1	0	0	
Research Potential	2007	4	3	0	
	2008	4	3	0	
	2009	4	1	0	
Science in Society	2007	9	4	0	
	2008	10	2	0	
	2009	5	0	0	
EURATOM		7	0	0	

Response from the European Commission

From: Maurice.MAXWELL@ec.europa.eu [mailto:Maurice.MAXWELL@ec.europa.eu]
Sent: 15 December 2011 11:55
To: McKee, David
Cc: Jonathan.SCHEELE@ec.europa.eu; Jeanette.THORNTON@ec.europa.eu; Catherine.MCSHANE@ec.europa.eu
Subject: FW: Committee for Enterprise, Trade and Investment's Inquiry into Research and Development

Dear David,

In reply to your request please find attached copies of previous correspondence I had with OFMDFM on the approach I believed should be followed with regard to engagement in EU Research programmes.

I'm happy to say that, overall, a good start has been made to implement this approach led mainly by DETI and InvestNI. Of course there is much still to be done but resources have now been put in place both in Belfast and Brussels to drive forward the approach suggested. We have worked closely with Intertradelreland to further N/S connections and learn from best practice. This has already led to positive developments. This should be continued but needs to be widened in scope to embrace the wider interests of the Research community not only in Ireland but the UK and, of course, throughout the EU.

Commissioner,Geoghan-Quinn came to NI to endorse this approach and encourage NI to engage more fully with EU Research and a conference was held end June to further information and interest of stakeholders (Minister Foster opened the conference and Minister Farry attended the closing event).

We must continue to focus on the possibilities on offer especially in the new framework programme recently launched by the Commission entitled Horizon 2020.

I would underline at this stage the importance of extending the range of our interests in the Research field. Horizon 2020 puts even greater emphasis on the research challenges posed by societal problems and changes. Our universities should be at the forefront of making a concerted effort to take the lead in these areas. I also believe the Science Community (Science Park) should also be part of this spearhead using their contacts and knowledge to identify possibilities and drive forward proposals. The agricultural and food sectors also need to become more closely engaged. They are associated already with some of the initiatives underway but I believe this engagement needs to be more structured.

In summary, I think that an architecture of interests should be established involving DETI/ InvestNI; Universities; Dard/AFBI and Science Park/Matrix to provide a driving force and coherence in addressing the possibilities offered by Horizon 2020. Perhaps someone should be appointed with the mandate to manage this process and bring all the strands together (not an easy task).

I hope you find this useful. If you need further information I am, of course, at your disposal.

Best wishes

Maurice

Response from EU Commission

Dear Ms White,

I refer to your letter of 25 February 2010 requesting additional information regarding access to EU Research and Development funding.

Please find in annex a summary of the approach I believe should be adopted for Northern Ireland to maximise its participation in EU funded Research.

The advocated approach presupposes not only greater involvement in and intensification of our awareness of the planning and adoption of EU R&D priorities but also “on the ground “ engagement in the processes surrounding such activities.

This would entail a specific mandate to the NI Executive Office in Brussels (in addition to work here in NI) to adopt and action this approach.

In terms of the work of the Committee of the First Minister and deputy First Minister, I suggested that it would be impossible (and fruitless) to try to scrutinise every proposal which emanates from Brussels and which, in any case, is already subject to UK scrutiny in the House of Lords. It is my understanding that summaries of such scrutiny are reported to the NI Executive. I believe I suggested that a relatively small number of priorities should be identified by the Committee on which it would concentrate its attention to ensure, as far as possible, that the defined outcomes were being achieved.

I know resources are even scarcer at the moment than in normal times but I believe the presence in the Brussels' office of an official whose responsibility would be to report directly to the Committee would be a more than worthwhile investment.

I believe I also suggested that, with the adoption of the Lisbon Treaty, the influence of our MEPs should serve as a valuable resource in N Ireland's future dealings with the EU institutions in Brussels.

Further information on some of the matters raised in my presentation to the Committee can be followed up through the links noted below:

House of Lords EU Committee:

<http://www.parliament.uk/hleue/>

<http://www.publications.parliament.uk/pa/ld/ldeucom.htm>

Link to House of Lords Report:

http://www.parliament.uk/parliamentary_committees/lords_eu_select_committee/lisbontreaty.cfm

EC impact assessments:

http://ec.europa.eu/governance/impact/index_en.htm

I hope this information is helpful and I remain at your disposal for any further clarification.

Yours.....

Future EU Framework Programme for R&D

Suggested approach for N Ireland to maximise participation.

The European Commission has just published its proposals for the follow up to the “Lisbon Agenda” – “Europe 2020” – [Brussels, 3.3.2010 (COM(2010) 2020)].

The basic conclusion is:

“Europe’s structural weaknesses have been exposed.

Moving out of the crisis is the immediate challenge, but the biggest challenge is to escape the reflex to try to return to the pre-crisis situation. Even before the crisis, there were many areas where Europe was not progressing fast enough relative to the rest of the world:

Europe’s average growth rate has been structurally lower than that of our main economic partners, largely due to a productivity gap that has widened over the last decade. Much of this is due to differences in business structures combined with lower levels of investment in R&D and innovation, insufficient use of information and communications technologies, reluctance in some parts of our societies to embrace innovation, barriers to market access and a less dynamic business environment.”

The shape of future EU funding for R&D and innovation and the size of budget to be allocated is obviously not yet determined. A new Commission has just taken office but the “Europe 2020” document has already put Research and Innovation at the heart of Europe’s strategy for recovery from the current crisis. “Europe 2020” identifies a number of linked so-called “flagship initiatives” including, most importantly in this context:

Flagship Initiative “Innovation Union”; Flagship Initiative: “A Digital Agenda for Europe”; and Flagship Initiative: “A Resource efficient Europe”

All of these initiatives will involve significant EU research related funding subject, of course, to the outcome of the budget discussions with the budgetary authority (Council and Parliament).

What is the EU’s Framework Programme?

The EU’s Framework Programme for Research & Development is the funding instrument for research actors across the EU. A tool to maintain leadership in the global knowledge economy, the Framework Programme aims to strengthen the scientific and technological base of European industry.

We are currently about half way through the Seventh Framework Programme (FP7), which has an overall budget of over €50 billion for the period 2007-2013. This funding is spent on: 1) high level collaborative applied research through European consortia of industry and academia in ten thematic areas; 2) frontier research through the European Research Council; 3) the mobility and training of researchers; and 4) the strengthening of research capacities.

Although the first official documentation on a future Framework Programme from the European Commission will most likely not emerge before 2011, the Commission will have already started to plan ahead and will be having discussions and consultations with interested parties.

The over-riding message in this context is that waiting until 2011 to react will already be too late to influence the process. Many other regions within the EU realise this and are already pro-active on the ground. Initiatives include setting up mailing lists to inform interested stakeholders on the possible direction of the future Framework Programme given the Commission’s published strategy documents. This advanced information should help potential stakeholders to position themselves for the formal consultations.

Clearly, preparations and contacts locally with potential stake-holders would be an essential ingredient in the preparatory phase. The eventual aim is to match those parts of the final Framework Programme to the strengths and interests of local researchers capable of participating in this type of research. I understand that the UK Government plans to launch a consultation exercise in summer 2010.

Other regions have found it fruitful to work with European partners, for example, through the European Regions' Research and Innovation Network (ERRIN) which facilitates engagement with the Commission through events in Brussels.

With a new Commission and a new Commissioner for R&D, it is impossible to predict at this stage what the final direction of a new Framework Programme will take. However, soundings in Brussels indicate a number of possible directions already being discussed. Some believe that the focus could be mainly on global challenges such as climate change, energy shortage, pandemics, ageing societies and security.

Another direction could be a concentration on more participation SMEs in the research Agenda with more emphasis on the commercialisation of the results of the research.

Attention will focus on how best to involve the participation of small and medium sized businesses (SMEs). In the EU as a whole currently only about one sixth of FP7 funding for collaborative research projects is allocated to small businesses. It would be in N Ireland's interest to see to what extent the Commission's thinking is moving towards involving greater SME participation in future programmes given the need for job creation and SMEs important role in that context.

In reality, the outcome will most likely be a mix of these priorities. The keyword for a region such as N Ireland is to participate in the discussions; to be aware of the priorities as they emerge; to identify who the principal participants are likely to be and to communicate the results of this to potential NI researchers.

This strategy demands an investment in personnel both locally in NI and, especially, on the ground in Brussels with a clear mandate on what the objectives are, a knowledge of the processes involved, an ability to engage with not only the European Commission but also officials and representatives of the other Institutions.

With the adoption of the Lisbon Treaty, the role of the European Parliament has been enhanced to the stage where co-decision with the Council is now the norm. MEPs can play a vital role in promoting the interests of their region through the formal and informal network discussions. This could be particularly valuable in maximising Northern Ireland's return from the R&D budget.

Helpful links to information on the EU's research programmes can be accessed at:

http://cordis.europa.eu/eu-funding-guide/home_en.html

<http://www.enterprise-europe-network.ec.europa.eu/news-media/news/enterprise-europe-network-website-relaunched>

Response from Federation of Small Businesses

Federation of Small Businesses
Northern Ireland Policy Unit
Cathedral Chambers
143 Royal Avenue
Belfast
BT1 1FH



Jim McManus, Committee Clerk
Room 375, Parliament Buildings
Ballymiscaw, Stormont
Belfast
BT4 3XX

13th February 2012

Re: Enterprise, Trade and Investment Committee Inquiry into Research & Development

The FSB welcomes the recognition given by the Enterprise, Trade and Investment Committee to Research and Development, an issue which will be of critical importance if Northern Ireland is successfully to grow its economy in the future in a way which maximises the local skills' base and offers export-led growth to the small business sector.

The small business sector and its innovation capabilities are illustrated in the statistics below¹;

- Northern Ireland has the highest concentration of SMEs of all the regions in the UK
- 98% of firms employ fewer than 20 people
- 95% employ fewer than 10 people
- Around 6,000 people start up their own business in Northern Ireland every year
- Small firms employ more than 65% of the private sector workforce in NI
- 57% of commercial innovations come from small firms

These figures indicate how critical it will be to ensure that there is sustained growth in the rate of R&D activity amongst small businesses in Northern Ireland. **It is welcome that the Draft Economic Strategy² places R&D as a priority issue. This must now be acted upon, by both government and businesses alike.** An extension of the Regional Innovation Strategy will also underpin this area and it is hoped that government will take this opportunity to place R&D at the heart of the 'game changing' philosophy it currently promotes.

However, to do so, a much more risk-taking culture must becoming engrained. Initiatives such as MATRIX and the Northern Ireland Science Park have shown that there is considerable potential in local entrepreneurs and, by the application of innovation, there are substantial commercial rewards. Similarly, there are many examples of 'traditional' businesses such as Delta Packaging in Belfast, who have looked outside their traditional markets and successfully entered new markets with new products.

Through a series of interviews with FSB members in Northern Ireland³, the following issues have been identified in relation to R&D;

1 FSB Manifesto, Making Northern Ireland an Enterprise Zone, March 2011

2 <http://www.northernireland.gov.uk/economic-strategy>

3 The FSB regularly interviews, formally and informally, members through panel surveys and one-to-one Q&A sessions, to ascertain their views on issues which affect them. A number of interviews relating to R&D issues were held in December 2011/January 2012

- Despite the progress on innovation, there remain a significant proportion of businesses which continue to see it as 'tech-led'. In the case of many small businesses, they put forward the message that they are "too busy trading, just to stay in business, and don't have enough time or resources to invest in R&D".
- **Collaboration** - There have been considerable efforts to develop a collaborative approach between businesses and academia and, to an extent, this is proving successful - especially in relation to the 'innovation voucher' system. The introduction of the 'Open Ulster' concept will hopefully take this a stage further but currently, although this approach is working, there is still a perception amongst many businesses that universities are more concerned with research-led and not market-driven opportunities.

It is often stated that businesses are unaware of the expertise that exists in universities and, by extension, whereabouts this is located within in the universities, and how it can be accessed. Similarly, from a university perspective, the needs of businesses – particularly small businesses – are often not clearly articulated and therefore it is difficult to formulate ways of engaging which are relevant and appropriate. In consequence, the weaknesses in this two-way communication are an area in which to look for improvements.

- A small number of businesses have highlighted the issue of timelines and **differences in attitudes between businesses and academia**. Again, timelines are not focused on market issues – with some applications taking approximately one year to approve and project work lasting up to five years – meaning unworkable timescales in relation to bringing products to market.
- **R&D Grant Support** - Invest NI supports a package for R&D, with a straightforward application and funding process, and a stringent system for verification, ensuring it is well-placed when compared with, for example, Enterprise Ireland.
- The high profile **Boosting Business** campaign, with its focus on exports, is a welcome step forward in raising the profile of enterprise in Northern Ireland and, in particular, its advertisements '*Boosting Business through R&D helps companies grow stronger*'. There is clearly a need to find effective methods of communicating with the broad small business sector – the typical businesses of Northern Ireland - especially those which simply do not have time to devote to attending lengthy presentations or seminars.

The increase in communications from Invest NI to promote R&D through the Boosting Business campaign, media advertising and direct emails etc is welcome. It is hoped that this is reflected when assessing the number of businesses which are engaged in R&D for the first time as a result of the campaign.

- The use of **R&D champions** is another useful tool in engaging new converts to R&D. Experience determines that small businesses will go a little further to explore those areas which make a measurable and positive difference to their business and therefore the challenge is in making the connection with R&D and overcoming the perceptions that innovation and R&D are all about technology and '*just not what I do*'.
- Many local businesses have been discouraged from pursuing **FP7 Funding** because of the perception that it appears to be more suitable for larger organisations and academia, and there has not been the pro-active approach necessary to engage with SMEs. Indeed, many have not even sought to explore possible opportunities in this area. It is clear that take-up rates in other EU regions, including Ireland, are substantially higher. There remains a general reluctance to consider cross border collaboration in Europe amongst many local businesses and this is an area which requires substantial effort to address within the DETI export strategy.
- The Irish Times monthly Innovation Magazine provides an excellent platform for innovation and R&D successes within industry and academia, with many case studies of successful Irish businesses pursuing R&D. However this publication is largely Republic of Ireland-focused and a Northern version might be useful. Whilst this may be considered by some a

trivial issue, it contributes towards a culture where innovation is more widely read about, understood and made accessible to a much wider group of potentially interested parties.

- Innovation voucher scheme – feedback from business participants is that this system has been well-received, it is easily understood and it is easily integrated with small business processes - and the most effective way for collaboration between business and academia. What has not developed is significant collaboration between businesses which, in turn, can encourage greater levels of R&D, in partnership with academia.

In brief, a number of points have come through during research in this area;

- Every business has different levels of need, there is no 'one-size fits all'. Instead, there is a need for processes for different sectors, and a need to draw out what each type requires.
- There is a tendency for businesses only to seek help when they have identified a problem, rather than looking at initiatives which might improve their products.
- The biggest challenge for many small businesses is to move from fighting fires to initiating new ideas to expand their markets.
- There is unhelpful tension between proper governance and accountability versus flexibility.
- Trade Associations and informal networks are helping businesses to improve interaction with universities, especially from an export perspective. However these links need to be considerably deepened.
- Many small businesses that need help may be unattractive to academics and therefore this mismatch undermines potentially significant R&D progress.
- The FSB supports the concept of 'champions' – those businesses which have successfully embraced R&D, and demonstrated the positive business benefits to the wider sector.
- The FSB has welcomed the inclusion of an Action Plan to accompany the Draft Economic Strategy. This is important because Northern Ireland is now at a stage whereby measureable implementation of initiatives to support businesses is needed.

We trust that you will find our comments helpful and that they will be taken into consideration.

The FSB is willing for this submission to be placed in the public domain, and would appreciate being kept apprised of further developments.

Yours sincerely,



Wilfred Mitchell OBE

Northern Ireland Policy Chairman

Response from InterTradelreland

InterTradelreland Response to the Northern Ireland Assembly Committee for Enterprise, Trade & Investment Inquiry into Innovation, Research & Development

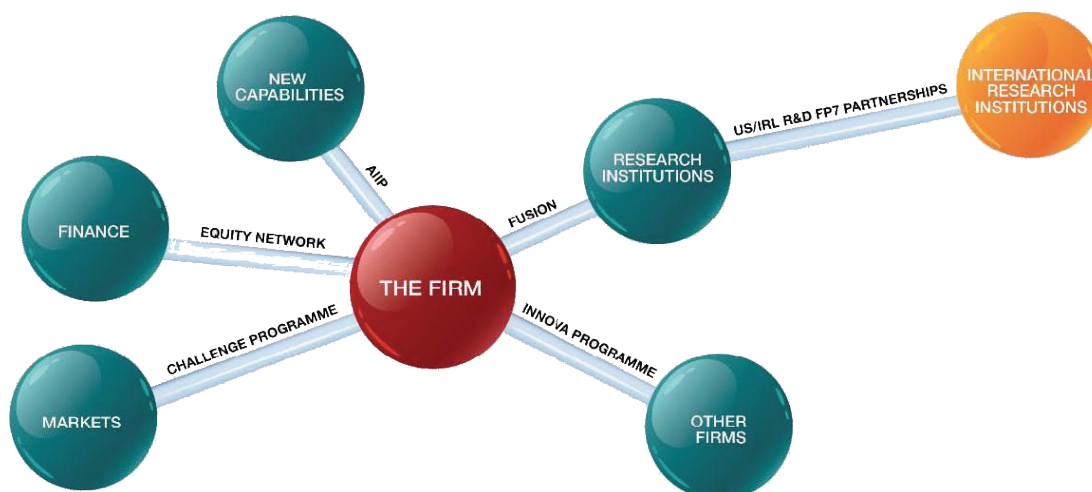
March 2012

Innovation Ecosystem – InterTradelreland's View

Innovation is a collective and interactive process involving many different players and resources of which R&D is only one. As a result R&D should not be considered in isolation but rather as an integral part of a wider ecosystem. This system includes other firms, customers, suppliers and a variety of supporting actors who provide firms with resources needed for innovation such as finance, technological expertise, market access support, intellectual property advice as well as R&D support. It also includes Government, which has a role to play in setting the wider framework conditions for innovation. Getting this interactive ecosystem right, so that firms can easily access all the resources needed to engage in innovation, will increase the odds of innovation success.

The ecosystem envisaged by InterTradelreland, which given our legislative remit is cross border in nature (see Figure 1 below) introduces diversity and opens up complementary resources and competences to firms in each jurisdiction. By putting enterprise at its centre it tries to ensure that the resources, be they financial, technical or otherwise, are readily available and accessible to companies, regardless of which jurisdiction they are located in, to ensure that creative ideas are commercialised effectively and efficiently. As such innovation is viewed as a strategic value creating business process rather than an ad-hoc technical project-based process.

Figure 1: Innovation Ecosystem



InterTradelreland is currently undertaking a study to determine the characteristics of an Innovation Ecosystem across Northern Ireland and Ireland which puts enterprise at its centre.

The aim of the research is to better understand:

1. How firms leverage external connections for business advantage within local, cross-border and international innovation systems to drive innovation;
2. The internal practices and capabilities of firms to manage innovation; and
3. How the local and cross-border innovation systems respond to the needs of firms.

The background stage of the research tells us that a large majority of businesses (73%) consider themselves to be innovative and 58% have an ambition to grow in the immediate future.

The survey of 1,000+ businesses across the island has revealed issues for businesses in terms of internal capabilities to manage innovation and the extent to which they leverage external connections. The key highlights include:

- Only 40% of firms have a written strategy or business plan;
- 72% of firms do not have a formal process for managing new developments or improvements in their business
- Businesses tend to place more value on the importance and effectiveness of actors within a firm's value chain (i.e.: staff, customers and suppliers) compared to those who sit outside
- A high number (60%) of past innovators innovate without leveraging external resources and supports
- One reason for the lack of leveraging of external supports may be a failing identified by businesses themselves concerning their capability to find external support for new development or to network with others in the same sector
- Where they do use external support for innovation it is predominantly to source ideas and, to a lesser, degree at the development and commercialisation stages
- Approximately a third of firms in each jurisdiction draw on clients, customers and suppliers that are based in the other jurisdiction to support their development work

Some emerging findings from the work to date are:

1. A general sense among stakeholders that the innovation support system pays insufficient attention to smaller businesses in traditional economic sectors, where incremental innovation, often based on the adoption (diffusion) of novel solutions developed elsewhere, can play a fundamental role in securing employment and facilitating the emergence of superstar businesses that exhibit strong growth and can trigger transformation in their competitors and up and down their value chains
2. Small businesses tend to have narrower managerial and technological capabilities than medium and large-scale businesses, by virtue of their size, and most will simply not attempt, or would struggle, to launch innovative new services or enter new markets.
3. All stakeholders see an opportunity for businesses and research institutes to forge stronger alliances as a means by which to more successfully target EU funding for research and innovation
4. The public sector accounts for 20-30 percent of output and few public bodies are making use of this large and highly structured marketplace to seed innovation or otherwise create lead markets
5. Improving the provision of information about innovation and innovators, access to intermediaries with the experience and personal skills to mentor would-be innovators and the further development of what are sometimes called "boundary spanners", would be a real boost

InterTradelreland Innovation Supports

In InterTradelreland our view of innovation, as outlined above, focuses on a highly connected web of resources, with enterprise at its centre. As a result we have developed a number of initiatives (see Figure 2) such as Fusion, Innova, Equity Network and the new Challenge Programme that help enterprises make best use of resources available to them, through supporting connections and capability development. The business value realised to date by companies participating on the Fusion (technology transfer programme) is £148M, while £35.8M has been realised from the Innova (collaborative R&D) programme. These rates of

return confirm InterTradelreland's view that innovation is not solely a technological, or R&D, process but a value-creating business growth model.

Figure 2: InterTradelreland Innovation Supports

Innovation & Collaboration

- **Fusion** company-graduate-academic partnership
- **Innova** strategic company-to-company innovation partnership
- **Challenge** strategic planning and business transformation
- **FP7 support programme** crossborder voucher scheme and information service
- **All-island Innovation Programme** events, workshops and master classes

Equity Finance

- All-island Seedcorn Business Competition for the best early stage companies
- Venture Capital Conference annual event
- Equity advisory service one to one advice from our equity expert
- Business plan workshops, guides and events
- Business Angel Networks and Syndicate groups
- Entrepreneurship master classes

While the programmes above are focussed on developing connectivity and capability in the ecosystem on the island, cross border cooperation can also increase participation in international R&D. Two areas where InterTradelreland is particularly active in this regard are:

- EU Framework Programme
- US-Ireland R&D Partnership

EU Framework Programme

Given the scale of funding that has been available under FP7, over €50bn from 2007 to 2013, and the projected increase in funding moving into Horizon 2020 up to €80bn, this is an ideal time to be analysing and setting in place relevant structures that will enhance local participation. InterTradelreland has developed several initiatives under the guidance and advice of an FP7 steering group¹ comprising representatives from relevant agencies in Northern Ireland and Ireland and chaired by InterTradelreland, aimed at increasing North/South collaborative applications. The following are the current on-going initiatives:

- **Support to 'Regions of Knowledge' North/South applications** – 3 proposals were recently submitted, one under resource efficiency and two under the digital agenda.
- **'Focus On' FP7 events** – the „Focus On Cancer Research? event was held in November and brought together the leading cancer researchers from both NI and Ireland, academia and industry, to look at the early draft of the upcoming July 2012 work programme. Further events are being planned under other thematic headings such as 27th April under Environment (water management, waste recovery and ocean-related topics) and 2nd May under Health (brain and brain-related diseases) with others being investigated.
- **EU Notice Board** – bringing forward those who are developing projects and in requirement of a partner with a specific expertise and being advertised on a North/South basis.
- **Cross-border collaboration voucher** – Financial support to ensure that researchers can travel to meet and discuss further ideas for EU research applications as well as visiting the potential partner's facilities and staff.
- **FP7 Support website** – offering useful information on the supports available in Ireland and Northern Ireland and other FP7 related topics.

1

Comprised by representatives of InterTradelreland, Invest NI, Enterprise Ireland, Department of Agriculture and Rural Development, Department of Enterprise, Trade and Investment, Department of Jobs, Enterprise and Innovation, Department for Employment and Learning, North South Ministerial Council Joint Secretariat and the European Commission.

- **Cross-border Partner identification** – InterTradelreland continues to assist those who are attempting to identify partners for projects and where the options above are not suitable.
- **InterTradelreland FP7 conference** – as a follow up to last year's well received conference (June 2011) InterTradelreland have been tasked by the steering group with organising a further conference in June 2012. Commissioner Geoghegan-Quinn is expected to attend and the event will focus on the final calls of FP7 (due to be launched July 2012) and on the next programme, Horizon 2020. Overarching this will be a focus on SMEs and their participation under both programmes.

InterTradelreland continues to explore and develop new initiatives to stimulate participation in EU research programmes on a cross-border basis. These include:

- **Interactive mapping** – A web-tool designed to demonstrate North/South collaborative projects, including FP7, Fusion and Innova.
- **Travel to EC 'Info days'** – A scheme which will provide financial support to North/South partners to attend „FP7 Info days? organised by the EC. The objective is to provide the opportunity for prospective programme applicants to put their questions directly to the EC officials, present their ideas to stakeholders, meet potential partners and learn more about the state of the art and the broader policy context.
- **Commercial benefits** – it has been agreed that there is a need for case studies to show where previous applicants have derived commercial benefits from their engagement with FP6 and 7. This could be on the smaller scale, i.e. the benefits from a specific work package, or it can be from the overall project being commercialised, even down to the level of increased exposure which generated more sales across the EU. InterTradelreland have been tasked with investigating past projects and establishing where benefit has been obtained and then with disseminating this out to the industrial partners.
- **Social Sciences and Humanities (SSH) Engagement for Horizon 2020** – Given the move towards increased engagement of the SSH researchers under Horizon 2020 projects, InterTradelreland intend to perform a mapping exercise and generate a database of SSH researchers that can be distributed to those within the other research areas.
- **FP7 Briefings** – Briefings highlighting the results of successful FP North/South collaborations, created to promote projects and raise awareness of its benefits within the political sphere.

Analysis of the most recent data provided by Enterprise Ireland indicates that there have been 553 Collaborative Applicants (216 Northern Ireland and 337 Ireland) in 197 proposals to November 2011 of which 137 applicants (54 Northern Ireland and 83 Ireland) have proved successful securing funding of €40,171,045 for 50 proposals (€9,948,297 Northern Ireland and €30,222,748 Ireland). The summation of the total project values that successful applicants are accessing totals €591,582,694. Box 1 below provides information on a Northern Ireland SME who has successfully participated in an FP7 project.

Box 1:

Cherry pipes is the co-ordinating company on the “Ultravisc” project which received a grant to process recycled polymers with a higher level of product quality and with greater efficiency than was previously possible.

Dr Paul Beaney, Technical Manager of Cherry Pipes, believes that FP7 funding has been enormously beneficial and would encourage local businesses to investigate the opportunities.

“As a small company with limited resources, the funding has given us access to world class research and technology developers across Europe, enabling us to deliver a ground-breaking product which will change the way plastic polymers are processed in our industry. A lot of organisations don't know that this money exists and even if they do, they don't know how to access it.”

The largest areas of successful activity are Marie Curie, AgriFood, Research for the Benefit of SMEs, ICT, Health, Security, NMP and ICT. In the context of overall FP7 participation: Irish applicants in these North/South collaborations account for 6.79% of all applicants and 7.30% of successful applicants in Ireland. In contrast, Northern Ireland applicants in the North/South collaborations account for 29.07% of all applicants and 33.54% of successful applicants in Northern Ireland.

As a result of these statistics, InterTradelreland will take action and address areas where there are seen to be shortfalls in the level of cooperation that would otherwise be expected.

US Ireland R&D Partnership

The Partnership is a unique tri-jurisdictional alliance that is promoting collaboration between world class researchers to address common research challenges in the areas of nanotechnology, sensor technology, telecommunications, energy & sustainability a range of health areas that are consistent with the respective remits of the participating funding agencies. The support system behind the Partnership consists of government departments, funding agencies, a steering group and secretariat provided by InterTradelreland. The US lead for the Partnership is Dr Kerri-Ann Jones, Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs, US State Department.

The work invested in developing the Partnership is beginning to show success which is indicative of the excellence of the Ireland and Northern Ireland researchers. To date eight proposals have passed the robust standards of the US National Institutes of Health / National Science Foundation peer review. The Partnership is a new model for research cooperation with the United States and represents a stepping up of R&D collaboration between the three partners that will be a significant factor in the creation of a world-class all-island research network which is fundamental to competitive advantage.

The status of applications is that eight proposals have been funded and a further nine are going through the process. These nine proposals are spread across the thematic areas as follows:

Area	No. of proposals pending	Area	No. of proposals pending
Nanotechnology	1	Energy & Sustainability	1
Sensor Technology	2	Diabetes	0
Telecommunications	3	Cystic Fibrosis	1

The future work of the Partnership will concentrate on promoting activity in the new areas under the Partnership, creating broader awareness and visibility of Partnership activities and also assessing the outcomes and benefits derived from supported projects.

Response from Invest NI

Written submission from The Department of Enterprise Trade and Investment to the Committee for Enterprise Trade and Investment Inquiry into Innovation and Research & Development

Introduction

1. The Invest NI Corporate Plan 2011-2015 sets out the role Invest NI will play to drive economic growth in N. Ireland as detailed in the recently published Economic Strategy by acting as an enabler and catalyst to grow Innovation, Exports, Productivity and Employment throughout the business base in N.Ireland.
2. A core driver of economic and productivity growth is the Invest NI objective of “stimulating Innovation, R&D and Creativity”.
3. In support of this objective, Invest NI provides a comprehensive range of interventions in support of enhanced levels of business R&D and in pursuit of higher levels of research commercialisation and knowledge transfer from the research base.

Supporting R&D

4. The private sector will always be central to innovation, however Government has a key role to play in ensuring entrepreneurs, business leaders and innovators have the best possible environment in which to operate.
5. Invest NI provides support for R&D and Innovation relevant to all stages of business growth. It does this through a range of interventions which are highlighted in the form of the Innovation Escalator (presented in Appendix A). In the years 2011-15 Invest NI will secure £764m investment in innovation and R&D by assisting businesses to move up the innovation escalator.
6. In recognition of R&D as a key driver of economic growth, Invest NI has allocated a growing proportion of its budget to incentivising R&D activity within the business base. In the period 2008-2011 the budget available to support R&D increased from £19m to £46m (28% of the total Invest NI budget). In the four years of the current Corporate Plan period 2011- 2015, the budget is projected to average £31m per annum. Of this budget approximately 80% will go directly to businesses with the remainder allocated to the research base in pursuit of higher levels of research commercialisation and knowledge transfer.
7. One of the main facilitators of this increased budget for R&D is its alignment to ERDF criteria. Currently 80% of the Invest NI annual budget for R&D is ERDF funded making this a very efficient way of maximising the draw- down of EU structural funds for N.Ireland.

Support Mechanisms

8. For those businesses with a nascent or core R&D function the main form of support is through Grant for R&D which operates across a wide range of sectors and size of businesses and covers the significant costs associated with carrying out R&D.
9. Invest NI has a clear focus on getting more businesses to do R&D and this is facilitated by our current Boosting Business through R&D initiative. This initiative has targeted ‘New to R&D’ businesses as well as small businesses doing more R&D. There is also a renewed emphasis on supporting businesses with the commercialisation phase of any R&D project through the promotion of market led R&D interventions.
10. For large scale R&D performers Invest NI seeks to incentivise R&D activity through sharing the risk and promoting collaborative EU funding opportunities and initiatives such as Competence Centres.

11. A list of the key R&D and Innovation support mechanisms is attached in Appendix B.

The Research Base

12. With two universities that are undertaking world class research and a number of clusters of business excellence developing, N. Ireland has the potential to experience global growth. However, to maximise the potential for success in global markets, N. Ireland must strengthen its ability to accelerate the commercialisation of emerging technologies and to capture the value chains that result.
13. Support programmes such as the Proof of Concept (PoC) Programme and the Knowledge Transfer Partnership (KTP) Programme have as their prime objectives, accessing and transferring knowledge from the research base and embedding it in the business base for commercial return.
14. The Innovation Voucher scheme has also provided a valuable mechanism to provide businesses with a first step in building a culture of knowledge transfer between the research base and small businesses.
15. The detail of these programmes can be found in Appendix B

Promoting R&D - Advice and guidance

16. In addition to financial support for businesses, a cadre of Specialist advisers offers a wide range of advice, guidance and support in the areas of innovation such as for technical issues, product development, IP, lean, design and collaborative 'R&D'
17. Specifically Innovation advisers reach out to local businesses to raise awareness of the support available and to assist them to become involved in innovation and R&D by supporting in the initial application process. There are currently 16 advisers in total, operating across the wider innovation support available, of which three are actively involved in providing specific support to businesses starting out on R&D activity.

Knowledge and Connectivity within Government

18. Knowledge about the wider regional, national, EU and global Innovation and R&D agenda comes largely from Invest NI's connectivity with other stakeholders in the wider Innovation ecosystem.
19. The range of players in the innovation ecosystem is acknowledged to be extensive. In pursuit of strategic alignment Invest NI has built mutually beneficial relationships with international; national and regional players to help provide a joined up picture for businesses and to maximise impact for N. Ireland.
20. A key example of this in the area of EU as outlined below:

Enterprise Europe Network (EEN)

21. Invest NI is the (only) regional host for Enterprise Europe Network. This EU programme provides international collaboration opportunities and information for any organisation (although the focus is SMEs). The network extends beyond the EU (50+ countries) and by the end of 2012 should include Brazil, Indian and China. Being a member of the EEN gives local companies access to the largest Technology Transfer database in the world, and to 600+ partner organisations. More than 50% of the budget is for Technology, Innovation and R&D activities. As a region our total annual budget is €400k, 50% funded by the EU.

EU Framework R&D Programme

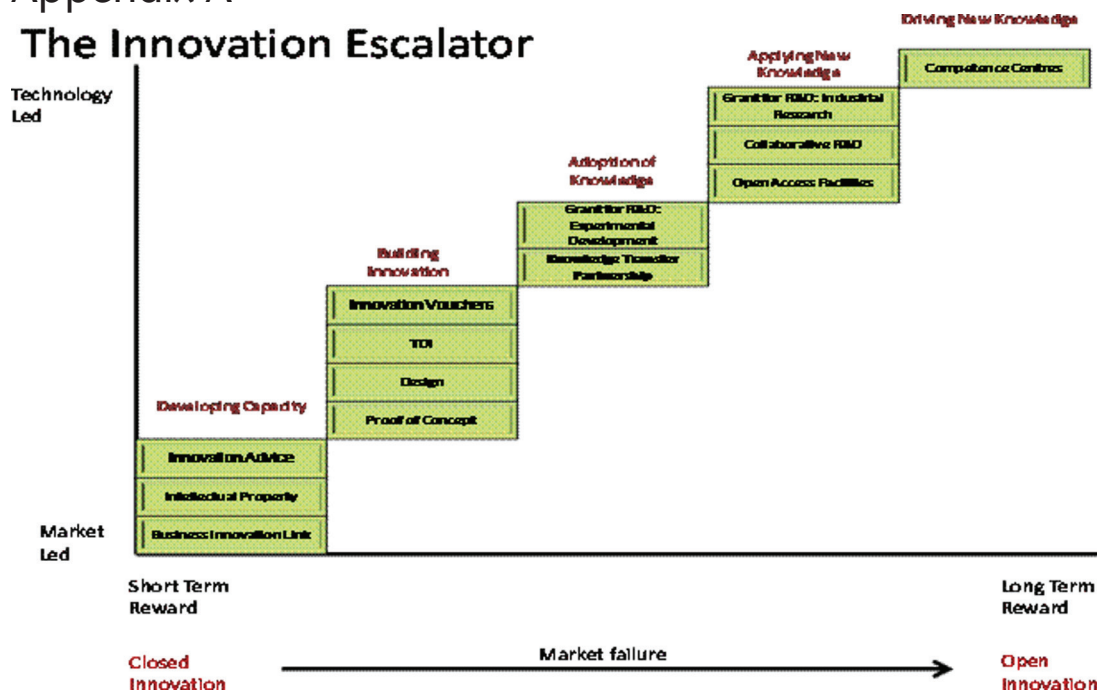
22. There is widespread recognition that the successful application and use of the EU Framework Programme (FP7) is essential to developing commercially prescient R&D throughout the EU and the use of such funds is specified in most UK Regional Economic Strategies.
23. An increase in companies participating in collaborative R&D Programmes, particularly those funded by the FP7 and the Technology Strategy Programme (TSB) could help achieve the aims of both Matrix and the Barosso Northern Ireland Taskforce. However, Northern Ireland as a region currently underperforms in the take up of FP7 funding due in part to low uptake by SME's (a European wide issue) and by the limited number of large indigenous companies.
24. In support of enhanced drawdown of Framework funds Invest NI has appointed two NI-based Collaborative Executives who have been in post since August and September 2009 respectively. As well as responding to queries from Invest NI client companies, the wider business community, universities and other public bodies eg PSNI, the team has set about pro-actively targeting companies currently in receipt of Invest NI funding for Industrial R&D. These Clients would be expected to be the most capable of succeeding in applications to FP7/TSB.
25. More recently Invest NI's Collaborative R&D team has introduced a Mentoring scheme which seeks to provide funding to enable applicants to contract hands-on advice from FP7 experts to overcome the cost issue in developing suitably robust project applications. This Pilot Scheme seeks to overcome two market failures, a failure by the market to provide suitable information related to Framework Programme support and a possible demonstration effect to the rest of the market as to the benefits of utilising FP7 funding support.
26. With respect to the Technology Strategy Board (TSB) Programmes promotion and liaison, Invest NI advise N.I. businesses on applications to the TSB's Collaborative R&D competition. The Collaborative R&D Team also hosts TSB events which directly target NI businesses for specific collaborative R&D funding calls. This team has also increased awareness of Northern Ireland's capabilities by attendance at Networking Events with the TSB, the UK-wide Enterprise Europe network and the UK FP7 National Contact Points (NCPs). Most recently Invest NI is represented on the TSB Horizon 2020 (H2020) Steering Group with a view to ensuring that the views of N.Ireland are considered in the development of the UKs proposals for the implementation of the H2020 programme.

Representative in Brussels

27. In April 2010, the focus of the Innovation, Research and Technology Division within Invest NI on the Framework Programme, was strengthened by the addition of an Executive based in Brussels, Fahra Brahmi. This Executive has been developing relations with key individuals within EU institutions in order to support Northern Ireland R&D stakeholders and influence EU R&D policies. Solid relations have been established with UK Permanent Representative and all other representatives of UK devolved governments and many European regions.

Appendix A

The Innovation Escalator



Appendix B

Invest NI's R&D and Innovation support mechanisms

Programme	Objective of the Invest NI Programme
Grant for R&D	The aim of the Grant for R&D is to support businesses developing new products, processes and services to improve company competitiveness and to benefit the NI economy. The grant is designed to provide support for R&D and technological innovation relevant at all stages of company development.
Innovation Advisory Service	Sector Specific R&D Advisers specialising in the disciplines of health and life sciences, food technology, engineering and ICT who are working closely with Invest NI's Client Executives and Technology Executives to help stimulate greater demand for R&D support and assist companies access Invest NI's R&D programmes.
Knowledge Transfer Partnership (KTP)	To promote the practical application of knowledge and technology transfer from further and higher education to companies.
Design	The aim of Invest NI's suite of Design initiatives (i.e. Design advice/mini Design programme & Design Development Programme) is not only to inspire businesses but also to facilitate and embed the use of design through the provision of professional services, supported by programmes that will develop long-term capability and robust new product development processes in Northern Ireland companies.

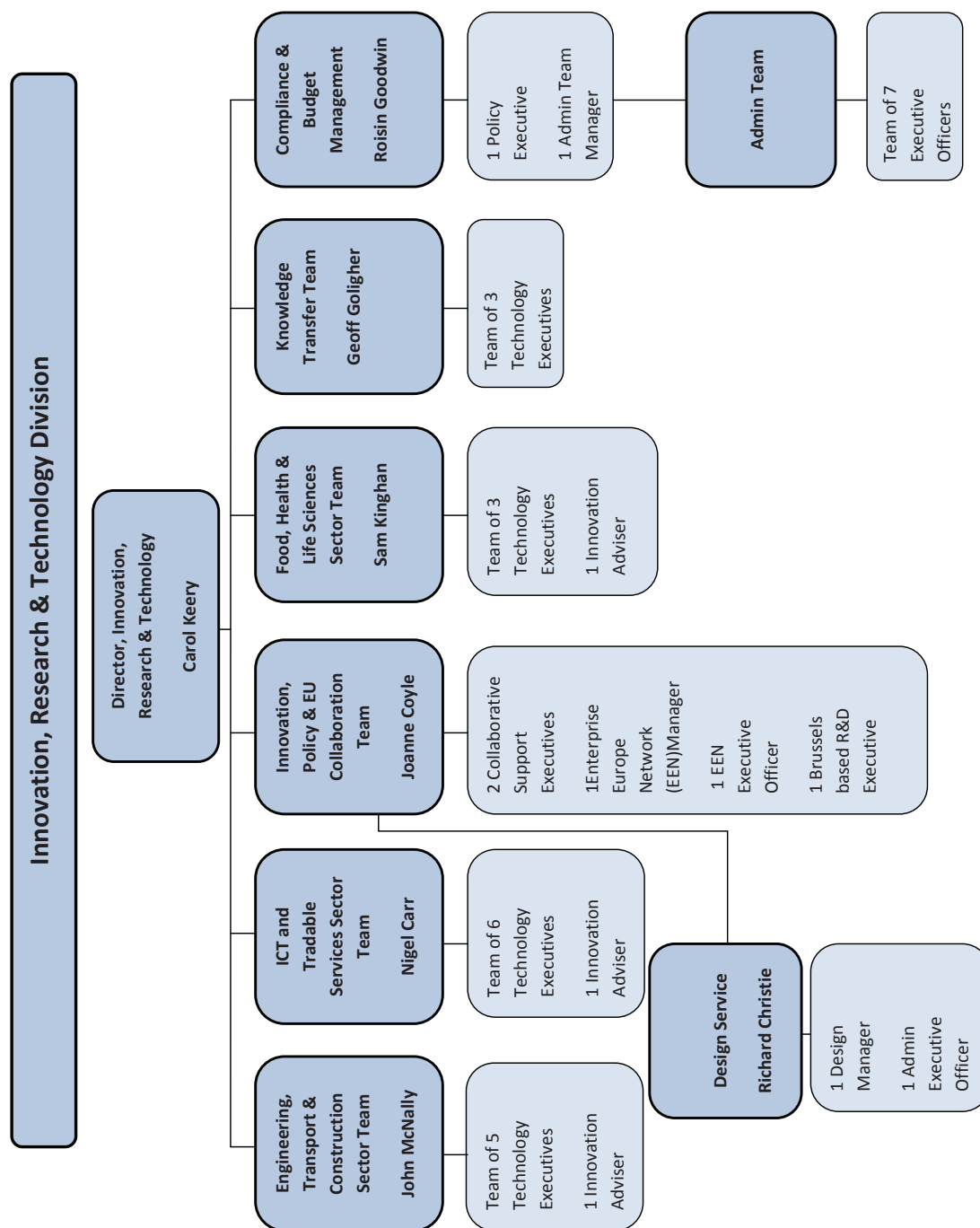
Programme	Objective of the Programme
Competence Centres	Invest NI's Competence Centres Programme will aim to provide collaborating businesses with the opportunity to agree and contract out high risk, longer term research that focuses on future industry needs.
Enterprise Europe Network	<p>Promotion of Technology Transfer to and from Europe.</p> <ul style="list-style-type: none"> • To transfer innovative technologies from Europe to SMEs in Northern Ireland • To transfer innovative technologies from Northern Ireland to SMEs in Europe • To disseminate the results of EU funded research to SMEs • To signpost SMEs to sources of EU financial, legal and technical assistance.
University Proof of Concept Fund	Grant funding to stimulate and support the pre-commercialisation of leading-edge technologies emerging from our universities, research institutes and NHS Boards. It facilitates and accelerates the development of research outcomes to "proof of concept" stage, and ultimately to position projects for commercialisation and adoption by industry.

Request from the Committee

The Committee has asked for details of the structure of Invest NI's R&D arm.

Departmental Response

Please see organisational chart below.



Response from Newry and Mourne District Council

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Newry & Mourne DC	028 3031 3233			
Organisation Address	Organisation Type (Include one or more X)			
Haughey House Greenbank Industrial Estate Warrenpoint Road Newry BT34 2QJ	Business		University	
	Business Support		FE College	
	Government	X	Research	
	Other (Please Specify)			

Please provide some background information on the organisation

Local Government Organisation

Mission Statement

Our mission as a Council is: -

"To provide leadership, services and facilities that reflect, in a sustainable way, the needs of the people and environment of Newry and Mourne."

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

Newry and Mourne District Council have an active role in District Development which encompasses economic development. Our Economic Development Unit is actively involved in sourcing all aspects of funding and this includes, EU (INTERREG, Rural Development). We are also actively on board with all relevant Gov Depts.

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

The appropriate opportunities are available however the mechanisms for delivery are a major stumbling block for implementation. The administration processes are too bureaucratic. Local Government should have greater decision making and delivery powers.

3. What support is available to assist organisations to access opportunities for research and development?

Newry and Mourne District Council have dedicated officials to advise, signpost, apply for funding and implement projects. We do this individually, in partnership with other Councils and on a Cross Border basis. All relevant bodies responsible for R&D have a good working relationship with our Council, however again the delivery mechanisms are not fast and need to be improved particularly in the current economic climate.

4. How beneficial is the available support in assisting organisations?

In the current economic climate it is imperative that as much R&D support and funding assistance is made available to not only large organisations but the smaller SME's which make up the lifeblood of business in Newry and Mourne in particular (Newry and Mourne has the highest business start up rate in N. Ireland. Everything however is hinged on drawing the funding down to the organisations. At present processes are not delivering on the ground quick enough or with the amount of financial assistance.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

- Administration and bureaucracy in funding processes.
- Information on available programmes.
- Lack of knowledge on existing programmes.
- Local Government and/or local delivery bodies should have greater influence.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Free up the bureaucracy.

Engage directly with Local Government (Newry and Mourne District Council). We have our individual economic development strategy which was devised and developed via public consultation and engaging with all relevant stakeholders in the District and nationally.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

Devolve the responsibility of the funding implementation to the Local Authorities. We are best placed working on the ground with businesses and have the experience of implementing and delivering small and major programmes and projects.

8. How can business and academia work to support research and development opportunities?

Already an example of best practice is happening in Newry and Mourne where the education sector, enterprise agency, Chambers of Commerce and Council together with other stakeholders meet on a regular basis and have a positive and successful relationship in all aspects of our work.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Newry and Mourne District Council have a successful model of best practice. We deliver successfully on a partnership basis. If you need to discuss the process please contact me directly.

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Manufacturing NI

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Manufacturing NI	07718 658665			
Organisation Address	Organisation Type (Include one or more X)			
18, Hampton Drive, Belfast, BT7 3DE	Business	X	University	
	Business Support		FE College	
	Government		Research	
	Other (Please Specify)			

Please provide some background information on the organisation

Manufacturing NI represents the interests of almost 500 manufacturers from a variety of sectors and location in Northern Ireland. We welcome the opportunity to respond to this consultation.

This response constitutes the general view of the organisation. We have distributed a good number of response packs to a cross-section of members across a variety of sectors whom we presume will respond directly to the Committee in relation to the individual programmes in which they have been involved.

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

Questor;
Centre for Competance for Sustainable Energy @ Queens;
NI Competance Centre for Composites;
Carbon Zero NI

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

We recognise the ongoing need for Research & Development – without new products the economy cannot grow. At this particular point in time however, with the economic recession continuing, and general instability in many European markets, many companies are in “survival” mode, and consequently are not in a position to expend resources on R&D. Coupled with the continuing lack of private sector finance, we believe that these factors make growth through R&D more difficult, particularly in the short to medium term. On the other hand, some companies have recognised that employing key personnel on R&D can be a core tool in staff retention when times are lean.

3. What support is available to assist organisations to access opportunities for research and development?

Invest NI grants up to £50k
Invest NI Innovation Vouchers – up to £4k
Invest NI 10 days consultancy for market research.

4. How beneficial is the available support in assisting organisations?

At the present time many companies are in “survival” mode and under severe financial pressure. Although we recognise the need for ongoing R&D in all companies, to develop and market new products, the lack of private sector finance is hindering many companies from investing in R&D.

We also believe that many companies make a presumption that R&D is only applicable to new products and do not recognise that support is equally available for process development in their existing product range, leading to greater efficiencies and increased margins. We feel that greater emphasis should be placed on this aspect of support.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

Lack of access to private sector finance.

Some European funded programmes require applicants to form collaborative partnerships across three companies and EU countries. There is a natural reluctance for companies to share new ideas with other companies who may also be competitors in other markets

We also have some feedback from members about the poor quality of consultancy available to NI companies. If we are to have world class companies, they deserve world class support.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Improve awareness of R&D tax credits.

Develop case studies showing how other companies have made use of R&D in a difficult economic climate.

Improve awareness and access to UK wide schemes administered from Westminster.

Reduce confusion on the maze of overlapping schemes provided by Invest NI, local District council Groupings, local FE colleges and other organisations with a clear road map of what is available and to whom.

Expand the understanding of Research & Development among SME's and micro businesses

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

In Northern Ireland specifically and the island of Ireland in general, the quality of research conducted is, said to be reasonably poor. Good consumer research is expensive and isn't any cheaper in Northern Ireland than GB, despite the much smaller budgets available to companies because of their smaller scale. Unfortunately many local research providers have adapted to available budgets and provide low standard research as a result. The financial rewards for research companies are therefore lower and they can't attract the same quality of researchers that would exist in GB. In addition, the marketers or commercial managers that are commissioning the research are less experienced and don't know that the quality of what they are getting is poor. And if they do, they can't afford to do anything differently as their budgets are so small.

A potential solution to this problem is for Invest NI to have a couple of high quality consultants to ensure the right quality of research is conducted. Costs for their time and the research project will be significantly higher than current so Invest NI would also need to fund a higher proportion of the total cost to make it an attractive option. This could be somewhat off-set by not funding anything other than bought-in costs for a company (ie. contributing towards a company's costs for the employee time dedicated to the project) - we believe this restriction would be widely accepted as it is the bought-in costs that are the barrier, not availability of personnel.

8. How can business and academia work to support research and development opportunities?

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from NILGA

NILGA Evidence to the Assembly – Committee for Enterprise, Trade and Investment.

Inquiry into Research and Development



The Northern Ireland Local Government Association (NILGA) is pleased to offer written evidence as requested by the NI Assembly's Committee Enterprise, Trade and Investment. Such evidence pre-empts NILGA's Executive Meeting of 13th January 2012 and is such is offered pending corporate approval.

For further information or to discuss any of the issues highlighted, please contact Karine McGuckin at the NILGA Offices: Email: k.mcguckin@nilga.org Tel: 028 9079 8972.

Derek McCallan, Chief Executive

8th December 2011

PRE-AMBLE

NILGA, the Northern Ireland Local Government Association, is the representative body for district councils in Northern Ireland. NILGA represents and promotes the interests of local authorities and is supported by all the main political parties in Northern Ireland. Research and Development represents an important economic sector and it is supported by local government due to the potential for job creation and the positive impact this sector can have on the level of innovation and the internationalisation of its practices. NILGA is pleased to be able to have an opportunity to comment on the Inquiry into Research and Development and we trust that our comments will be taken into account when developing the final report.

NILGA is pleased to offer evidence as requested by the Northern Ireland Assembly's Committee for Enterprise, Trade and Investment. Such written evidence pre-empts NILGA's Executive Meeting of 13th January 2012 and as such is offered pending corporate approval.

NILGA would respond to the issues referred to in the Inquiry as follows.

Background:

According to the "Rebalancing Northern Ireland's Economy" report, Northern Ireland has a particularly low level of business expenditure on R&D, and the limited data available suggests that levels of patenting from Northern Ireland companies are also very low.

Northern Ireland expenditure on R&D and innovation is especially low when compared to successful small economies in Europe several of which are in more peripheral locations than Northern Ireland.

There was a significant improvement in 2009, when business expenditure on R&D in Northern Ireland increased by 76.0 per cent.

This reflects the increased priority given to innovation and R&D in recent years by the NIE. However, notwithstanding this improvement, over the past five years business expenditure on

R&D in Northern Ireland has averaged 0.69 per cent of GVA compared to 1.23 per cent for the UK as a whole.

In addition, business expenditure on R&D in Northern Ireland is heavily focused on a small number of companies, with just 10 companies accounting for some 57 per cent of all business R&D investment in 2009.

1. What opportunities are you aware of at EU, UK, Cross-Border, Northern Ireland and local government levels for businesses and academia to become involved in research and development?

NILGA would assert that numerous – perhaps from a customer perspective too many which potentially cross-over and compete with one another – opportunities exist for businesses and academia to become involved in research and development.

Local Councils through their Development Strategies

Councils have had experience of promoting and supporting Research and Development through their Development strategies and in cooperation with their local universities and Further Education colleges. A number of concrete projects have been supported over the years and more details are provided in question 3. However this is not consistent and is discretionary.

The Northern Ireland Spin-Out (NISPO) initiatives support start-up and early stage businesses in Northern Ireland. The support includes a £5 million venture capital fund, the Invest Growth Fund, which focuses on seed and early stage businesses with high growth potential and a £3 million proof of concept fund, the Invest Growth Proof of Concept Fund, which is funded by Invest NI to provide funding to very early, non-university projects. **Councils are materially involved** in this process by signposting local businesses to opportunities which they otherwise would not be aware of. Their experience of dealing on a one-to-one basis with their local business community allows them to identify opportunities which can be harnessed and developed through appropriate programmes and contacts which can be essential to the development of innovative concepts and turn them into exploitable products.

Investment Readiness Programme

Innovative and interactive workshops aimed at the management teams of Northern Ireland's high growth potential businesses. The Programme sets-out to provide entrepreneurs, who have ambitions to raise investment finance, with an understanding of the investment process; how to prepare for investment; and how to subsequently utilise investment funds to best effect. Invest Growth Fund

The Invest Growth Fund is a new £5m venture capital fund, which has been established to invest in start-up and early-stage businesses based in Northern Ireland. The Fund Manager, E-Synergy, is looking to invest in numerous 'seed' and early stage companies over the five year period leading up to March 2014. Invest Growth Proof of Concept Fund

The Invest Growth Proof of Concept Fund is funded by Invest NI and set up as a pre-commercial grant-awarding fund managed by E-Synergy. The Fund enables individuals, start-ups, micro-enterprises and SMEs to establish the commercial potential of a concept resulting from in-house research and ideas.

Councils are an ideal co-ordination and strategic local enterprise player for such work, and NILGA would assert that through initiatives like the Workforce Development Forum, consistency of product AND resource would be a positive step for SME's throughout Northern Ireland. Councils (as has been the case with other economic development matters) could engage in cluster work to achieve a cost effective outcome and one which is business / customer focussed.

Intellectual Property Exploitation Unit

The IPEU is funded by Invest Northern Ireland and acts as a licensing guidance unit for individuals, start-ups, micro enterprises and small and medium enterprise. In addition to providing guidance the IPEU also organises events that allow the showcasing of ideas that could be exploited through licensing deals to individuals experienced in such deals.

Queen's University Belfast Innovation Fund (QUBIF)

The Queen's University Belfast Innovation Fund (QUBIF) is a £1 million venture capital fund, set-up to invest in post Proof of Concept, pre-commercialisation spin-out companies. The Fund will make a number of 'seed' and early stage investments over the four year period leading up to March 2014.

Ulster Innovation Fund (UIF)

The Ulster Innovation Fund (UIF) is a £1 million venture capital fund, set-up to invest in post Proof of Concept, pre-commercialisation spin-out companies. The Fund will make a number of 'seed' and early stage investments over the four year period leading up to March 2014.

R&D Office for Health and Social Care in Northern Ireland

The R&D Office for Health and Social Care in Northern Ireland promotes, co-ordinates and supports R&D within the NIHPSS. It is a directorate of the Northern Ireland Health and Social Services Central Services Agency and was established to promote, co-ordinate and support R&D within the NIHPSS. Its remit encompasses the research needs of the DHSS&PS and all sectors of Health and Social Care within Northern Ireland.

It has a dual strategic role and operational role. At a strategic level the Office provides an overall strategic direction for Health and Personal Social Services (HPSS) R&D and liaises with national statutory bodies and health-related organisations including the Department of Health. At an operational level the R&D Office supports a wide range of R&D initiatives from education and training to direct commissioning.

The estimated value of the **6392** awards from **1646** organisations is over £3,043 million.

R & D Relief

Over the last 11 years, HMRC has handled numerous claims for R & D tax relief on behalf of clients, as well as successfully dealing with a number of enquiries from the specialist R & D units.

Research & Development (R & D) tax relief is one of the UK's most generous tax reliefs.

Small and medium sized companies can obtain tax relief of 200% (225% from April 2012) of expenditure on R & D or, alternatively, - where the company is not in profit - a cash repayment of 14% can be obtained from HMRC. Large companies can obtain relief of 130% on R & D expenditure.

■ MATRIX

The Northern Ireland Science Industry Panel offers the following:

- Provide the business community - in partnership with the public and academic sectors - with a mechanism by which to advise NI Government on policies aimed at the development of the region's R&D, innovation and knowledge-based economy;
- Advocate the development of the regional economy through the exploitation of the R&D and science base and the promotion of innovation;
- Champion and develop a more effective and productive relationship between industry and the regional R&D and science/technology base;

- Act as an influential and central point of coordination in building the case for resources to increase levels of exploitation from the science and technology base in the region, and maximising the gearing and leverage of public sector funding, taking all other reasonable resource priorities into account;
- Maintain a strategic view of science and research for the region in overseeing the development of a Strategic Technology Horizon Scanning programme to maximise the future success of Northern Ireland's R&D and innovation based economy;
- Report directly to DETI and the DETI Minister, in recognition of that Department's policy lead for innovation and the commercialisation of R&D and science and technology.
- The Panel shall provide advice in the three main areas
 - Key R&D and science & technology issues affecting business innovation;
 - The emerging strategic technology priorities impacting on Northern Ireland's economy;
 - The promotion of a culture of innovation and the importance of R&D and science & technology in the future, particularly with business and in regard to commercial exploitation activities.
- The objectives of the Northern Ireland Science Industry Panel are as follows:
 - To seek to increase the economic return from science and innovation in Northern Ireland (improve behavioural attitudes in the short term and GDP in the longer term);
 - To commission research, analysis and studies, to assist DETI in building the evidence base for future science and R&D policies within the wider Innovation policy context;
 - To act as an influential and central forum in advising on the development and promotion of the science and R&D base within both the private and public sectors;
 - To promote and educate the importance of science, technology and R&D to Northern Ireland and in particular business competitiveness and growth;
 - To build strong, mutually beneficial working relationships with partner bodies across Northern Ireland, the United Kingdom and the island of Ireland, and internationally, as appropriate.

Innova

The programme is looking for ambitious businesses across the island to collaborate and form a strategic innovation partnership with another company - to get great products, services or processes off the ground.

Companies can claim up to **£250,000/€285,000** per partnership to cover staff, equipment, consultancy and operating costs of the innovation project.

The Seventh Framework Programme (FP7)

Knowledge lies at the heart of the European Union's Lisbon Strategy to become the "most **dynamic competitive knowledge-based economy in the world**". The '**knowledge triangle**' - **research, education** and **innovation** - is a core factor in European efforts to meet the ambitious Lisbon goals. Numerous programmes, initiatives and support measures are carried out at EU level in support of knowledge.

The **Seventh Framework Programme** (FP7) bundles all research-related EU initiatives together under a common roof playing a crucial role in reaching the goals of growth, competitiveness and employment; along with a new Competitiveness and Innovation Framework Programme (CIP), Education and Training programmes, and Structural and Cohesion Funds for regional convergence and competitiveness. It is also a key pillar for the European Research Area (ERA).

The broad objectives of FP7 have been grouped into four categories: **Cooperation, Ideas, People** and **Capacities**. For each type of objective, there is a specific programme

corresponding to the main areas of EU research policy. All specific programmes work together to promote and encourage the creation of European poles of (scientific) excellence.

The non-nuclear research activities of the Joint Research Centre (JRC) are grouped under a specific programme with individual budget allocation.

US - Ireland R&D Partnership

The Governments of the United States of America, Northern Ireland and the Republic of Ireland have come together for a unique initiative to advance scientific progress in fields that will have a significant impact on the health, well-being and economic prosperity of all their citizens.

The "US-Ireland R&D Partnership" will help link scientists and engineers in partnerships across academia to address crucial research questions; will foster new and existing industrial research activity that could make an important contribution to the respective economies; and will expand educational and research career opportunities in science & engineering.

The Government Departments and Agencies across the three jurisdictions supporting this initiative are:-

- Northern Ireland – Department for Employment and Learning, Invest NI and the Health and Social Care (HSC) R&D Office
- Republic of Ireland – Science Foundation Ireland (SFI)
- United States of America – National Science Foundation (NSF) and National Institutes of Health (NIH)

The following thematic areas have been prioritised as important research challenges for the health and prosperity of the citizens of the United States, Ireland and Northern Ireland:

- Nanotechnology
- Sensors
- Diabetes
- Cystic Fibrosis
- Telecommunications
- Energy and Sustainability

Note that the NI element of Diabetes and Cystic Fibrosis research themes will be funded by the Health and Social Care (HSC) R&D Office.

This US-Ireland R&D Partnership has its origins in the US-Ireland Business Summit that took place in Washington, DC in 2002.

The Partnership is guided by a joint Steering Group composed of senior representatives from government, academia and private industry across the three jurisdictions.

Working groups, with representatives from each jurisdiction, have been established in each thematic area to advise and make recommendations to the Steering Group on the scientific themes and issues to be addressed in each area.

2. How appropriate are the available opportunities for developing the Northern Ireland Economy?

NILGA would assert that a thorough and clinical scoping exercise needs to be completed, independently, objectively and without prejudice, to determine the extent of such interventions and re-design them with a significant private sector bias in terms of what and how such R&D is developed. Councils can play their full part in providing such information and through the above mentioned Development Strategies be part of the co-ordination of future delivery.

3. **What support is available to assist organisations to access opportunities for research and development?**

In terms of support provided by local authorities, NILGA would assert that the following actions are being taken:

- Local SME Development plans – Councils offer the experience and local frameworks to develop long-term economic investment and job creation based upon local SME knowledge and needs. Councils are ideally placed to identify and develop sub-regional infrastructure projects as it has been demonstrated in the past through the Interreg programme.
- Local Economic Development – Councils offer strengthening “home market” SME development and growth through developing local businesses, cluster development, signposting and networking – in doing so encouraging SME innovation and R&D transition to export markets. Councils are in the prime position to develop in partnership sector industry clusters within Northern Ireland and outside.
- Seeking out wider EU investment opportunities – Councils through NILGA’s EU Knowledge Bank offer the opportunity to seek new, wider EU investment opportunities (HORIZON Programme for example), to maximise the benefit of regional EU financial mechanisms, and explore the possibility of developing in partnership with the NI Executive, a local government capital investment holding fund / bank.
- Strengthening local skills – Councils in partnership with FE/ Universities offer knowledge and the ability to link local skills development with areas of industry growth.
- Integration of local R&D/ new technology – Councils offer local integration of government policy to develop new markets through use of technology e.g. waste management and renewable.

Creating consistent, across NI accessible, affordable, small menus of R&D opportunity has got to be the outcome of this exercise and NILGA would assert that Councils through shared services and in regard to the Programme for Government and associated key strategies can play a critical role, as long as properly planned, designed and resourced initiatives are drawn down by them – with resource transfer from agencies to Councils being a key determinant, along with customer demand and satisfaction.

4. **How beneficial is the available support in assisting organisations?**

Most of the support currently available is not comprehensively utilised. The providers of these measures/programmes may need to become involved in practical measures to entice SMEs to embrace innovation. In addition, some small companies do not feel that they qualify for any assistance or may consider that the process allowing them to become involved is too cumbersome.

Most SMEs which would have the potential to innovate also lack the necessary contacts to create meaningful and efficient partnerships with bodies and institutions allowing them to create an “innovation chain”.

NILGA asserts that local authorities can facilitate the establishment of these innovation chains by placing R&D, amongst other activities, at the heart of their development plans and facilitate the establishment of contacts between SMEs, skill providers such as the colleges, and academia.

5. **What are the main barriers faced by organisation in accessing opportunities to be involved in research and development?**

The recently published Forfas Report, “Innovate Market Sell”, which looked at the marketing, sales and innovation capabilities of exporting Irish/ border regions SMEs, highlighted that:

“Less than half of the SMEs surveyed were satisfied with idea generating and idea screening processes – indicating a lack of understanding of such processes and a lack of tools to structure this early phase of innovation”.

The report further stated that this:

“Highlighted a need for upskilling which, if not addressed, will remain a significant barrier to SMEs becoming more innovative and competitive”.

The report made a number of recommendations, which this proposal directly addressed:

- Promote Innovation Among SMEs: highlighting that SMES need to be learn that: “successful innovation requires a company-wide innovation culture which they must lead, and may involve working with external parties such as third level institutions and suppliers to access skills and other resources not available in-house”

The report highlighted the importance of “on-site support to transfer learning into action”

- Cultivate Expertise in Innovation: highlighting the need to provide “skills training in innovation process management” and “developing a portal to facilitate sharing of best practice linking marketing an innovation. This would allow firms to network and learn from each other and to learn through case studies”
- Most of the knowledge that firms use in innovation comes from outside, so absorptive capacity, which is the ability to recognise the value of new external information, assimilate it and apply it to commercial ends is key to performance. From literature, five elements are seen as central to this:
 - Human capital, especially in form of graduates, scientists etc
 - Ability to network with external sources of knowledge and other resources
 - Organisation, routines and organisational processes
 - Learning processes (cognition)
 - Codification

Forfas Making Technological Knowledge Work – A study of Absorptive capacity of Irish/ border counties SMEs February 2005 highlighted that “improving the capabilities of smaller firms with low technological capability cannot be achieved simply by hanging up a sign advertising support, and waiting for companies to apply. A proactive approach is needed to:

- *Broaden awareness of innovation and recognising the value of external knowledge*
- *Develop human resources*
- *Increase networking*
- *Improve management organisation and routines*
- *Develop learning processes within companies”*

It has been highlighted how relatively low the Gross-Value Added (GVA) is in the INTERREG sub-regions of Scotland and Northern Ireland compared to the % of the UK Average.

Not only is GVA per capita around 30% lower in this region, but there is some evidence of the regions falling further behind (i.e. the gap with the UK average is growing).

In terms of innovation, using the 2005 Community Innovation Survey for the UK to look at single plant, in the South East of the UK (as the ‘best practice’ benchmark’) and the INTERREG sub-regions, enterprises in the market-based sector of the economy (i.e. excluding the public sector) located in INTERREG sub-regions had lower probabilities of undertaking R&D and/or innovating, and they had much lower levels of R&D spending per employee. Source: weighted CIS4 data (only single-plant enterprises included in calculations)

Ireland lags behind other European countries in terms of overall business innovation. In 2003, Irish companies only reported 19.1% of sales coming from new or renewed products/services in the previous two years compared to the EU average of 22%. (Source: Innobarometer 2002 EU)

With respect to the southern border counties, information is sourced from the BMW (Border, Midland and Western Regions of Ireland) region analysis. According to a national study undertaken by National Institute of Transport and Logistics, supply chain management capability of companies in the BMW region is significantly lower than it south and east of Ireland counterparts.

Enterprise Ireland's assessment of productivity between companies in the BMW region and the Southern and & Eastern region companies shows that output per head is 30% lower in the BMW region. In addition, the majority of engineering sub-supply firms are experiencing major price competition from Central Europe. Unless they can innovate and move up the value chain they will not survive.

Overall, gross expenditure on R&D in all three regions (Ireland, Scotland and Northern Ireland) remains low compared to the UK, EU and OECD levels. (Source: A Socio-Economic Profile of Border Region, Northern Ireland and Western Scotland)

NILGA asserts that the support already available in Northern Ireland should be communicated more efficiently to companies which are already innovating or which have the potential to innovate.

NILGA also asserts that regional, cross border and European networks be facilitated and that the perceived or actual difficulties associated with the building of these should be addressed in the next round of European funding to ensure maximum transfer of knowledge and innovation leading to creating of wealth and quality employment.

6. **What can government do at UK, cross –border, Northern Ireland and local level to assist organisations and to improve opportunities for research?**

The original **2000 vision of the European Research Area** was founded on the analysis of the unfavourable gap between Europe and the US and Japan on key science and technology indicators. The vision stated that European research would need to be more than the simple addition of the research efforts of the Member and Associated States to be able to compete. A European market for supply and demand in knowledge had still to be created. Fragmentation of the European research system was therefore identified as one of the main problems and efforts to develop a broader, more coherent approach to European research policy, aligning the national, European and intergovernmental levels, and ensure sufficient critical mass were called for. The key image of fragmentation remains central, with the **2007 ERA Green Paper stating**:

“...much ground work needs to be done to build ERA, particularly to overcome the fragmentation which remains a prevailing characteristic of the European public research base. Fragmentation prevents Europe from fulfilling its research and innovation potential, at a huge cost to Europeans as taxpayers, consumers and citizens.”[p7]

The overwhelming majority of public research in Europe is financed and governed through 27 national systems (and regional ones below). Although this multi-centred and multi-level governance of research is not per se “fragmentation” (see **ERA Rationales** report), there are according to the 2007 Green Paper five negative systemic characteristics and consequences arising from “fragmentation”:

- Barriers to researcher mobility inhibiting career opportunities;
- Difficulty in establishing cross-border academic industrial partnerships;

- Duplication of funding between national/regional programmes dispersing resources, losing spillovers and making Europe's global role sub-critical
- Lack of European perspective and transnational coherence in reforms undertaken at national level; and
- Diminished attractiveness as a location for business R&D investment.

Overcoming the negative consequences of fragmentation is the main challenge faced by ERA.

NILGA asserts that a scoping exercise needs to be completed to, without prejudice, determine a way of addressing the fragmentation issue in order to ensure that Northern Ireland, as part of Europe, fulfils its research and innovation potential without imposing an overwhelming burden on taxpayers.

Conclusion

Through RPA and partnership in strategic and operational terms with Colleges, and R&D elements of some large businesses, e.g. added value food processors, Economic Development for indigenous SMEs can be furthered by Councils, and, as such, a proportionate amount of time and analysis can in the future be earmarked within Local Development Strategies, by the new Councils, in regard to R&D, as the outputs of this will help demonstrably to sustain local economies and improve the quality of statutory local development plans as legislated for in the Planning Act (Northern Ireland) 2011.

R&D should figure in future Competitiveness Funding (2014-2020) regardless of who the managing or delivery agents are, and Councils recognise the importance of forward planning and developing relationships with existing and future entrepreneurs.

In conclusion, NILGA recommends that a simplified (menu, eligibility, access) R&D road map is prepared with SMEs and Councils, as commercial, community and civic drivers, form part of a regionally consistent product essential to sustaining, rebalancing and regenerating our fragile local economies.

Derek McCallan

Chief Executive

Northern Ireland Local Government Association

Disclaimer

The Northern Ireland Local Government Association (NILGA) endeavours to ensure that the information contained within our Website, Policies and other communications is up to date and correct.

We do not, however, make any representation that the information will be accurate, current, complete, uninterrupted or error free or that any information or other material accessible from or related to NILGA is free of viruses or other harmful components.

NILGA accepts no responsibility for any erroneous information placed by or on behalf of any user or any loss by any person or user resulting from such information.

Response from Dr Chris Lundy

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Dr Chris. Lundy	07503 902395			
Organisation Address	Organisation Type (Include one or more X)			
11 Old Coach Road Templepatrick Ballyclare Co. Antrim BT39 0BA	Business	<input type="checkbox"/>	University	<input type="checkbox"/>
	Business Support	<input type="checkbox"/>	FE College	<input type="checkbox"/>
	Government	<input type="checkbox"/>	Research	<input type="checkbox"/>
	Other (Please Specify)			<input type="checkbox"/>
	Part-time Independent Consultant			

Please provide some background information on the organisation

I am a strategist, graduating from the University of Ulster with an Honours Degree in History of Resource Management and then obtained a DPhil for research in the development of seaports. After some 20 years experience of aviation, working at both Belfast International and Belfast City airports, I am currently employed by NI Water as Strategy Author.

I was for a year, seconded part-time to the CBI office in Belfast undertaking policy research and have also been a member of the UK Airport Operators' Association Environment Committee and a member of the NI Bio-diversity Group.

As Chairman of the British Universities Sports Federation Development Committee, I initiated and drove the strategic plan to bring the World University Games to Sheffield in 1991. I compiled the 25-year Master Plan for Belfast City Airport and am currently engaged by Belfast International Airport as a consultant advising on future development strategies and opportunities.

I was a member of the DCAL 2012 Co-ordination Committee and provided advice to the Director of the Glasgow Commonwealth Games Bid and the Director of Planning for 2012 Olympic & Paralympics Operations at Heathrow Airport.

I am not directly involved in the R&D cycle so will therefore not directly address all the questions posed in the Call for Evidence. My perception of the guidance provided in the Call for Evidence is that the Inquiry is primarily focused on developing R&D within indigenous companies and research institutions. However, the focus of this submission is on the opportunities to attract foreign enterprises to set up R&D facilities in Northern Ireland.

Section 2 Questions to Consider

1. **What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**

The Inquiry will be aware of the establishment of a Confucius Institute at the University of Ulster. This will develop closer links with China, including the potential to open new communication channels with China at a high level. Being based on an academic model, the Confucius Institute would appear to offer opportunities to bring together academia and business to explore and develop R&D opportunities both for companies within Northern Ireland and for Chinese companies seeking R&D opportunities in Europe. Indeed, the developing links with China should be used to explore the potential for Chinese venture capital to be invested here in R&D activity.

I attach Annex A for the information of the Inquiry; an academic paper from 2009 that reviews Chinese investment in R&D. (Chinese foreign direct investment in R&D in Europe: a new model of R&D internationalisation?) The paper illustrates that China is actively seeking international R&D opportunities. While the conclusion is that “at present, Chinese outward FDI mostly flows to developing countries such as those in Asia and Latin America...,” it is also states that “...the Chinese interviewees seldom mentioned the support and incentives they received from local European governments. Such indifference may signal a parallel lack of interest and awareness on behalf of European policy makers. We [the paper's authors] believe that the lack of strategy for dealing with and responding to Chinese R&D investment in Europe and its evolution is undesirable, and potentially harmful to the EU's own innovation system.”

This clearly signals that Chinese companies are actively seeking R&D opportunities around the world and that there is an opportunity for Northern Ireland to capture a significant slice of this R&D business. However, it is important that we move quickly to understand what Chinese companies are looking for by way of support and to demonstrate to them that we can deliver an imaginative, competitive and flexible package with the aim of establishing a Chinese R&D cluster in Northern Ireland. Speed is of the essence. We are in a highly competitive environment and the paper quoted above is already at least two years old.

I refer to China as that is the market with which I am most familiar, but similar strategies should be developed for the other BRIC countries, particularly India.

2. **How appropriate are the available opportunities for developing the Northern Ireland economy?**

I would encourage the Inquiry to explore the opportunities and barriers around the encouragement of Foreign Direct Investment (FDI) towards R&D. As illustrated in Annex B to this submission, the formation of FDI R&D clusters can drive the creation of further ‘spin out’ companies and provide greater access to international markets.

3. **What support is available to assist organisations to access opportunities for research and development?**

In 2004, Arthur D Little prepared a report (see Question 6 below) which concluded that “support available to business appears ‘too light’ to facilitate adequate scale-up of R&D activity.” Financial support, and importantly the time taken to secure public funding support, are key factors in the R&D cycle.

However, support other than financial is also important. The Arthur D Little report provides a number of Case Studies of R&D in other regions and points to structures and the importance of reducing the time taken to secure public funding support. I would therefore encourage the Inquiry to consider how the roles of a number of organisations might be re-aligned to provide an efficient, effective, responsive and innovative ‘one-stop-shop’ for R&D activity. Whether this results in the development of a new organisation or, for better cost effectiveness, the

development of a specialist unit within an existing organisation, the resources should not be new resources, but be identified through a rationalisation and re-location of existing resources from within InvestNI; the Centre for Competitiveness; the Innovation Centre; the Strategic Investment Board; DETI and other bodies. The resultant unit would have direct links into not only business and our universities but other research institutions such as Loughry and Greenmount Colleges etc., and the Confucius Institute.

This unit would network closely with the business and public sectors and our academic institutions. It would be responsible for exploring new R&D opportunities and developing R&D investment strategy; exploring opportunities for securing international venture capital; coordinating the development of R&D clusters and rapidly assessing applications for R&D funding.

4. How beneficial is the available support in assisting organisations?

No comment.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

No comment.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Previous studies

I am aware of some previous work undertaken to review the barriers and opportunities for R&D in Northern Ireland. In particular, the following reports:

'Research and Development Business Expenditure in Northern Ireland – A comparison with the UK and other International Regions', Arthur D Little, August 2004.

'The Future of Manufacturing in Northern Ireland – Policy Response', DETI, March 2006.

Both these reports contain valuable results of research and sound recommendations with regards to encouraging and supporting R&D in Northern Ireland. I would commend these reports to the Inquiry and suggest that these reports may help to focus the Inquiry's thoughts in developing its own recommendations and actions.

It is important that any recommendations made by the Inquiry are quickly implemented through an Action Plan which clearly identifies those agencies responsible for the delivery of the actions, and the monitoring regime to be used to ensure actions are completed.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

Acceptance of risk

R&D by its very nature implies varying degrees of commercial and therefore financial risk. Failure to appreciate the nature of risk and ability to manage risk will therefore inhibit R&D activity. This can occur in two ways:

1. The Arthur D Little Report of 2004¹ noted the fear of failure as one impediment to R&D, i.e. an unwillingness by a company to engage in R&D due to the prospect of failure and the impact that may have on confidence within the business.

1 R&D Business Expenditure in Northern Ireland, Final Report to DETI, Arthur D Little, 2004, Conclusion 11

2. The nature of the framework within which R&D projects are assessed and monitored will determine what type of R&D culture will emerge. In my opinion, a 'risk adverse' system is not conducive to the encouragement of R&D.

I would therefore recommend that the Inquiry consider the governance culture and framework within which R&D is to be encouraged and sustained. For example, it is right and necessary that those charged with the expenditure of public monies be accountable and open to scrutiny, but this must be balanced by the realization that investment in R&D carries a higher level of risk than other activities. Therefore while the Northern Ireland Audit Office, the Public Accounts Committee, the Department of Finance and Personnel and others have roles to play in the overseeing of public expenditure, there must be an over-arching policy which not only recognises but accepts the inherent risks attached to R&D activities. This policy will be supported by an appropriate mechanism that is able to rapidly assess the risks of proposed R&D ventures on a case by case basis, within a risk tolerant framework and in sympathy with the timescales of commercial pressures.

Creating the Culture

It therefore follows that in developing a R&D friendly culture, relevant government supporting agencies should be led and driven by innovative, strategically minded people whose primary focus is on delivering outputs. Fear or stigma of failure must be removed. Indeed, innovation, creativity and entrepreneurship must be further celebrated and encouraged, while failures must be seen as learning experiences.

Within these agencies there must naturally be a counter balance of challenge and process, but the leaders must be the champions of, and drivers for, innovation and continual development in pursuit of economic opportunities. They must be strategically minded to encourage and facilitate inter-agency collaboration and common goals.

8. How can business and academia work to support research and development opportunities?

A specialist, centralised unit is proposed, providing a 'one-stop-shop' for support to those involved in R&D.

See response to Question 3.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

I note that the Committee for Culture, Arts and Leisure is inquiring into the financial and business support; tax credits; education; training and skills development; leverage into international markets; the protection of intellectual property and legislative developments in the creative industries. Although considering different business sectors, the reports of the two inquiries should provide much synergy to the resultant action plans, particularly as much of R&D is about creativity, innovation, design, intellectual property and leverage into international markets.

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Northern Ireland Science Park

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
NI Science Park Foundation Ltd	028 9073 7800			
Organisation Address	Organisation Type (Include one or more X)			
The Innovation Centre Queen's Road Queen's Island Belfast BT3 9DT	Business	X	University	
	Business Support	X	FE College	
	Government		Research	
	Other (Please Specify)			
	Not-for-profit and limited by guarantee			

Please provide some background information on the organisation

Northern Ireland Science Park (NISP) is a peer-driven network aiming to establish Northern Ireland as one of the most ambitious Knowledge Economies in the world. With a growing reach to all of Northern Ireland, and a funding proposal currently with SEUPB (INTERREG IVa) for a new Science Park at Fort George in Derry~Londonderry NISP provides a hub for Knowledge /R&D-based entrepreneurs, investors, business professionals and global (FDI) corporates.

NISP has a 10 year track record which inputs £10m gva into the NI economy has ~100% occupancy and ~110 companies on its Titanic Quarter, Belfast site.

NISP has adopted and distilled the best practice from the international Science Park movement, the Global CONNECT organisation and the Associations of Business Angel Networks in UK, Ireland and Europe into a successful not-for-profit business model for Northern Ireland.

It has a total of 200,000 net sq ft, fully occupied by local and global/FDI high tech businesses such as: HP, Microsoft, Citigroup, SAP, KANA, Fidessa, L&T Infotech, Dow Chemical and Polaris.

A strong community has evolved, linking the disparate worlds of research, business, finance and public sector in a manner which creates a network of deep respect, effective communication and a shared sense of the future. The transactions between the parties, which typify a good Knowledge Economy, are growing in volume and intensity and should, over the next few decades, take Northern Ireland to the target outcome.

The essential Knowledge/R&D channel is already operating healthily flowing from the universities through key pro bono programmes such as NISP CONNECT, operated in partnership with the private sector, targeting wantrepreneurs.

NISP also continues to operate Halo – the Business Angel Network in Northern Ireland. Certain NISP programmes, have been part funded by DETI, Invest NI, InterTradelreland and the EU.

Ultimately, NISP aims to become a completely knowledge-economy- driven model for the support of entrepreneurial business and funded commercially and by the knowledge economy community itself.

Section 2 Questions to Consider

1. **What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**

Programmes & Funding

Various EU programmes for the Interregion

- Eurostars (SME), Ambient Assisted Living, AAL, Artemis (Advance Research and Technology for Embedded Intelligence and Systems), ENIAC (Embedded Nanoelectronics), Eureka (Grant for R&D), ERANETS (Organic and Large Area Electronics)
- FP7 Capacities Work Programme: Regions of Knowledge Transnational cooperation between regional research-driven FP7 Capacities Work Programme: Regions of Knowledge Objective Strengthening the research potential of European regions, in particular by encouraging and supporting regional 'research-driven clusters' associating universities, research centres, enterprises, regional authorities and other stakeholders across Europe.
- Horizon 2020 (which supports Matrix NI)
- ERNACT – EU interregional partnership of public authorities from across European regions working together to jointly develop new ICT products, knowledge and expertise and applied research.

Cross Border

- InterTradeIreland – Innova/Fusion

UK

- Science & Engineering Councils
- Technology Strategy Board/Invest Northern Ireland - (i) Knowledge Transfer Partnerships (ii) Small Business Research Initiative (iii) Grant for R&D (single business) (iv) Collaborative Network (via INI)
- Innovative Medicines Initiative
- Competitiveness and Innovation Framework Programme 2007-2013

Funding

Invest Northern Ireland

E-Synergy - NIPSO Funds

- Intellectual Property Exploitation Unit
- Invest Growth Proof of Concept Fund
- Invest Growth Fund
- Investment Readiness Programme
- Ulster Innovation Fund
- Queen's University Belfast Innovation Fund

NI Co-investment Fund

- £7.2m over 6 years - In operation but not publicly launched.
- Co-invests with angel deals with deal sizes ranging from £250k-£450k - up to 45%
- Angels approach Fund, not companies

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

It is undoubtedly true that many companies and every research organisation in Northern Ireland should be able to benefit from one or more of the programmes listed above.

To allow an increased intensity of activity there must be an increase in the signposting (ie not just INI clients) of companies/individuals towards Knowledge/R&D support and investment/funding. Young companies will expect one, simple and comprehensive on-line presence to signpost everything (here our tradition is to have each body do its own). Government has the opportunity to draw these disparate elements together. Indeed benchmarking how R&D information is disseminated through the likes of MIT or University of California San Diego (UCSD) might prove useful.

To impact the economy, the need is for an increase in the scale and the intensity of the engagement and when it is allied to effective technology transfer and exploitation.

A good recent example would be Cherry Pipes www.cherrypipes.com In a nutshell, through the scheme, the Cherry family firm worked with Queen's University Belfast and the KTP programme (linking academic research with business) to transform their business from ordinary (concrete pipe maker) to top-notch polymer recycler of sufficient standing not only to be in but to lead a European FP7 Research Programme, and multiply turnover and profit. It has been officially recognised as the most successful technology transfer scheme in Europe (under KTP and in its previous incarnation the Teaching Company Scheme) Two young graduates (Paul Beaney and Justyna Grabowska) took the national award for their work in Cherry Pipes and in the Polymer Processing Research Centre at QUB under Gerry McNally and Alan Clarke. The team received their award from Vince Cable, Secretary of State for Business, Innovation and Science. (See the event <http://www.bit.ly/Live11> by NISP-based Switch New Media - NI's webcaster to and for the world)

Northern Ireland, greatly to its credit, embraced the KTP scheme whole-heartedly and became pre-eminent in its execution in both our universities. Names and organisations have changed (the sponsoring departments are now the Technology Strategy Board and Invest NI) but the principles and effectiveness are the same.

Cherry Pipes are exactly the type of company doing the right type of collaboration that we want to replicate as we build a Knowledge Economy here.

3. What support is available to assist organisations to access opportunities for research and development?

There is much support by way of information, notices of open calls, directories of possible partners etc.

Large organisations and universities have assistance and gateway processes and these are sometimes welded into strategies.

Larger companies will use the opportunities to position themselves into supply chains or to improve their ability to deal with (or stop) some new global or supra-national regulation. They can use InvestNI resources well.

Mostly, however, it will be the contacts of individuals and groups that place them into opportunities.

Small companies cannot usually afford the over-head to both navigate the opportunity and to make the speculative bid. The most successful will have already a relationship with a university or college group and this works well. For those outside this loop, there is not much available.

There is a lack of genuine Knowledge/R&D funding for innovative start-ups to help develop their products. E-Synergy PoC helps to a degree, but it is not clear that E-Synergy NI growth fund will fund R&D and Halo angels are often reluctant to invest at very early stages of a concept. Clarity around this funding would be helpful.

4. How beneficial is the available support in assisting organisations?

From NISP's 10 year experience, it is clear small companies still do not know how to access the Knowledge/R&D networks. The need here is 'efficient' support ie with the minimum of public sector overhead, bureaucracy etc.

Springboard

Recently NISP introduced the Springboard programme, now running as part of the eco-innovation system which offers customised business coaching and mentoring to, specifically promising Knowledge/R&D entrepreneurs and their teams.

It addresses each stage of the commercialisation process: concept, start-up, challenge and opportunity. NB This programme has been written into the commercialisation process for university spin-outs in California, to give wantpreneurs the best opportunity for success.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

- Inexperience
- A lack of intellectual confidence
- Fear of loss of intellectual property
- A lack of resources able to be applied at risk without enough certainty of success

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Tackle each of the above.

- Inexperience: Mentoring and role play workshops
- A lack of intellectual confidence: introductions, ice-breaking and other programmed engagements
- Fear of loss of intellectual property: help with strategies of how and what to trade
- A lack of resources able to be applied at risk without enough certainty of success: some funding support for introductions, visits and bid preparation, to take some of the risk out of the process.

Public Sector People Development/Awareness Raising

- Developing Client Executives awareness of how the Knowledge/R&D system works at the likes of NISP – for example a 'Seeing is Believing Tour' of NISP for Client Executives and an introduction to the NISP team.
- Further work with Councils/LEAs to capture those companies which are not INI clients but are seeking Knowledge/R&D structures of nurture and support.
- Various Ministers/Departmental representatives have visited NISP. It could be a valuable exercise for policy makers to visit NISP to really understand the Science Park eco-innovation system at work.

Venture Capital

The one big problem in NI is the lack of venture capital. This is reflected in the Knowledge Economy Index report.

When we review NI's model for venture capital in isolation we see that Northern Ireland does in fact have a venture capital scene with money deployed into early stage companies. But when we review the model against that required to develop the entrepreneurial knowledge economy and the scale, structure and skill required to build new world class companies, it is entirely inadequate and insufficient.

Funding gap – seed stage

There is a gap where researchers face difficulty finding early stage funding to develop and test prototypes and conduct market research. Investment by angels and venture capitalists is predominantly in later-stage enterprises. To fill the funding gap and accelerate the commercialization of university innovations, a new type of organization has emerged in the USA — the Proof of Concept Centre (PoCC)*. Two key US examples of institutions devoted to facilitating the spill over and commercialization of university research are the *Deshpande Center at MIT* and the *von Liebig Center* at the University of California San Diego (UC SD). Both centres are mechanisms designed to fill the “funding gap” of seed-stage investing (as opposed to later stage investing). Source: **Proof of Concept Centres - Accelerating the Commercialisation of University Innovation* by Ewing Marion Kauffman Foundation - January 2008.

Statistics Gathering

The Knowledge Economy Index Baseline Report 2011 commissioned by NISP identified a need to review the gathering and monitoring elements of statistics gathering, ensuring Northern Ireland is included in the level of detail required for the Knowledge Economy across each of the surveys.

Other details identified to improve the baseline knowledge included:

- Incorporation of the 5 digit SIC definitions used to define the CONNECT knowledge economy
- Co-ordinate a single source of data to capture venture capital activity for Northern Ireland for further updates of the CONNECT metrics. This should include the rate of deals and level of investment.
- Continue collating data for business Angel investment
- Key innovation Metrics Spin offs - Ensuring the HE Business and Community Interaction Survey includes all spin off activity from university in its information gathering. Ideally it should be total spin offs across all categories. (See Table 4.9, Page 59 Key Innovation Metrics)

NISP recommends Government use the Knowledge Economy Index to track the development of the sector.

Marketing Research

Another element missing is a study into Employment Multipliers.

For example, every job at Boeing in the US creates 8 jobs outside of Boeing. There is no understanding of the employment multipliers of innovative indigenous companies in NI.

NISP recommends a study is done to research the employment multipliers of Andor and First Derivatives as a start.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

Generally speaking the current approaches are passive, broadcast style mainly because that cannot be seen as biased towards one company or sector. The need is to go proactive; so using an open process like Matrix NI should choose and declare some sectors and some programmes of special interest and offer a fast, transparent competition to help small firms especially over the hurdles identified above.

The Technology Strategy Board (TSB) the UK public body operating at arm's length from the Government reporting to the Department for Business, Innovation and Skills (BIS), is relatively unknown in Northern Ireland. Increased connection between the TSB (via Invest NI) and NISP could prove a useful platform for more focused engagement. The FP7 programme like TSB, again, is known to companies by exception.

Closer engagement of Government with associated Knowledge Economy/R&D Vehicles such as:

- **University of Ulster Knowledge Club:** promotes activities and encourages stronger links between university, business and the community. It creates an opportunity for knowledge/R&D sharing and transfer, bringing together those with common interests and creating opportunities for partnership through a number of events and forums
- **EpiCentre:** (www.epicentreireland.com) is a practical cross-border, industry-focused technology and innovation centre for the North West region, funded by INTERREG, jointly managed and staffed by University of Ulster, North West Regional College Letterkenny Institute of Technology (LYIT) where practical industrial problems can be solved in partnership between local companies and the three further/higher education institutions in the region. To date 240 projects have been completed at the centre.

Marketing of NISP success stories within Invest NI and through INI's channels.

8. **How can business and academia work to support research and development opportunities?**

In addition to the suggestions above, academics with a good national or international reputation should be encouraged to volunteer (with inducement if required) for service on programme committees.

Meeting content is rarely secret; so NI can pay such people to broadcast and to mentor the relevant communities here as to what is coming and how to engage. Clearly, this cannot continue once the call is active but it can be a real help in the run-up.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

As stated: '**conclusions and recommendations on how policies, procedures and practices can be improved in order to maximise opportunities to support innovation, research and development for the benefit of the Northern Ireland economy**' will be presented to the Assembly.

Given how crucial it is for growth in Knowledge/R&D in Northern Ireland it is important to re-emphasize the role of NISP

By June 2012, with the completion of 50,000sq ft Concourse II building (the design proposed for North West Regional Science Park), in Belfast, NISP will have ~100% occupancy, ~110 companies with 2000 staff providing ~£60m gross and ~£20m net GVA pa into the Northern Ireland economy.

Knowledge has emerged as a crucial source of economic growth and employment in the global economy because it is the basis for **innovation**. This Knowledge comes from R&D in private firms and investments made in research and education in universities. However, it is clear that investments in university research do not automatically spill-over to generate innovative activity and economic growth.

The key is to drive the commercialisation of Knowledge/R&D into proven channels, such as Science Parks, where business and academia nurture and support growth within an eco-innovation system.

NISP, through its *not-for-profit* Science Park business model nurtures and supports growth of Knowledge/R&D through various mechanisms developed from global best practice. These include a range of offerings within:

NISP CONNECT which, in partnership with the private sector (including Northern Bank, Bank of Ireland, Young Enterprise, ASE, Business professional firms, etc,) provides a variety of activities which focus attention on the skills, knowledge and resources essential to launch and grow high-tech companies which have Knowledge/R&D at their core.

- **Frameworks:** Educational seminar-style programmes allowing the Knowledge/R&D entrepreneur to gain timely access to knowledge, skills, and tools that can be readily applied (just-in-time) within their business.
- **Evening Series:** These clustering programmes are delivered throughout the year and enable emerging and seasoned Knowledge/R&D entrepreneurs to learn from one another.
- **£25K Awards:** A weed-and-feed competition for Northern Ireland's public funded Knowledge/R&D base (staff and students) to encourage the development of high-tech businesses which are presented to an audience of experienced entrepreneurs and investors.
- **Entrepreneur-in-Residence (EIRs):** a team of experienced and successful Knowledge entrepreneurs and senior executives who pledge one day per week for no less than three months, pro bono, to young Knowledge/R&D companies.
- **Venture Capitalist Forum:** Selected entrepreneurs have the opportunity to present Knowledge/R&D to a group of premier venture capital providers actively funding investments.

Three recent additions to NISP's nurture and support delivery include:

- **Springboard:** provides coaching and mentoring to promising Knowledge/R&D entrepreneurs and their teams and is the manifestation of the CONNECT programme principles.
- **NI Knowledge Economy Index:** an independent private sector report on the Knowledge Economy which has determined the Knowledge/R&D baseline and has identified targets and actions for improvement.

To review the data on the NI Knowledge Economy Index please go to:

<http://www.nisp.co.uk/wp-content/uploads/2011/10/Northern-Ireland-Knowledge-Economy-Index-Baseline-Report-20113.pdf>

- **Generation Innovation:** the new Knowledge Economy social network comprising Northern Ireland's young people designated by their schools and peers as having the most potential for entrepreneurial success.

NISP offers vital financial direction and support with:

NISP Halo: a private equity programme, facilitates investment opportunities between experienced national and international business angels and fledgling Knowledge/R&D-based businesses. Halo is designed to fill the funding gap by connecting, in a structured manner, high net-worth individuals with relevant Northern Ireland companies. Angel investors, often in groups or syndicates, invest and also provide invaluable skills and experience. Between them, they assist new ventures to develop their business model, find the right people and skills they need and ultimately to source the capital to make their business a reality.

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

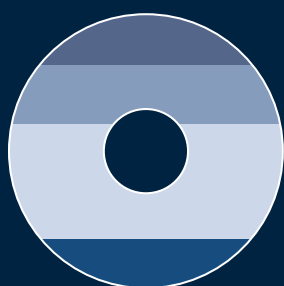
Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

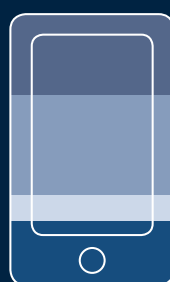
Northern Ireland Knowledge Economy Index

Baseline Report 2011

A benchmarking report tracking the health of the Northern Ireland Economy against other UK regions



Software/Digital



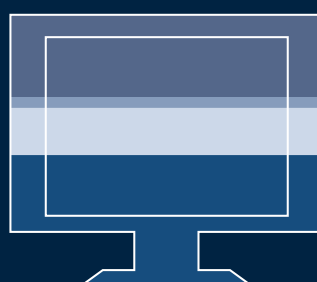
Telecommunications



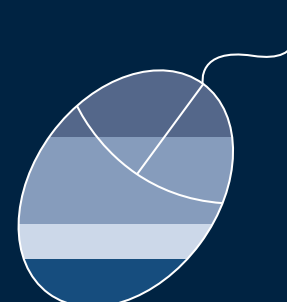
Aerospace & Transport



Pharmaceuticals and biotechnology



Computing/Advanced Electronics



IT Services

Report prepared by Oxford Economics for Northern Ireland Science Park CONNECT

NISPCONNECT

 OXFORD
ECONOMICS

In partnership with

Northern Bank

Contents

Foreword	3	4 R&D and research activity	44
Executive Summary	4	4.1 Research & Development (R&D)	44
The need for knowledge	4	4.2 Research undertaken by HEIs	54
Building from a sound foundation	4	4.3 Number of PhDs	57
Measuring the challenge	4	4.4 University spin off activity	58
Aspiring to transform	5	4.5 Summary	59
Ensuring a supportive policy environment	6	5 Patent activity	60
Acting now	6	5.1 Innovation activity	60
1 Introduction	7	5.2 Patent activity	62
1.1 Scope of study	7	5.3 Summary	71
1.2 The innovation agenda in NI – what is the Executive's approach?	8	6 Conclusions	72
1.3 What is a knowledge economy?	9	6.1 Economic context	72
1.4 Structure of this report	10	6.2 The innovation agenda in Northern Ireland	72
2 The knowledge economy	11	6.3 Sizing the 'knowledge economy'	73
2.1 Skills and external focus	11	6.4 Investment Activity	73
2.2 Employment	14	6.5 Research and development activity	74
2.3 GVA, productivity and wider economic contribution	19	6.6 Research activity in universities	75
2.4 Total business stock	20	6.7 Patent Activity	76
2.5 New business start ups	21	6.8 Aspiring to transform	76
2.6 Wages	27	Annex A: Knowledge economy sector definition	80
2.7 Summary	28	Annex B: Technical Notes	84
3 Investment activity	30	Additional VC Data	84
3.1 Private equity investment (covering venture capital)	30	M&A and ECM data	86
3.2 Mergers & Acquisitions (M&A) and Equity Capital Market (ECM) deal activity levels	39	Enterprise Investment Scheme	86
3.3 Business Angel investment	40	Other research activities	88
3.4 Public companies	41	Patent Data Notes	88
3.5 Summary	43		

Foreword

The “NI Knowledge Economy Index: Baseline Report” could not have been published at a more opportune time. Given the lack of growth in our private sector and the overall impact that the 2008/09 downturn has had on public funding, our labour market and our general prosperity it is now imperative that we become proactive rather than reactive in steering our economic destiny.

The commissioning of this report by NISP CONNECT was prompted by an awareness of successful international experience in terms of achieving high levels of economic growth and job creation through knowledge-based growth. But before we begin to set measurable targets for monitoring progress in this area it is imperative that we have a clear understanding of where our economy currently resides in terms of its knowledge base. In this report Oxford Economics successfully presents a model which not only replicates the key knowledge economy metrics used internationally and applies them to the local economy, but also presents them in a form which is accessible to policy makers, the business sector and educationalists.

The findings of this report show clearly that our current economic model in Northern Ireland is not working. Despite the aspirations set out in the Executive’s very first draft *Programme for Government* over a decade ago, our knowledge economy base is still stunted. The bottle-neck in Northern Ireland’s economic growth and our inability to create jobs lies in the fact that we require a step-change in our efforts to build a knowledge economy. The report highlights the scale of the gap between our current knowledge economy base relative to international comparators and reveals that even in a UK context we are also lagging other regions. In addition, this report demonstrates that private funding in terms of venture capital activity is virtually non-existent in NI relative to other regions. This problem requires urgent policy attention and one key method of solving this problem is to further extend and develop our research base. International experience tells us that when the capacity of local research institutions is built up this acts as a catalyst for those much needed private capital flows.

This research also presents us with the stark reality of where we are now and the sheer scale of the challenges that we face. The evidence presented here shows us that the status quo renders us incapable of producing a sufficient number of high-tech jobs in the

long-term and this research succinctly uses a number of key performance indicators to demonstrate why exactly this is the case.

This report is an essential read for policy makers. If economic growth and job creation are genuine policy priorities then urgent targets for raising our knowledge economy base and the constant monitoring of these NISP CONNECT indicators must be undertaken. Proposed targets and timetables for improving each of our knowledge economy indicators will be developed by an expert panel from the Science Park and the private sector in the coming months and should be built into Northern Ireland’s forthcoming economic strategy. This report signals to policy makers that we urgently need a much greater policy focus in terms of innovation, research and business start-up funding. It also highlights the link between successful knowledge economies and a region’s skills base. In summary, for Northern Ireland to become a knowledge economy it requires a significant lift in levels of innovation, talent, technology, enterprise and active networks.

This research also makes interesting reading for the private sector - particularly in the current economic climate. The report serves as a reminder that successful regions such as San Diego have managed to up build up significant knowledge economy bases without spending vast amounts of money. For example, R&D and innovation can be increased substantially in the private sector through greater collaboration with local universities, further education colleges and indeed the Science Park.

In its entirety this report demonstrates the willingness of the private sector to engage with policy makers for the purpose of raising our economic game. Key players in the economy can no longer operate in isolation, but with a joint effort and challenging (and realistic targets), we could potentially become one of Europe’s leading knowledge economies. Government, business and the higher and further education colleges must all step up to the mark. We should not underestimate the scale of our respective contributions if we are genuinely committed to creating prosperity and raising local living standards for all.

Angela McGowan
Chief Economist
Northern Bank

Executive Summary

The need for knowledge

The economic landscape has changed profoundly over the last 5 years. The global recession ended a period of rapid growth which was underpinned by escalating levels of debt and most developed economies are still struggling to regain the level of economic performance they enjoyed in 2007-2008. Recovery has been slow as cash strapped consumers and governments, allied to nervous businesses reluctant to invest have created conditions that are not supportive of growth. Yet against this backdrop opportunities clearly exist. Growth in emerging markets continues and the growing global population is placing demands on energy, food, products and services that are necessitating new ways of thinking and innovative solutions. How can Northern Ireland capture these opportunities and pull itself up from its traditional position as the economically weakest UK region?

Knowledge is the answer. It is in the knowledge intensive sectors in which the developed world continues to have its comparative advantage. Highly specialised skills, developed business practices and existing business and technological infrastructure are core strengths that emerging nations are only beginning to challenge effectively. Knowledge based jobs are well paid, rewarding and ultimately able to generate global sales, crucial when domestic markets remain subdued.

This report is designed to present a benchmark for the Northern Ireland knowledge economy, mimicking as closely as possible the CONNECT programme based in San Diego. San Diego CONNECT is a highly respected regional programme linking inventors and entrepreneurs with the resources they need for commercialisation of products. It is hoped that the work will help to raise awareness of the sector's importance and provide a platform from which to foster growth, ensure a supportive policy environment and to use as a framework to monitor progress.

Building from a sound foundation

Defining the knowledge economy is difficult, the definition used in this report is based on the definition used in the CONNECT report to allow comparison. This model of economic development that developed so dramatically in San Diego is the 'entrepreneurial knowledge economy'. Though this knowledge economy sector is relatively small in Northern Ireland it is an important one, consisting of:

- 30,500 people employed directly
- 2,000 businesses
- £1.8 bn of direct GVA
- £1 bn in direct wages annually
- 27,000 people employed in the wider economy through the supply chain and wages paid
- £300 million of business R&D expenditure

This suggests a platform exists from which to build; the knowledge economy is flourishing already in Northern Ireland. Looking back further in history the Northern Ireland economy has been a world leader in the knowledge economy, be it the linen industry or the ship building industry. Today within the broad knowledge economy sector Northern Ireland enjoys strength in a number of specialist areas each containing world class firms. These specialist areas include:

- Transport and defence
- Software and digital content
- Manufacture of computing and electronics
- Life sciences

Building on these comparative strengths and broadening the sector's reach into new and evolving areas of the knowledge economy will be necessary to realise the full economic potential in Northern Ireland.

Measuring the challenge

The knowledge economy in Northern Ireland is much too small, less than half the size of the sector in the leading regions of the UK across a number of indicators. The benchmarking analysis draws out a number of key messages with regard to the knowledge economy sector in Northern Ireland:

- The sector is approximately half the size of the leading UK knowledge economy, with a third of the business stock that might be expected
- Levels of R&D in the region are well below the levels in leading 'knowledge intensive' regions
- The venture capital market is small and underdeveloped
- Patent applications are low and linked to only a few major firms

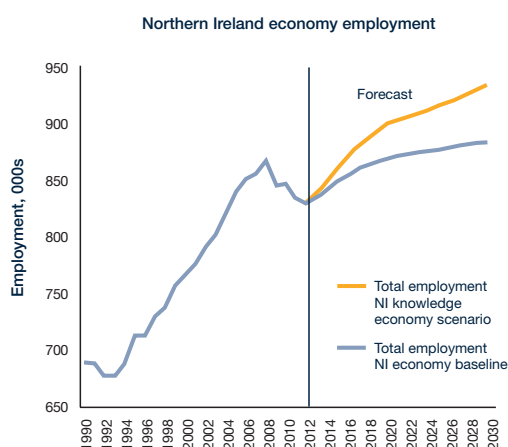
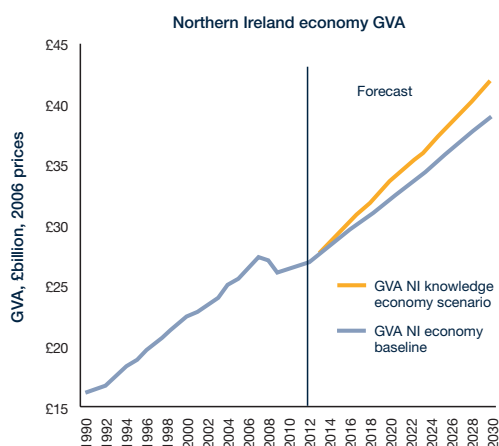
Aspiring to transform

When San Diego set out on its journey to transform its knowledge economy back in the 1960s, it was described as America's "bust" city. In 1985, San Diego had a population of 1.8 million people and faced losing 100,000 jobs. Today it is one of the most successful economies in the US with the knowledge economy now representing 11.2% of the economy's employment and generating a full quarter of the region's wages. Northern Ireland needs to mimic this ambition, and ultimately this success. To do so would have a transformative effect on the Northern Ireland economy; increasing employment, wages and reducing the dependency on the public sector and upon the British taxpayer. Based on the findings of the benchmarking report it is possible to quantify the transformation required to make Northern Ireland the most knowledge intensive region of the UK:

- 25,500 more people employed directly in the knowledge economy
- 6,000 more knowledge economy businesses
- £800 million more spent on R&D annually
- 200 more PhD students per annum
- 42,000 more science and technology graduates working in the economy
- 200 more patent applications annually
- A further 24,000 people employed elsewhere in the economy as a result of the new knowledge jobs

It is customary in Northern Ireland for economic policy to aspire to the average, to move off the bottom, but as San Diego showed aiming for the top is not misguided, just demandingly ambitious. To achieve this step change in the Northern Ireland economy would have a material effect on the economy, as illustrated in this indicative scenario where Northern Ireland achieves its aim of being the UK's leading knowledge intensive region by 2030.

The impact of a knowledge transformation - baseline and scenario forecasts



Ensuring a supportive policy environment

There are many demands of government at present and a shrinking pot of money to meet those demands. The San Diego transformation did not require local government funding (San Diego targeted Federal research funding) and it is the private sector that can lead Northern Ireland's evolution into a leading knowledge region. That does not mean the government cannot play a very effective role in ensuring a fertile soil in which to nurture the knowledge economy. Drawing on the lessons from elsewhere and the evidence in the benchmarking report important government messages include:

- **Research:** Northern Ireland needs to compete to win more than its fair share of UK and EU research funding. Currently Northern Ireland is not even in the game.
- **Ensuring a business friendly tax and policy environment.** This includes a supportive planning system, regulatory framework and firm support network. It may also include specific tax policies (compliant with UK and EU law) to support the sector. Delivering lower corporation tax would be an undoubted help.
- **Promoting and marketing the sector.** Both in terms of Ministerial visits and trade missions but also through the Government investment agency network.
- **Promoting collaboration.** This might include providing government research grants or funding conditional on university links and collaborative bids.
- **Procuring creatively.** The government can look to procure innovative solutions to energy, transport and service delivery challenges helping to promote a vibrant local market for knowledge based firms. The Small Business Innovation Research (SBIR) is a great example of this, a federal fund San Diego tapped into.
- **Ensure pipeline of skills is in place.** Ensuring the knowledge economy has the high end specialist skills it needs to compete globally.
- **Ensuring suitable infrastructure:** both in terms of technology infrastructure but also physical connectivity through the air network.

Acting now

The global economy is moving apace, competitors are growing and all the while the UK's financial position weakens. As a region Northern Ireland relies on the UK for a 'subvention' or transfer of at least £8bn per annum, over 25% of GDP. This is unsustainable and leaves Northern Ireland's economic future largely out of its own hands. There is a need for the private sector to grow and to reduce this dependency, the knowledge economy will be critical in achieving this aim.

Many parts of the sector have performed well during the recession and are already showing their value to the local economy. With a bigger critical mass the impact could be transformative and the future brighter, making Northern Ireland the UK's very own San Diego success story.

The entrepreneurial knowledge economy will be the most difficult to achieve but the most rewarding.

The prize is thousands of new high value jobs, thousands of new jobs in support industries, clusters of companies embedded here and not interested in relocating, corporation tax paid by indigenous companies, capital gains tax paid on executive and employee stock options at wealth realisation events such as IPOs and company trade sales and most importantly; an opportunity for any kid with ambition and talent to make it big in Northern Ireland.

There are many versions of what a knowledge economy looks like. This one, the most ambitious, must be the aim.

1. Introduction

1.1 Scope of study

- Oxford Economics were commissioned by the Northern Ireland Science Park CONNECT to develop a baseline report, based on the CONNECT indicators, to track the health of the Northern Ireland knowledge economy on an annual basis against other UK regions, and some international competitors. The report looks to replicate as far close as possible the key innovation metrics used to measure the CONNECT programme in San Diego (see the box below) and where applicable, examine other relevant innovation data.
- These indicators put in place an effective monitoring framework to support the ongoing implementation of the CONNECT programme and help to identify the necessary steps in future to achieve the ambitious goals of the programme.
- The intention is that the results will provide the evidence base upon which the stakeholders of the CONNECT programme can begin to construct an action plan to create the appropriate conditions for knowledge based growth in Northern Ireland. The report will be followed by a conference in Q1 2012 to develop targets against each indicator.
- The majority of data within the report has been sourced from national or international data sources; however, this has been examined and supplemented with additional data where applicable from those involved in the knowledge economy in Northern Ireland. As this is the baseline report it also contains further analysis of contextual data and indicators which are not available for all UK regions and hence cannot be included in those metrics to monitor.

CONNECT

The CONNECT Programme, run from NISP, is based on the highly respected San Diego CONNECT initiative and aims to support potential entrepreneurs and start-up companies within high technology sectors. This support is provided to ambitious high technology companies in a number of ways including business mentoring, networking, interactive workshops and enterprise forums (including a forum for venture capital).

NISP CONNECT brings together a number of stakeholders within the region including the University of Ulster, Queen's University, Belfast and the Agri Food & BioSciences Institute (AFBI).

CONNECT in San Diego has assisted in the formation and development of more than 2,000 companies since 1985 and is a highly regarded regional programme linking inventors and entrepreneurs with the resources they need for commercialisation of products. The programme has been modelled in almost 40 regions around the world.

Today San Diego is home to almost 6,000 technology companies employing almost 140,000 people (11.2% of the total economy). Technology companies represent six percent of the region's employers and they pay 90 percent more than the average salary – a full quarter of the region's wages.

The key indicators used to measure the knowledge economy in San Diego are:

- | | |
|---|--|
| 1. Technology start-ups | 6. Private placement investment |
| 2. Technology start-ups new job creation | 7. Initial and follow-on public equity offerings |
| 3. Technology sector wages and employment | 8. Patent activity |
| 4. Venture capital investment | 9. Federal and private research grants |
| 5. Merger and acquisition activity | |

1.2 The innovation agenda in NI – what is the Executive's approach?

- Innovation and creativity are essential for sustainable growth and economic development. There are several core conditions that enable innovation and encourage economic growth, including:
 - Strong standards and effective enforcement of intellectual property protection;
 - Vigorous competition and contestable markets;
 - Open trade and investment in a stable economic environment;
 - A strong and sustainable fundamental research and development infrastructure, sound policies and mechanisms to promote the science-innovation interface;
 - Efficient and transparent regulatory systems;
 - Ethics and the rule of law; and
 - A strong emphasis on education at all levels.
- Innovation policy in Northern Ireland is developed and driven by the Department of Trade and Investment (DETI), whose stated goal is "to grow a dynamic, innovative economy". The central vision of the Regional Innovation Strategy for Northern Ireland (2003) is *'To create a culture and environment within which Northern Ireland will prosper by using its knowledge, skills and capacity to innovate'*. The accompanying 2008-2011 action plan looks to contribute towards addressing the Executives Public Service Agreement (PSA) 1, which seeks to "promote higher value-added activity through innovation and the commercial exploitation of R&D" and progress towards this will be measured in terms of the increase in the average annual growth of Business Expenditure in R&D¹.
- However, the approach to Innovation policy in Northern Ireland is somewhat blurred. Although innovation is prominent in most Government strategy documents, the Regional Innovation Strategy for Northern Ireland² was published almost a decade ago. Innovation is concentrated in high-tech industry which is dynamic, ever evolving and rapidly changing with new markets developing all the time (e.g. i-phone application development). However, it is not only the industry

that has changed– the Northern Ireland economy is fundamentally different than a decade ago and faces an entirely different set of challenges in today's global marketplace. Arguably, in today's economic climate without the cushion of a public sector with an abundance of available finance, a strong innovation policy with a clear strategic direction led by the private sector is more important than ever.

- The Executive has already taken the important step of making the economy the top priority in its Programme for Government (PfG), with halving the private sector productivity gap an overarching policy. If Northern Ireland is to achieve the convergence in productivity and living standards with other parts of the UK (as outlined in the PfG), then there needs to be a much greater emphasis on value added investments and growing the knowledge economy, both for indigenous businesses and also as a means of attracting and retaining foreign investors.
- The Independent Review of Economic Policy in Northern Ireland placed a particular emphasis on prioritising Innovation and R&D in the future to meet the goals in the PfG. The PfG will soon be out of date as the associated actions covered the period 2008-2011.
- A new Economic Strategy for Northern Ireland is expected in Autumn 2011 which will focus on competitiveness and short term job creation. It will consider the possible implications of Corporation tax powers if granted and the role of exports in generating economic growth. There is likely to be a strong emphasis on innovation and the knowledge economy (in its widest sense) driving economic growth, although other key challenges such as worklessness will be as important.
- The rebalancing agenda in the UK is gathering pace as an important pillar for future economic growth. Despite Northern Ireland's strong level of dependency on the public sector, activities within the private sector demonstrated by manufacturing, agriculture and tourism activities are fairly diverse. In that regard Northern Ireland's favourable wage rates, rates incentives for manufacturing and skill sets presents a good foundation for private sector growth.

¹ Increase by 8% the average annual growth in BERD expenditure in Invest NI client companies with less than 250 employees; and increase by 5% the average annual growth in BERD expenditure in Invest NI client companies with greater than 249 employees.

² DETI (2003) Think, Create, Innovate: The Regions Economic strategy for Northern Ireland.

- Today, Northern Ireland faces severe economic and social challenges. The 2008-10 economic downturn has led to a fall in output and employment, rising unemployment and soaring public debt has led the UK Government to curb public spending growth, which will have a disproportionately large impact on the NI economy given its high dependence on the public sector.
- To recover, Northern Ireland needs to find new and sustainable sources of growth. Future growth must therefore increasingly come from innovation-induced productivity growth. Innovation is a key route to boosting productivity although it should be recognised that it does not always create large numbers of direct employees. Importantly, the potential devolution of corporation tax powers in Northern Ireland could also have important implications for the knowledge economy, potentially affecting the location choices of global firms which often tend to be more R&D intensive than indigenous companies in Northern Ireland.

1.3 What is a knowledge economy?

- Simply put, a knowledge economy is an economy that is fuelled by innovation, technology and talent. It is characterised by the growth of high wage jobs, the development of high growth industries and the existence of high economic impact multipliers. In the knowledge economy there are large numbers of significant start-up successes, successive waves of new technologies and extremely active networks of people and organisations. Such an economy adapts quickly to change, and effectively responds to market opportunities.
- There are many different definitions of the knowledge economy in terms of specific industrial classifications used by national and international organisations and by academics. Importantly, the definition used here to monitor the size of the knowledge economy is in keeping with the characteristics of the CONNECT programme and the types of companies it assists and does not include the full breadth of services that are often captured in the wider uses of the term 'knowledge economy' such as financial and businesses services, which in Northern Ireland's case are typically dominated by 'low innovation' activities such as retail banking and call centres.

1.3.1 CONNECT Sector definition

- In this report the knowledge economy is defined as an aggregation of the following sectors based on the CONNECT report, and represent research intensive sectors that where new ideas, new products and new processes are key determinants of competitiveness³.
 - Pharmaceuticals and biotechnology/life sciences;
 - Medical devices;
 - Software & digital content;
 - IT services;
 - Telecommunications;
 - Computing and advanced electronics;
 - Other technical services; and,
 - Aerospace and other transport equipment.
- These sectors tend to be high wage, high productivity and more R&D and export intensive than other sectors of the economy. Job creation and business development in these sectors has a more significant economic impact and can help the Northern Ireland economy achieve its objective of closing the productivity gap with the rest of the UK to raise overall prosperity in Northern Ireland.

³ Annex A Technical Notes explains the sector definition in more detail and lists the relevant SIC codes. The definition of the knowledge economy has been devised based on the sector definitions used in the CONNECT programme, which has involved mapping UK Standard Industrial Classification (SIC) codes against the NAICS codes used in the CONNECT programme. In practice the knowledge economy is not measured against this narrow definition for some indicators as the data does not always follow SIC codes (e.g. venture capital data). Also for some indicators it is necessary to present the data against European or International definitions of the knowledge economy.

1.4 Structure of this report

- The report is structured as follows:
 - **Chapter 2: Knowledge Economy**, which examines the current size of the knowledge economy in Northern Ireland, in terms of employment, start-up activity and business stock.
 - **Chapter 3: Investment Activity**, which provides an overview of flows of private equity and venture capital investment and other forms of investment into Northern Ireland.
 - **Chapter 4: R&D and Research Activity**, which looks at the current levels of R&D, research grants, spin outs and other metrics of research activity in Northern Ireland.
 - **Chapter 5: Innovation and Patent Activity**, which examines European patent data and a recent study into patent activity in Northern Ireland.
 - **Chapter 6: Conclusions and Key Metrics**, provides analysis of the key indicators to be used to monitor the knowledge economy moving forwards.

2 The knowledge economy

- This chapter examines the current size of the knowledge economy, in employment and business number terms, and start up activity. These indicators focus on using the CONNECT sector definition but other wider metrics are also examined including Eurostat employment definitions (for international comparisons), entrepreneurial activity across the economy and wage levels across relevant occupations.
- The CONNECT sector definition of the knowledge economy, as outlined in Annex A, is based on 2007 Standard Industrial Classification (SIC) codes at a 5 digit level. This has restricted analysis reliant on SIC codes to 2009-2010 as data for previous years uses 2003 SIC codes. It has not been possible to map the 2007 codes to 2003 codes accurately due to considerable changes in sector codes.

2.1 Skills and external focus

- The knowledge economy tends to be more export focused than other sectors of the economy, and exports will be a major factor in Northern Ireland's recovery from the recession.
- Aerospace and transport equipment represents one of the most export orientated sectors in the economy, with the sector selling over 90% of its sales in export markets- accounting for almost a fifth of all manufacturing exports. Electrical equipment is another expansion within Northern Ireland, accounting for 12% of total exports and exporting over four-fifths of its output.
- Other sectors within the knowledge economy that are important exporters include computer, electronics and optical equipment and pharmaceuticals, which export over 70% of their output, accounting for 11% and 3% of Northern Ireland manufacturing exports respectively.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Table 2.1: Share of Sales, External Sales and Exports by Industrial Sector, 2009/10 (£ million)

Industrial sector	Total sales, £m	% total sales	External sales, £m	% external sales	Exports, £m	% all Northern Ireland exports	Export intensity (exports as % of total sales)
Other transport equipment	£1,076	6.9%	£1,050	8.6%	£991	18.9%	92.1%
Electrical equipment	£765	4.9%	£727	5.9%	£642	12.3%	83.9%
Computer, electronic and optical	£699	4.5%	£683	5.6%	£573	10.9%	82.0%
Chemicals and chemical products	£440	2.8%	£344	2.8%	£323	6.2%	73.4%
Pharmaceuticals	£187	1.2%	£165	1.3%	£134	2.6%	71.7%
Machinery and equipment n.e.c.	£717	4.6%	£574	4.7%	£433	8.3%	60.4%
Rubber and plastics	£720	4.6%	£564	4.6%	£377	7.2%	52.4%
Other manufacturing	£93	0.6%	£59	0.5%	£42	0.8%	45.2%
Paper and paper products	£270	1.7%	£170	1.4%	£118	2.3%	43.7%
Wearing apparel	£71	0.5%	£55	0.4%	£24	0.5%	33.8%
Wood and products of wood & cork	£295	1.9%	£156	1.3%	£93	1.8%	31.5%
Repair and installation of equipment	£62	0.4%	£39	0.3%	£19	0.4%	30.6%
Furniture	£240	1.5%	£108	0.9%	£54	1.0%	22.5%
Basic metals	£18	0.1%	£4	0.0%	£4	0.1%	22.2%
Motor vehicles and trailers	£335	2.1%	£270	2.2%	£69	1.3%	20.6%
Fabricated metal products	£771	4.9%	£421	3.4%	£148	2.8%	19.2%
Printing & reproduction of recorded media	£151	1.0%	£46	0.4%	£28	0.5%	18.5%
Non-metal minerals	£497	3.2%	£198	1.6%	£90	1.7%	18.1%
Food, Beverages & tobacco	£8,076	51.5%	£6,500	52.9%	£1,038	19.8%	12.9%
Textiles	£1,674	10.7%	£143	1.2%	£39	0.7%	2.3%
Manufacture of leather & related products	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Coke & refined petroleum products	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total	£15,669	100.0%	£12,278	100.0%	£5,240	100.0%	33.4%

Source: Manufacturing sales and export survey DETI, 2009/10. Note totals may not add due to rounding.

- Although the data presented in the table does not directly correlate to the 5-digit SIC code definitions used to define the CONNECT knowledge economy, it provides a useful indicator of the importance of the knowledge economy in the Northern Ireland economy. The pharmaceutical; computers & electronics and optical equipment; electrical equipment; machinery & equipment; and other transport equipment sectors combined account for over half of all Northern Ireland export sales.
- The knowledge economy is also more graduate intensive than other sectors as shown below. The sectors shaded in darker blue are within the CONNECT definition and have some of the highest rates of graduate intensity. For instance 88% and 84% of the total workforce for web portal design and research & experimental development on biotechnology respectively. Overall eight of the top 25 graduate intensive sectors are within the CONNECT knowledge economy definition.

Table 2.2: Graduate intensive sectors

Rank	4 Digit SIC code & sector description	Graduate intensity (%)
1	63.12 Web portals	88%
2	72.11 Research & experimental development on biotechnology	84%
3	72.20 R&D on social science and humanities	82%
4	18.20 Reproduction of recorded media	77%
5	70.21 PR & communication activities	75%
6	64.30 Trusts, funds & similar financial	71%
7	72.19 Other R&D on natural sciences & eng	67%
8	90.03 Artistic creation	67%
9	58.11 Book publishing	66%
10	74.30 Translation and interpretation activities	62%
11	71.11 Architectural activities	61%
12	94.91 Activities of religious organisations	61%
13	90.02 Support activities to performing arts	61%
14	73.12 Media representation	61%
15	74.90 Other professional, scientific & technical activities n.e.c.	60%
16	69.10 Legal activities	59%
17	70.22 Bus & other management consultancy activities	59%
18	90.01 Performing arts	59%
19	58.21 Publishing of computer games	58%
20	91.02 Museum activities	58%
21	26.52 Manufacture of watches and clocks	58%
22	62.02 Computer consultancy activities	58%
23	46.51 Wholesale comp, comp peripheral equipment & software	57%
24	62.01 Computer programming activities	57%
25	60.10 Radio broadcasting	57%

Source: Labour Force Survey (LFS)

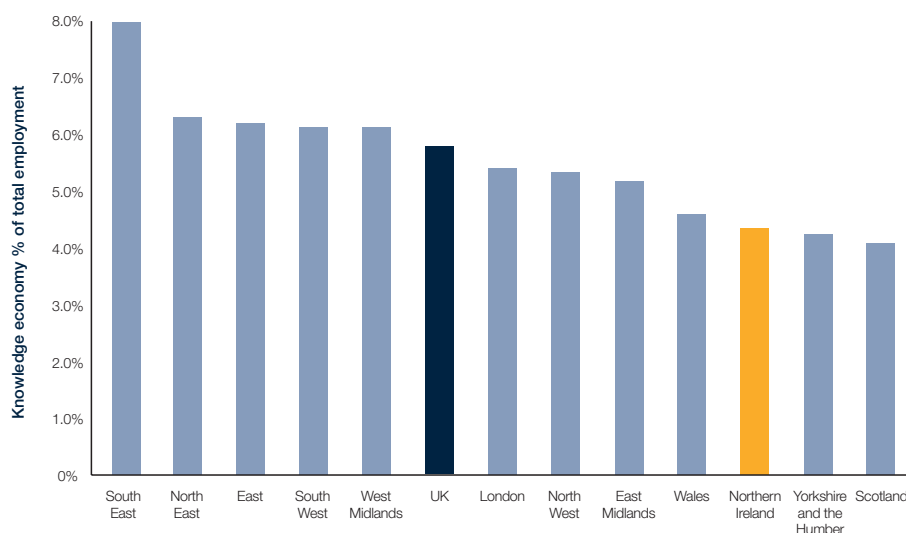
2.2 Employment

2.2.1 CONNECT definition

- In 2009 the knowledge economy, according to the CONNECT based definition, was small in the UK, accounting for just 5.7% of total employment, which compares to 14.8% in wholesale & retail, 20% across all business and professional services and 28.4% in the public sector (administration, education & health). Although the sector is larger in employment terms than construction (4.7%), transport and storage (4.6%) and finance and insurance activities⁴ (3.9%).
- In Northern Ireland, the total level of employment in the knowledge economy is approximately 30,600 persons, which represents 4.4% of total employment. This compares to 35.6% for the public sector (administration, education & health), 18.1% for wholesale & retail, 4.7% for construction and 2.8% for finance & insurance activities.
- In relative terms the knowledge economy in Northern Ireland is one of the smallest of all UK regions. Only Yorkshire and the Humber and Scotland have a smaller proportion of employment in the knowledge economy. Northern Ireland's low ranking is unsurprising, as its share of total employment is skewed by the region's large public sector base. There are a number of factors that partially explain why the private sector is small in Northern Ireland such as the legacy of the troubles coupled with the loss of employment in traditional sectors, the region's relative peripherality to the rest of the UK, transport infrastructure and relatively higher energy costs.
- The South East has the largest knowledge economy at 8.1% of total employment followed by the North East, East, the South West and the West Midlands, which have levels above the UK average. The high levels in the South East and East are unsurprising given the presence of the Universities of Cambridge and Oxford and intensity of research in the area. London's ranking is relatively low due to its overreliance on financial and business services which are not included in the CONNECT definition of the Knowledge economy.
- The 2008 employment data, not presented here, also shows the knowledge economy to be largest in these regions although the East outperforms the North East, which is more in line with what would be expected given the characteristics of these economies. It appears from examining the data by sub-sector that the surprisingly high level of employment level in the North East is heavily skewed by a large telecommunications manufacturer.

⁴ Finance and insurance activities is a subset of business and professional services.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Figure 2.1: Employment in the knowledge economy as % of total⁵ employment, 2009

Source: Business Register and Employment Survey (BRES), ONS and Census of Employment, DETI

- To put these figures in context, the knowledge economy⁶ in 2010 in San Diego accounted for approximately 11% of total jobs (as of Q4 2010)⁷.
- To reach a similar concentration in Northern Ireland (assuming the total level of employment remains similar), employment in the knowledge economy sector would need to grow in absolute terms by approximately 45,700 or alternatively to reach the level in the South East (8.1%), the number of jobs would need to affectively double.
- Due to disclosure issues, employment data has been estimated for Communications, Other Technical Consultancy Services and Software & Digital Content for Northern Ireland. The largest sub-sector and which has a higher proportion of employment than the UK average is transport and defence and reflects the presence of aerospace companies such as Bombardier and BE Aerospace and their tier 1 suppliers. In addition two other sectors represent a higher proportion of total employment than the UK- computing and advanced electronics, and software and digital content (although this sector has been estimated⁸).

⁵ The high proportion of employment in the knowledge economy in the North East appears very high. The data has been investigated and appears to reflect high levels of employment in telecommunications, which could represent one or two large companies.

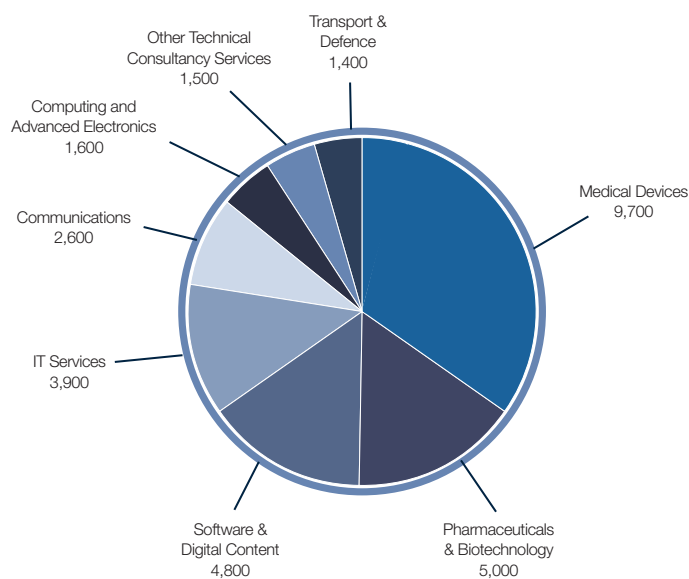
⁶ Please note that the innovation economy in San Diego does follow a slightly different definition, which the definition here is based on. See Annex A for further details.

⁷ Connect Innovation Report, Fourth Quarter 2010 and full year 2010 summary, Connect, 2010.

⁸ These figures have not been disclosed by NISRA.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Figure 2.2: CONNECT sectors, 2009



Source: Census of Employment, DETI. Figures for Software & Digital Content, Other Technical Consultancy Services and Communications have been estimated based on other SIC codes and using employer listings.

Table 2.3: CONNECT sectors as % of total employment, 2009

	As % of total employment	
	Northern Ireland	UK
Communications	0.2% (e)	0.8%
Computing and Advanced Electronics	0.7%	0.3%
IT Services	0.4%	1.5%
Medical Devices	0.6%	0.8%
Other Technical Consultancy Services	0.2%(e)	0.6%
Pharmaceuticals & Biotechnology	0.2%	0.2%
Software & Digital Content	0.7%(e)	0.4%
Transport & Defence	1.4%	1.2%
Knowledge economy	4.4%	5.7%

Source: Census of Employment 2009, DETI. BRES for UK figures. Figures for Software & Digital Content, Other Technical Consultancy Services and Communications have been estimated based on other SIC codes and using employer listings.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- Table 2.4 below explores the CONNECT sectors by region - there are two sectors where NI has a relatively high level of employment compared to other regions, the manufacture of computing and electronics and software & digital content, which both account for 0.7% of total employment, which for both sectors is higher or equal to all other regions. Examples of large companies likely

to be captured in computing and electronics are Schrader Electronics and FG Wilson, which employ approximately 700 and 2,300 persons respectively⁹. Within software & digital content it is business and domestic software development activities which dominate the overall sector, representing companies such as Citigroup and Fidessa.

Table 2.4: CONNECT sectors as % of total employment across all UK regions, 2009

	South East	North East	East	South West	West Midlands	UK	London	North West	East Midlands	Wales	Northern Ireland	Yorkshire & The Humber	Scotland
Communications	1.1%	1.3%	0.8%	0.9%	0.7%	0.8%	0.9%	0.7%	0.4%	0.7%	0.2%	0.8%	0.5%
Computing and Advanced Electronics	0.3%	0.4%	0.4%	0.3%	0.2%	0.3%	0.1%	0.2%	0.4%	0.4%	0.7%	0.2%	0.2%
IT Services	2.7%	0.9%	1.3%	1.2%	1.5%	1.5%	2.4%	1.1%	1.2%	0.6%	0.4%	0.9%	1.0%
Medical Devices	1.3%	0.6%	1.5%	0.9%	0.4%	0.8%	0.6%	0.6%	0.5%	0.6%	0.6%	0.5%	0.7%
Other Technical Consultancy Services	0.7%	0.7%	0.8%	0.6%	0.7%	0.6%	0.7%	0.5%	0.6%	0.5%	0.2%	0.2%	0.1%
Pharmaceuticals & Biotechnology	0.2%	0.3%	0.2%	0.2%	0.0%	0.1%	0.0%	0.3%	0.1%	0.1%	0.2%	0.2%	0.1%
Software & Digital Content	0.8%	0.2%	0.3%	0.2%	0.3%	0.4%	0.6%	0.3%	0.3%	0.2%	0.7%	0.3%	0.2%
Transport & Defence	0.9%	1.9%	0.9%	1.8%	2.3%	1.2%	0.2%	1.7%	1.7%	1.6%	1.4%	0.8%	0.7%
Knowledge economy	8.1%	6.3%	6.2%	6.2%	6.1%	5.7%	5.4%	5.3%	5.1%	4.6%	4.4%	4.4%	4.2%

Source: Census of Employment 2009, DETI and BRES, 2009. Figures for Communications, Software & Digital Content and Other Technical Consultancy Services have been estimated.

⁹ Equality Commission (2010) Monitoring Report No. 20 A profile of the Monitored Northern Ireland Workforce.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

2.2.2 EU High-tech employment definition

- To understand how NI compares to Ireland and other selected European countries, the EU definition of High technology sectors has been used, which is a broader definition of the knowledge economy in comparison to the CONNECT definition used above (see Annex A for the full list but the differences are largely due to high technology services being included in the Eurostat definition).

- The European countries selected are considered small open economies that are appropriate benchmarks for Northern Ireland¹⁰. There is a new data series for this indicator from 2009 onwards, which has led to substantial differences with the historical data. Therefore in order to show a consistent series, only data for 2000-2008 is presented.

Table 2.5: High-technology Sectors as % of total employment (Eurostat), European comparisons, 2000-2008

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Finland	6.4%	6.6%	6.7%	6.4%	6.5%	6.6%	6.7%	6.7%	6.8%
Ireland	7.4%	7.6%	7.4%	6.8%	6.3%	6.3%	6.4%	6.2%	6.3%
Sweden	6.6%	6.9%	6.7%	5.9%	5.8%	6.2%	6.0%	5.9%	n/a
Denmark	6.1%	5.9%	5.8%	5.5%	5.1%	5.2%	5.2%	5.3%	5.2%
Norway	4.4%	5.1%	4.7%	4.4%	4.4%	4.3%	4.4%	4.3%	4.4%
Iceland	4.5%	5.6%	5.1%	4.8%	5.0%	5.0%	4.5%	4.4%	4.2%
Austria	4.9%	4.9%	5.2%	5.0%	3.9%	4.3%	4.1%	3.9%	4.0%
Estonia	4.3%	4.4%	3.4%	3.7%	4.2%	3.7%	3.6%	3.6%	3.9%
United Kingdom	5.9%	6.2%	5.7%	5.6%	5.5%	5.4%	5.2%	5.3%	5.1%
South East	8.5%	8.8%	8.2%	8.2%	7.5%	7.2%	8.0%	7.8%	8.0%
East of England	7.0%	7.7%	7.1%	6.4%	6.3%	6.9%	6.4%	6.3%	6.0%
London	6.3%	7.9%	6.9%	6.5%	6.7%	5.8%	5.7%	6.4%	5.8%
West Midlands	5.2%	5.2%	5.3%	5.0%	5.3%	5.5%	4.7%	5.0%	4.8%
Scotland	6.0%	6.0%	5.0%	5.5%	4.9%	4.1%	4.5%	4.8%	4.5%
North East	4.7%	5.8%	4.4%	4.1%	4.3%	4.3%	4.5%	4.9%	4.4%
South West	5.6%	5.6%	5.7%	5.6%	5.0%	5.4%	4.7%	4.9%	4.3%
East Midlands	4.4%	5.1%	4.6%	4.3%	4.5%	4.6%	4.4%	3.7%	4.2%
Northern Ireland	3.6%	3.4%	3.9%	3.6%	3.5%	3.4%	3.1%	3.4%	4.0%
Wales	5.1%	4.6%	4.4%	3.5%	5.0%	4.5%	4.5%	3.4%	3.8%
North West	5.1%	4.8%	4.6%	4.9%	4.6%	4.7%	4.3%	4.3%	3.7%
Yorkshire & The Humber	3.9%	4.2%	3.8%	4.3%	3.8%	4.2%	3.7%	4.1%	3.4%

Source: Eurostat, 2008 & 2009. Different data series 2005-2007. US figures derived from OECD.

¹⁰ This table is to be supplemented with data for the United States to provide further context.

- On this indicator in 2008 the UK had an average proportion of employment in high-technology sectors compared to those selected European countries at 5.1%, with the share decreasing over the past decade as the UK economy became more reliant on finance and business services, as well as debt fuelled sectors – public sector, retail, construction. The shares of high-technology employment in Finland, Ireland and Sweden are the highest – emphasizing success in economies with strong innovation infrastructures underpinned by innovation policy with a clear strategic direction.
- The case of Ireland being a top performer on this metric represents an opportunity for Northern Ireland companies given such close geographical proximity. There is potential for development through either cross border trade, supply chain linkages or through 'collaborative innovation networks' in ventures designed to penetrate global markets. The difference between the ROI and Northern Ireland may also be partially attributable to the differences in tax rates and a main argument for lowering Northern Ireland's corporation tax is to provide a more level playing field.
- At a UK regional level clearly the South East, East and London have consistently had the highest proportions of employment in high technology sectors, which represents the 'golden triangle' of research activities around the University of Oxford, University of Cambridge and London universities and associated private sector activity (an area which attracts a huge proportion of UK venture capital activity in life sciences). The share of high technology employment in Northern Ireland is low compared to most regions except Wales, the North West and Yorkshire and the Humber. London now ranks higher on this measure as the Eurostat definition has a broader definition of high tech services than those within the CONNECT cluster definitions.

2.3 GVA, productivity and wider economic contribution

- The Gross Value Added (GVA) for the knowledge economy (the CONNECT definition) and wider economic impacts (indirect and induced) have been calculated using Oxford Economics regional economic model and Input-Output tables for Northern Ireland.
- Overall total GVA is estimated to be £1.8 billion for the knowledge economy and productivity (GVA per employee) is £60,013, which is almost double the Northern Ireland economy average (£30,934). This clearly emphasises the high value of innovation led activities within the sector.
- The wider employment impacts including indirect impacts (those supported further down the supply chain) and induced impacts (employment and activity supported by the incomes of those directly or indirectly employed) are estimated to be approximately 27,000, which gives a multiplier value of around 1.9. In other words for every 10 new jobs created in the sector around 9 additional jobs can be expected to be created through the supply chain and wages paid.

Table 2.6: Direct, indirect & induced employment and GVA impacts of the CONNECT sectors, 2009

	GVA, £billion	Employment
Direct contribution	£1.8	30,580
Indirect & Indirect contributions	£1.0	27,008
Total direct, indirect & induced impacts	£2.8	57,588

Source: Oxford Economics

Northern Ireland Knowledge Economy Index: Baseline Report 2011

2.4 Total business stock

- The Knowledge economy (the CONNECT definition) in Northern Ireland, according to Inter Department Business Register (IDBR), accounted for only 2.5% of total business stock (including local units¹¹) in 2009 and 2010.

Table 2.7: Northern Ireland Business Stock - CONNECT Sectors

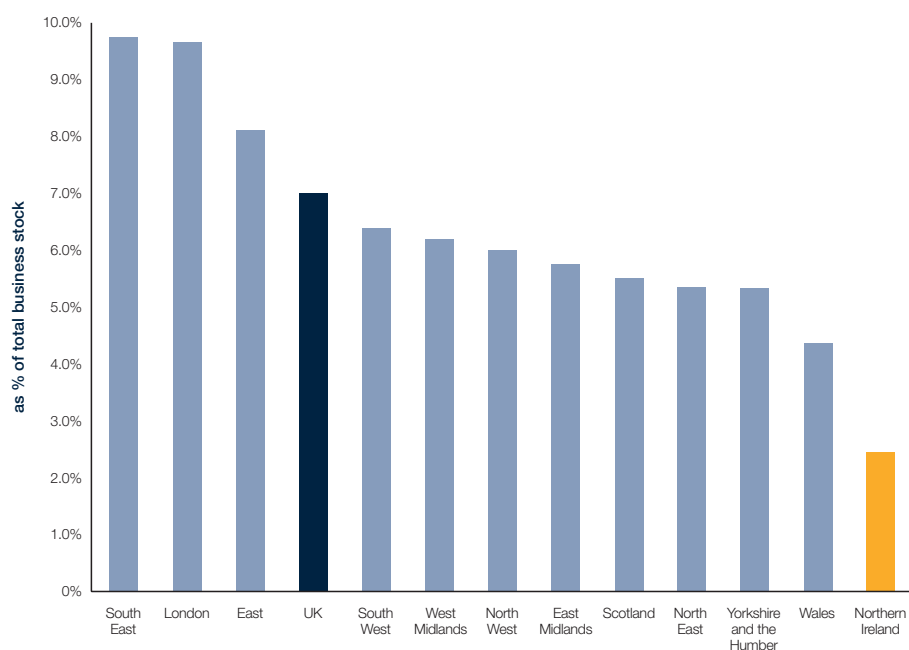
	2009	as % of total business stock	2010	as % of total business stock
Medical Devices	155	0.2%	160	0.2%
Pharma/Biotechnology	20	0.0%	20	0.0%
Software/Digital Content	480	0.6%	465	0.6%
IT Services	450	0.5%	410	0.5%
Communications	100	0.1%	105	0.1%
Computing & Advanced Electronics	60	0.1%	55	0.1%
Other Technical Consultancy Services	635	0.7%	655	0.8%
Transport/Defence	250	0.3%	205	0.2%
Total	2,150	2.5%	2,075	2.5%

Source: IDBR, 2009 & 2010. Data for local units so includes all enterprises sites (e.g. an enterprise may have a shop and a factory site).

- Comparatively, the proportion of businesses within the CONNECT sectors is much lower than all other UK regions and the UK average of 7.1%. There is considerable growth needed in the technology business base to reach the levels experienced in those regions topping the analysis - the South East (9.7%), London (9.6%) and the East (8.1%). The proportion is partially very low in Northern Ireland as relative to the UK there are a large number of agriculture businesses (19.4% of total stock compared to 5.4%).

¹¹ A local unit is an individual site (factory, shop, office, etc.) at which an enterprise conducts its business and therefore an enterprise may have more than one local unit.

Figure 2.3: Business stock of CONNECT sectors, as % of total regional business stock, 2010

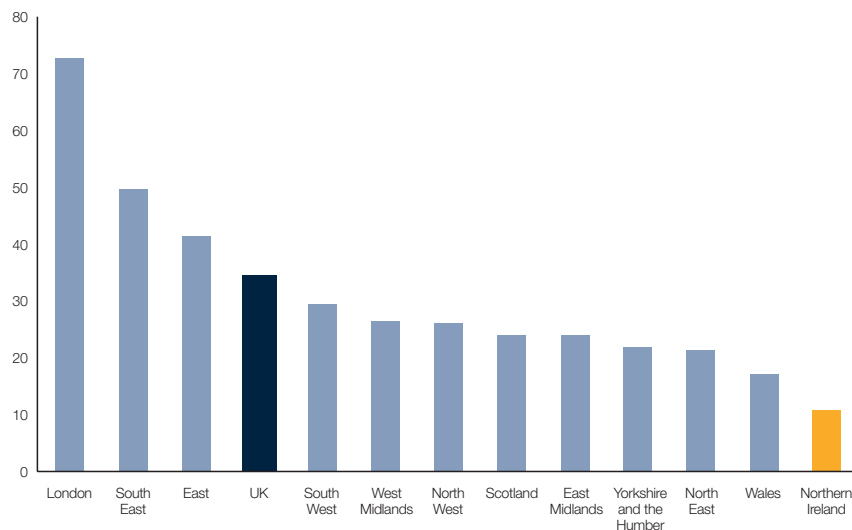


Source: IDBR, 2010. Data for local units so includes all enterprises sites (e.g. an enterprise may have a shop and a factory site).

2.5 New business start ups

- The level of business start ups per 100,000 population in the knowledge economy are clearly highest in London, the South East and East, the regions driving the UK level of 35.5 per 100,000 population in 2009. The level in Northern Ireland is the lowest by a considerable margin at just 11.2 per 100,000 population.
- It is important to note that businesses within this indicator are work place based therefore London will always appear very high because of the high levels of business activity and in-commuting.

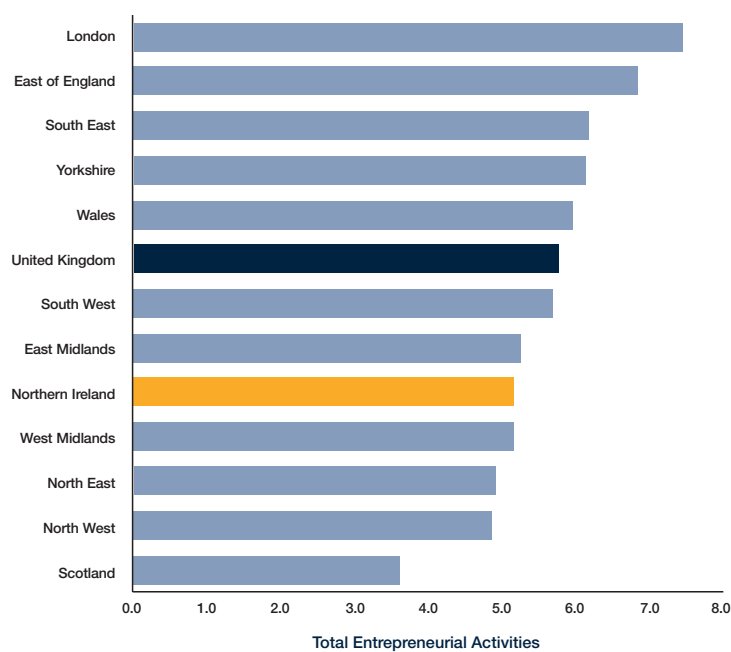
Figure 2.4: Knowledge economy (CONNECT) business start-ups per 100,000 population across the UK, 2009



Source: IDBR, 2009

- However, Northern Ireland performs slightly better when entrepreneurship is measured by the Global Entrepreneurship Monitor (GEM). This is a research programme focusing on entrepreneurs rather than the businesses that they run. GEM measures the entrepreneurial activity of people from intention to closure. The first two stages of active business development, the nascent entrepreneur stage and the new business owner-manager stage, are combined into one index of Total early stage Entrepreneurial Activity (TEA).
- On this measure Northern Ireland ranks above the West Midlands, North East, North West and Scotland (Figure 2.5).

Figure 2.5: Total Entrepreneurial Activity, 2009



Source: IDBR, 2009

- Examining business start ups within the CONNECT sectors (Table 2.8 overleaf) reveals that NI has the smallest business start-up rate for all sub-sectors.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Table 2.8: Knowledge economy start ups per 100,000 population, 2009

	London	South East	East	UK	South West	West Midlands	North West	Scotland	East Midlands	Yorkshire and The Humber	North East	Wales	Northern Ireland
Medical Devices	1.7	1.5	1.5	1.1	1.1	0.6	0.7	0.7	0.7	0.9	1.0	0.8	0.8
Pharma/ Biotechnology	0.4	0.4	0.4	0.2	0.1	0.3	0.1	0.2	0.1	0.2	0.2	0.2	0.0
Software/ Digital Content	18.6	12.6	8.6	8.1	6.3	5.6	6.2	4.3	4.8	4.5	4.4	3.5	2.0
IT Services	34.4	21.5	16.1	14.1	11.4	9.7	8.8	7.2	8.8	7.8	5.8	5.5	3.1
Communications	2.5	2.0	2.0	1.4	0.8	1.4	1.2	0.6	1.0	0.9	0.8	0.8	0.8
Computing & Advanced Electronics	0.8	0.7	1.0	0.6	0.5	0.5	0.5	0.3	0.6	0.5	0.4	0.3	0.3
Other Technical Consultancy Services	14.2	10.6	10.1	9.4	8.8	7.9	8.7	11.1	7.4	7.0	8.3	5.7	3.6
Transport/Defence	0.4	0.9	0.9	0.7	1.2	1.1	0.7	0.4	0.8	0.8	0.6	0.3	0.6
Total - Knowledge economy	73.1	50.1	40.7	35.5	30.1	27.1	27.0	24.7	24.2	22.4	21.5	17.2	11.2

Source: IDBR, 2009. Data for PAYE or VAT registered enterprises.

Employment in new business start ups

- The total level of employment recorded by IDBR for Northern Ireland business start ups (within the CONNECT sector) was approximately 350 in 2009. Data was not available for three of the sectors as it was deemed disclosive. The 2009 data is also likely to be affected by the recession and future updates should bear this in mind when measuring progress.
- The number of jobs per start up, using a rather crude average measure, are relatively low at 1.7 overall, which is very similar to the other regions and reflects the nature of business start ups in the innovation sector.

Table 2.9: Employment in new business start ups, Northern Ireland, 2009

	Births	Employment	Average business size
Medical Devices	15	n/a	n/a
Pharma/Biotechnology	0	n/a	n/a
Software/Digital Content	35	82	2.3
IT Services	55	78	1.4
Communications	15	27	1.8
Computing & Advanced Electronics	5	n/a	n/a
Other Technical Consultancy Services	65	95	1.5
Transport/Defence	10	n/a	n/a
Total	200	347	1.7

Source: IDBR, 2009

San Diego's Economic Transformation

- San Diego is ranked as the eighth largest city in the United States, with a population of 1.3 million. In recent times, San Diego has reformed and revitalised its economy, following a period of economic decline in the 1950s-60s, and is now a hub for innovation based businesses, particularly in terms of production of communication equipment (wireless cellular technology), pharmaceutical/biotechnology and medical devices manufacturing and software development.
- Through the 1930s-60s, the local economy was dominated by defence manufacturing, small farms, tourism and real estate speculation. The city was characterised by a tradition of failed entrepreneurial and economic development efforts and there were no large corporations based in the city. The post war economy consisted of declining local military and aerospace industries due to budget cutbacks. By the 1960s San Diego was identified by Time magazine as America's "bust" (failed) city- there was a serious need for economic diversification before the economy faced further turmoil.
- Economic development in the city changed focus to tackle these challenges and the transformation of San Diego was influenced by a number of key factors, including:
 - The emergence of a number of key research institutions, particularly the University of California, San Diego. This followed a focus on R&D after World War II. A number of key technology companies emerged from the University in IT, Life sciences and environmental technologies.
 - Strong leadership from small businesses. As there was no history of large business investment in the city or corporate foundations the economic transformation relied on the competitiveness and ambition of smaller businesses.
 - Collaboration among business leaders, enterprises and economic development officials to create a new (albeit uncertain) economic future.
 - Existing competitive capabilities within defence contracting and manufacturing.
- Business leaders created the environment that would incubate and grow these world class R&D institutions, the large number of small high growth technology companies (particularly spin outs) to build up clusters of companies, suppliers and professional services. This included providing leadership, contributing time and money, sharing contacts and networks.
- Most regions across the US, including San Diego, have realised that they need to adopt a comprehensive economic development strategy if they are to achieve job and income growth for a broad spectrum of their population. The strategy for San Diego had seven essential elements:
 - Investment in infrastructure
 - A focus on the manufacturing sector
 - Encouragement of creativity and constant innovation
 - Leveraging the diverse roles of government to achieve broad economic gains
 - Aligning education and workforce systems with sectoral strategies
 - Involvement of the labour community
- The CONNECT programme in San Diego, established in 1985, has helped in assisting this transformation of the San Diego economy through facilitating the convergences of scientific invention, entrepreneurship and smart capital to accessing technology developments in all fields, while providing business planning and marketing intelligence and access to diverse forms of finance.
- To conclude San Diego's lessons learned and previous experience would suggest that to develop and diversify the economy towards high growth sectors requires linking inventors and entrepreneurs through a comprehensive business network infrastructure and developing clusters and entrepreneurial capabilities in those sectors where existing research capabilities are strongest.

2.6 Wages

- The average (mean) annual wage for Northern Ireland in 2010 was approximately £21,700 for all workers across the economy, according to the Annual Survey of Hours and Earnings (ASHE) dataset. Using data from the Labour Force Survey (LFS) the average annual wage for Northern Ireland in the knowledge economy (CONNECT definition) is estimated to be approximately £32,802¹², representing a wage premium of £11,323 for jobs in the sector (or alternatively wages are 52% higher).
- Examining wage levels in the knowledge economy by region shows that the South East, East Midlands and East have the highest wage premiums. In Northern Ireland the wage premium is the 6th highest. London, despite having the highest wage in the knowledge economy, has one of the lowest premiums due to the high wages within financial services, which drives up the average wage across the whole economy.

Table 2.10: Annual mean wages in knowledge economy (CONNECT definition) and wage premium

Region	Knowledge economy (CONNECT) Annual salary, £		Wage premium ratio	
	2009	2010	2009	2010
South East	£48,625	£49,247	1.61	1.65
East Midlands	£37,178	£38,599	1.51	1.59
East	£42,755	£44,383	1.53	1.58
Wales	£29,350	£35,378	1.31	1.58
South West	£37,391	£37,576	1.56	1.57
Northern Ireland	£31,791	£32,802	1.46	1.52
West Midlands	£35,084	£35,439	1.49	1.49
North West	£36,519	£35,709	1.53	1.48
North East	£30,756	£33,087	1.37	1.47
London	£50,271	£53,658	1.34	1.44
Yorkshire and Humberside	£30,907	£33,397	1.32	1.43
Scotland	£34,585	£33,520	1.40	1.37
UK	40,895	41,610	1.55	1.57

Source: Oxford Economics, using LFS data to calculate the premium ratio, applied to the mean average wages from ASHE.

¹² The average wages estimated for the sector are also in line with the average wages at the science park, £34,000, as reported in the Evaluation of the NISP, Department of Enterprise, Trade & Industry, Evaluation of the Northern Ireland Science Park, January 2010.

Table 2.11: Average wage premium by sub-sector, 2010

Wages	Annual Salary, £	Annual Salary premium, £
Pharma/Biotechnology	40,842	19,142
Software / digital content	38,827	17,127
Communications	33,470	11,770
Computing and advanced electronics	33,175	11,475
Medical Devices	31,013	9,313
Transport / defence	29,616	7,916
Other technical consultancy services	27,671	5,971
IT services	27,376	5,676

Source: Oxford Economics, using LFS data to calculate the premium ratio, applied to the mean average wage for Northern Ireland from ASHE.

- The average wage premiums for Northern Ireland by sub-sector have also been estimated below and vary considerably. For instance in pharmaceuticals/ biotechnology and software/digital content wages are almost double the size of the whole economy average.

2.7 Summary

- The current size of the knowledge economy in Northern Ireland is very small, accounting for approximately 4.4% of total employment and 2.5% of the local business stock, compared to 5.7% and 7.1% respectively in the UK. In San Diego the knowledge economy accounts for 11% of total employment, which is substantially higher but the growth in the technology based firms and employment is viewed as an economic transformation over a number of decades, linked to closer links between business and research institutions, in a number of specific sector strengths.
- Sectors in which Northern Ireland has a relatively large footprint in the 'knowledge economy' include 'transport and defence' with firms such as Bombardier and BE Aerospace located locally and in the IT sector, particularly the 'manufacture of computing and electronics' and 'software & digital content'. There are also a number of leading 'life science' companies such as Almac and Norbrook.
- Despite the small nature of the 'knowledge economy' it plays a crucial role in the economy and is a key contributor to productivity growth. A Knowledge economy worker will, on average, earn a 52% wage premium above the Northern Ireland mean wage and be 52% more productive than the average private sector worker.
- Additionally, the 'knowledge economy' has wider economic impact through indirect and induced effects via business to business expenditure through the supply chain and consumer expenditure resulting from increased income. It is estimated that although the knowledge economy in Northern Ireland is relatively small at just 30,600, the sector supports an additional 27,000 jobs through indirect and induced effects.
- In conclusion it is recommended that the following key innovation metrics are used to measure the size of the knowledge economy in Northern Ireland.

Table 2.8: CONNECT - Key innovation metrics

San Diego: CONNECT Key Innovation Metrics	NISP CONNECT: Key Innovation Metrics (NI & all UK regions)	Source
Technology start ups	Knowledge economy employment, as % of total employment	BERR/Census of Employment
Technology start ups new job creation	Knowledge economy businesses, as % of total business stock	IDBR
Technology sector wages and employment	Knowledge economy business start ups per 100,000 population	IDBR
	Knowledge economy average annual wage level	ASHE/LFS

Source: Oxford Economics, using LFS data to calculate the premium ratio, applied to the mean average wages from ASHE.

3 Investment activity

- This chapter examines investment activity in Northern Ireland, based on the public data available and supplementary information from those involved in the field. The aim is to replicate the San Diego investment indicators as far as possible:
 - Venture capital investment.
 - Merger and acquisition investment.
 - Private placement investment.
 - Initial and follow-on public equity offerings.
- These indicators are used by the San Diego CONNECT model to assist in monitoring the availability of financial capital to the knowledge economy and represent investment flows across all sectors.
- The only two consistent data series available for Northern Ireland and all other UK regions focuses on private equity investment and M&As and Equity Capital Market (ECM) deal activity, which are examined here. Further information about each data series can be found in Annex B.
- In addition the level of business angel investment and the number of publicly listed companies are examined.
- There are numerous difficulties with data on investment activity in Northern Ireland and no source that can capture all venture capital activity. The BVCA data used here does exclude investments made by ROI based venture capital funds and investments made by USA based venture capital funds and investments made by local providers that are not members (e.g. Crescent Capital). Although a more accurate picture of the level of venture capital investment has been provided by Chartered Accountants Ireland Ulster Society (further details in Annex B), which does indeed demonstrate that BVCA data is likely to underestimate the true level. However, BVCA data is the only consistent source providing regional comparisons and that providing data on the number of companies receiving investments. There is a need to coordinate better data collection for further updates of the CONNECT metrics.

- The report focuses on measuring activity rather than examining the supply of venture capital. Tracking available funds under management for deployment in Northern Ireland is very important but a comparative study was not possible in the timeframe of this study. The venture capital stakeholders perceive a large discrepancy in the amount of available VC funds between Northern Ireland, the Republic of Ireland and other UK regions with Northern Ireland the most disadvantaged. For example there is approximately £7m in seed capital funds under management in Northern Ireland compared with 125 million Euro in the Republic of Ireland. The ongoing debate around VC in Northern Ireland is central to the CONNECT programme and, although out of the scope of this study, should be explored further.

3.1 Private equity investment (covering venture capital)

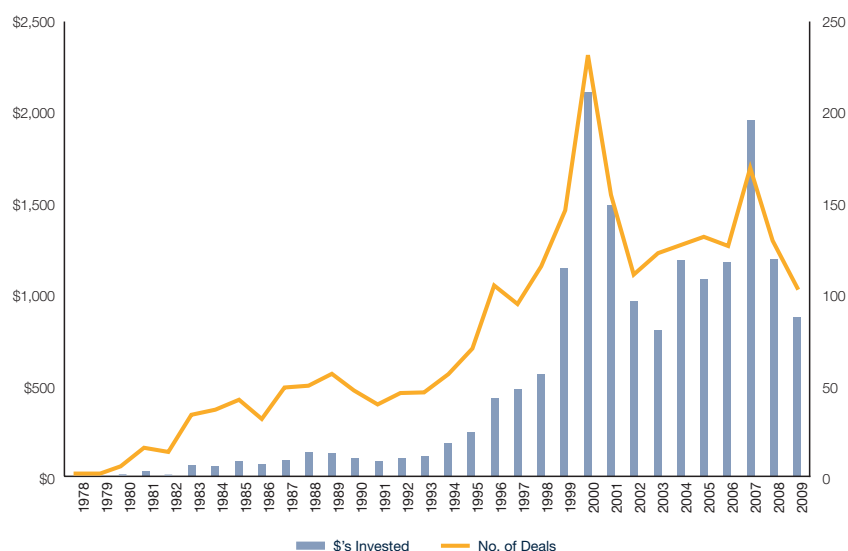
3.1.1 Context

- In knowledge based economies, economic growth and job creation increasingly depend upon successful innovation, meaning that the results of research and development (R&D) must be effectively translated into commercial outcomes. Access to finance is seen as a key factor in this process of innovation.
- Venture capital, as a specific type of finance that has been developed to fund high-risk projects, has an important role to play in this connection. Venture capital is crucial to the innovation process. For a variety of reasons, it is very difficult for large companies to undertake high-risk innovative projects. Such projects have the greatest chance of success if they are undertaken in small technology-based firms. Venture capitalists are willing and able, through their financial instruments, to invest in such high-risk innovative projects. This is confirmed by the evidence that technological revolutions which have resulted in the transformation of industries have been led by venture capital-backed firms; for example, the firms that have pioneered each new generation of computer technology (PCs, personal computers, software, etc.) have been financed by venture capital.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- San Diego has grown into a vibrant venture capital hub (\$1,000 billion in venture capital in 2010) through close cooperation between its public, private and academic sectors. Venture capital investors have been crucial to commercialising ideas from the small companies emerging from the University of California San Diego. The chart below shows that over the last decade VC investment deals have been consistently over 70 and of a value of around \$1,000 million in San Diego.

Figure 3.1: Venture Capital Investments in San Diego, 1978 - 2009



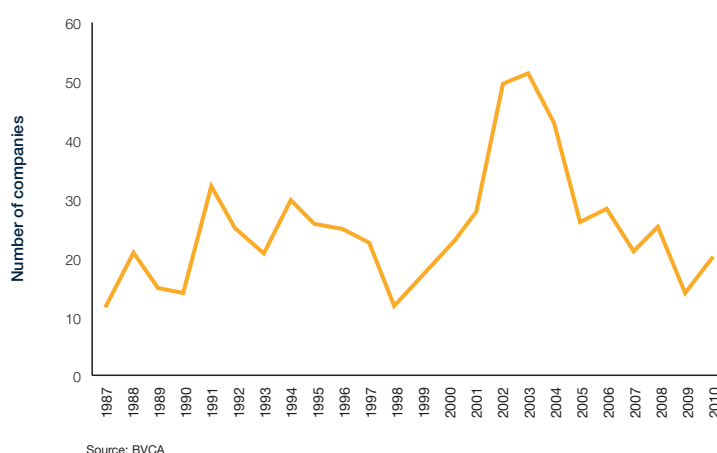
Source: CONNECT San Diego

- An important element of the NISP CONNECT programme is encouraging more venture capital investment in start-up companies from the two universities. Measuring the rate of deals and investment is an important element of monitoring the availability of capital investment to support the knowledge economy.

3.1.2 British Venture Capital Association (BVCA) Statistics

- Statistics on private equity investment by UK region are published by the British Venture Capital Association (BVCA), which covers venture capital, expansion investment, replacement capital, Management Buy Outs (MBO)/Management Buy Ins (MBI) and other later stage investments.
- The major drawback of BVCA statistics is that they only capture investment by venture capital funds that are members and thus underestimate the true level of private equity investment in Northern Ireland (and across the rest of the UK). However, they do capture activity by some overseas funds as well (if these funds work with British based members) and ultimately provide as complete picture as possible from published data of the flows of private equity across the UK region.
- The VC environment in Northern Ireland is very small and it also has more state investment than other regions of the UK with a number of Northern Ireland based firms managing public sector backed VC funds. In order to provide a more comprehensive overview the venture capital sector in Northern Ireland is summarised in terms of VC funds and associated organisations in Annex B.
- BCVA report in their 2010 Investment Activity Report that investment by private equity and venture capital firms in the UK was £20.4bn in 2010, up from £12.6bn in 2009 as the economy started to recover from the recession. Overall in terms of the number of companies there were 823 private equity investments in 2010. In Northern Ireland, a total of £163m was invested representing 20 companies. This was a jump in terms of the level of investment although this appears to have been driven by one large MBO/MBI transaction.
- The number of companies in the UK receiving private equity investment over the period 1987 to 2010 has fluctuated between 800 and 1,300, averaging 1,200 whilst figures for 2009 and 2010 were particularly low. The overall contribution of Northern Ireland to this total has been very low in absolute terms and as can be seen in Figure 3.2, only in 2003 did the number of companies receiving investment increase above 50.

Figure 3.2: Private equity investment by number of companies



Northern Ireland Knowledge Economy Index: Baseline Report 2011

- It is important to note that private equity investment is highly sensitive to economic downturns and the appetite in markets for new technology based firms. This trend occurs globally, and is illustrated by the recent downturn in the number of companies engaging in private equity investments in the UK.
- Examining the number of investments figures by region (Table 3.1) demonstrates that London and the South East dominate UK private equity investments, accounting for over half of the total amount invested in the UK. Over the period 1998/2010 NI accounted for 2.3% of the total number of companies provided with private equity investment in the UK.

Table 3.1: Private equity investment in Northern Ireland, number of companies, 1998/2010

Region	1998	2002	2006	2010	1998/2010	% of deals 1998/2010	No. of private equity investments per 100,000 VAT registered businesses, 2010
London	184	274	330	212	3,469	22.6%	54.0
South East	204	248	224	125	2,810	18.3%	31.7
North West	111	93	146	66	1,483	9.7%	25.8
East Anglia	85	132	95	47	1,305	8.5%	18.6
Scotland	121	93	78	61	1,182	7.7%	31.6
West Midlands	79	82	90	72	1,051	6.9%	34.3
Yorkshire and the Humber	91	39	83	50	944	6.2%	26.6
South West	76	61	98	46	911	5.9%	19.2
East Midlands	79	29	59	37	732	4.8%	21.2
North	46	47	28	46	550	3.6%	60.5
Wales	33	49	59	41	544	3.5%	36.3
Northern Ireland	12	49	28	20	356	2.3%	23.7
UK	1,122	1,196	1,316	823	15,336	100.0%	32.0

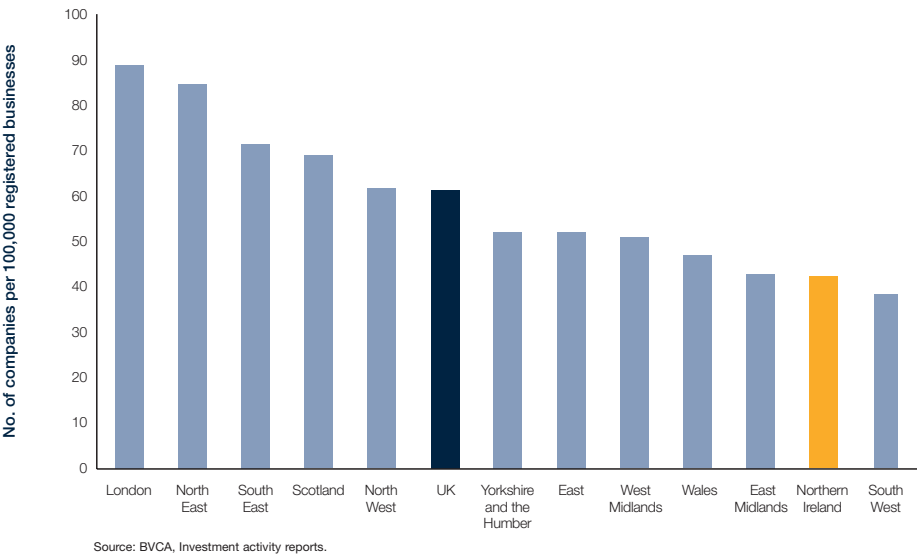
Source: BVCA, Investment reports.

VAT registered data changed in 2008 and now captures PAYE businesses as well therefore in all areas the rate per 100,000 has fallen.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- The average number of private equity backed companies per 100,000 VAT registered businesses (Figure 3.3) over the period 1998/2010 is relatively very low in Northern Ireland (2nd from bottom). This will be an interesting indicator to keep track of as the rate in the bottom half of regions does fluctuate quite significantly with bottom position changing between Northern Ireland, Wales, the South West and the East Midlands in most cases. Interestingly, in 2010 the rate was lowest in the East, caused by a very low level of companies receiving investments compared to earlier in the period.

Figure 3.3: No. of Private Equity backed companies per 100,000 VAT registered businesses, average, 1998 /2010



- The amount invested in companies is not extensively analysed here as it is very susceptible to one off transactions. For instance over the period 1998-2010 Northern Ireland has also accounted for a very low proportion of the total amount invested but the 2010 level (despite the number of companies falling) was actually very high because of a major MBO/MBI transaction deal.

Type of private equity investment

- The types of private equity investments are explored below in Table 3.2 (consistent data is only available for the last three years). Overall Venture capital (early stage investment) has accounted for the majority of investments in Northern Ireland at 57.4% of the total number of companies receiving investment over the last three years, which is slightly higher than the UK total of 39.3%. The absolute number of VC investments is very low in NI compared to all regions.
- There is also a very low level of Replacement capital and MBO/MBI activity in Northern Ireland, which indicates that venture capital investment activity, is more predominant than other forms of private equity investment. These forms of private equity investment are important to facilitate M&As given succession issues in family owned businesses and the reluctance of banks to lend at previous levels and the likely reduction in business grants in the near future. A reason for less private equity activity could be the lack of investment by Northern Ireland based financial institutions in private equity funds (e.g. elsewhere in the UK there is considerable activity by, for instance, local authority pension funds in regional private equity firms).

Table 3.2: Private Equity Investment by type, 2008-2010

	Number of companies		% of total	
	Northern Ireland	UK	Northern Ireland	UK
VC	39	1,217	57.4%	39.3%
Expansion	18	1,160	26.5%	37.4%
Replacement Capital	1	160	1.5%	5.2%
MBO/ MBI	5	349	7.4%	11.3%
Other	5	213	7.4%	6.9%
Total	68	3,099	100.0%	100.0%

Source: BVCA, Investment activity reports.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- Examining venture capital investments alone which are of primary interest the rate of investments per 100,000 VAT registered businesses (as an average over 2008/2010) is higher in Northern Ireland than the East of England, the South West and the East Midlands.

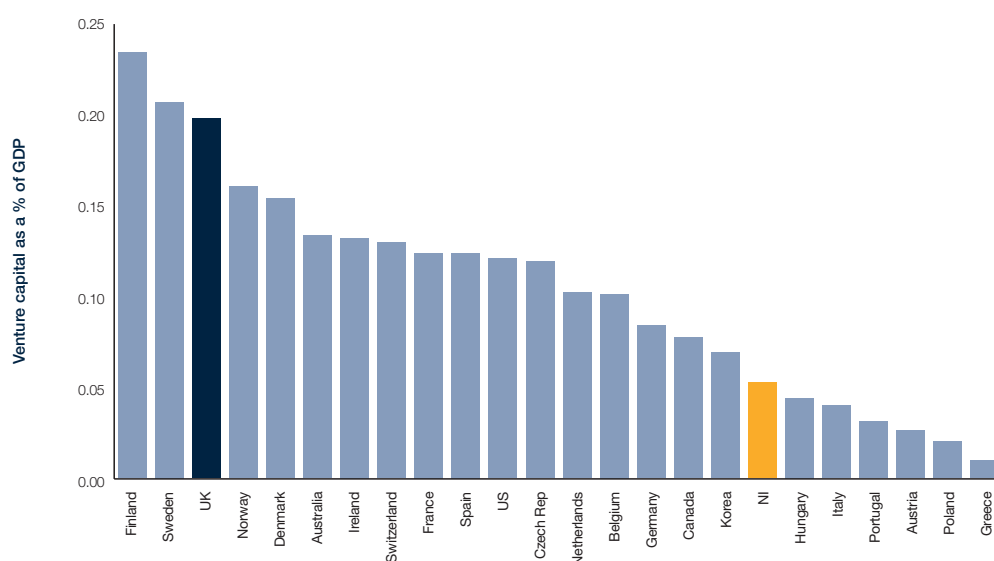
Table 3.3: Venture Capital Investment, no. of companies and rate per 100,000 VAT registered businesses, 2008-2010

Region	Number of companies			%			No. per 100,000 VAT registered businesses (average 2008/2010)
	2008	2009	2010	2008	2009	2010	
North East	22	18	16	4.8%	4.9%	4.0%	31.5
London	78	90	93	17.1%	24.7%	23.4%	24.9
South East	74	81	70	16.3%	22.2%	17.6%	21.6
North West	79	16	31	17.4%	4.4%	7.8%	20.1
West Midlands	45	22	43	9.9%	6.0%	10.8%	19.9
Wales	13	30	26	2.9%	8.2%	6.5%	19.5
UK	455	365	397	100.0%	100.0%	100.0%	18.3
Scotland	33	17	24	7.3%	4.7%	6.0%	18.0
Northern Ireland	18	7	14	4.0%	1.9%	3.5%	17.9
East of England	29	25	27	6.4%	6.8%	6.8%	12.1
South West	25	28	22	5.5%	7.7%	5.5%	12.0
Yorkshire and The Humber	28	13	13	6.2%	3.6%	3.3%	11.6
East Midlands	11	18	18	2.4%	4.9%	4.5%	10.1

Source: BVCA, Investment activity reports.

- Chartered Accountants Ireland Ulster Society gathered data on venture capital investment directly from active firms and the Irish Venture Capital Association (IVCA) and estimate in 2010 that the total level of investment was approximately £8million in Northern Ireland. The corresponding figures for BVCA are around £5million for 2010, which implies that the level is significantly underestimated using BVCA figures.
- When compared internationally Northern Ireland again ranks relatively low when benchmarked against other similar countries. Figure 3.4 illustrates that venture capital investments were substantial in Finland (0.24%), Sweden (0.21%) and the UK (0.20%).

Figure 3.4: Venture Capital investment as a % of GDP, 2008



Note: The OECD defines here venture capital as the sum of "seed/start-up stages" and "early development and expansion stages".
Source: OECD, BVCA, Oxford Economics.

- Northern Ireland lags behind the UK with Venture Capital investment representing just 0.05% of GDP. Venture Capital Investment is also much lower in Northern Ireland than in Ireland (0.13%) and other small open economies such as Norway (0.16%), Denmark (0.16%) and Switzerland (0.13%).

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Private equity investment by sector

- In 2010 in the UK the sectors with the highest investment were Healthcare & Consumer Services, followed by Technology and Oil & Gas. In Northern Ireland investments were also highest in these sectors.

Table 3.4: Private Equity Investment by industry sector and region (UK) – Number of Companies, 2010

Region	Oil & Gas, Basic materials & Industrials		Consumer Goods		Health care & Consumer services		Telecoms, utilities & financials		Technology		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
London	34	15.6%	11	20.4%	80	30.9%	27	39.7%	60	27.4%	0	0.0%
South East	35	16.1%	5	9.3%	40	15.4%	9	13.2%	34	15.5%	2	40.0%
South West	10	4.6%	6	11.1%	13	5.0%	3	4.4%	14	6.4%	0	0.0%
East of England	8	3.7%	3	5.6%	11	4.2%	0	0.0%	25	11.4%	0	0.0%
West Midlands	20	9.2%	4	7.4%	27	10.4%	5	7.4%	14	6.4%	2	40.0%
East Midlands	10	4.6%	4	7.4%	8	3.1%	5	7.4%	10	4.6%	0	0.0%
Yorkshire & The Humber	27	12.4%	3	5.6%	12	4.6%	1	1.5%	7	3.2%	0	0.0%
North West	21	9.6%	2	3.7%	23	8.9%	7	10.3%	12	5.5%	1	20.0%
North East	22	10.1%	6	11.1%	9	3.5%	4	5.9%	5	2.3%	0	0.0%
Scotland	18	8.3%	4	7.4%	12	4.6%	6	8.8%	21	9.6%	0	0.0%
Wales	10	4.6%	4	7.4%	18	6.9%	1	1.5%	8	3.7%	0	0.0%
Northern Ireland	3	1.4%	2	3.7%	6	2.3%	0	0.0%	9	4.1%	0	0.0%
UK	218	100%	54	100%	259	100%	68	100%	219	100%	5	100%

Source: BVCA, Investment activity report 2010.

3.2 Mergers & Acquisitions (M&A) and Equity Capital Market (ECM) deal activity levels

- The following table shows the regional M&A and ECM deal activity for 2009 and 2010 for each UK region and ROI, including in terms of deals per million inhabitant (using Experian Corpfm data). This data covers M&As and ECM deals covering flotations, rights issues and placements investments. There is some overlap with the private equity investment in that M&A activity also covers MBO/MBI.
- The largest volume of deals takes place in Greater London whilst the number of deals is also high in the South West (which includes the Channel Islands linked to its finance sector), the North West, the Midlands and the South East (which for the last three because they are large regions). In Northern Ireland the number of deals in 2009 was slightly higher at 47 compared to 32 in 2010.
- The regions with the largest number of deals per 100,000 VAT registrations in 2010 (taking account of the size of the regions) were London and Yorkshire but the rate was also high in the South West and East Anglia. The rate of deals per 100,000 VAT registered businesses in the South East, North West and the Midlands is much lower than other regions. Northern Ireland has the lowest level of activity of all comparator regions and ROI.

Table 3.5: Regional M&A and ECM deal activity by value (£m), volume (no. of deals) and no. of deals per 100,000 VAT registrations

Region	Value (£m)		Volume (no of deals)		Volume per 100,000 VAT registrations	
	2009	2010	2009	2010	2009	2010
Greater London	129,822	127,880	1,539	1,312	4,562	3,342
Yorkshire	5,123	5,987	549	504	3,601	2,684
South West	21,139	19,150	579	589	2,859	2,460
East Anglia	21,329	19,150	579	589	2,657	2,327
North East	1,161	3,084	146	148	2,542	1,948
Scotland	74,831	19,649	361	365	3,924	1,888
South East	16,415	36,129	511	483	1,507	1,224
North West	1,630	4,109	307	304	1,449	1,189
Wales	389	267	105	108	720	957
Midlands	3,647	1,741	208	205	640	533
Northern Ireland	93	1,380	47	32	666	380
UK	275,579	238,526	4,931	4,639	2,291	1,802

Source: Corpfm-Experian.

N.B value of deals only captures the reported value and therefore does not capture all deal activity (compared to the volume).

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- The value of deals, although displayed for context, does not capture the full values of all deals as some are not disclosed. Therefore the only data that should be monitored is the volume of deals.
- In addition the list below are examples of the deals that have taken place in Northern Ireland in 2009 to present, collected from NISP stakeholders:
 - Ten Alps acquiring Below the Radar Ltd, a Belfast company specialising in current affairs programming and Country Link Media, Belfast, the production company behind forthcoming public sector online TV channel, Fermanagh TV. Both deals were in 2009.
 - Belfast-based multimedia company Galleon Holdings, raising £3.85m via a share placing, in 2009.
 - Dublin-based Electricity Supply Board agreed to acquire Belfast-based Northern Ireland Electricity Plc for £1.034billion, which was a very large investment dominating the figures in 2010 (and which appeared in the private equity investment data).
 - Acquisition by Surrey-based AES Ballylumford Holdings Ltd of Ballylumford (Northern Ireland)-based Premier Power Ltd, in 2010.
 - £4.03million acquisition by Cambridge based CSR Plc of Belfast-based APT Licensing Ltd in 2010.
 - Lagan Technologies was sold to Kana Inc in November 2010 for £28m.
 - The Hardware division of APT was sold in March 2009 to the Audemat Group for £5.6m.
 - The recent acquisition of gem by Concentrix Corporation (US). gem is a European-based provider of customer contact solutions that supports a global customer base in 28 languages from locations in Belfast, Northern Ireland and Debrecen, Hungary.

3.3 Business Angel investment

- Another source of private equity finance is business angels. These are high net worth individuals who invest their own money, either alone or with others, directly in unquoted businesses in which there is no family connection. Business angels have long been recognised as an important source of finance for entrepreneurial businesses, particularly at their start-up and early growth stages where the amounts required are too small to be economic for venture capital funds to invest.
- There are two Treasury backed schemes, Enterprise Investment Scheme (EIS) and Venture Capital Trusts (VCT), which provide tax incentives to encourage individuals to invest in small, higher risk trading companies.
- The most recent Annual Report on the Business Angel Market in the UK¹³ reports figures for the UK, which have been supplemented by NI Halo and are displayed below:

Table 3.6: Business Angel Investment

Region	No. of deals		Angel Investment, £m		Inv/head per capita, £	
	2008/09	2009/10	2008/09	2009/10	2008/09	2009/10
England & Wales	233	238	£44.9	£42.3	£0.8	£0.8
Scotland	74	78	£17.9	£18.2	£3.5	£3.6
Northern Ireland	0	8	£0.0	£0.8	£0.0	£0.4
UK	307	324	£62.8	£61.3	£1.0	£1.0

Source: BBAA BIS Reports, NI Halo

¹³ Annual Report on the Business Angel Market in the UK, Colin M Mason (Hunter centre for Entrepreneurship, Strathclyde Business School, University of Strathclyde) and Richard T Harrison (Queen's University Management School, Queen's University of Belfast), BIS, May 2011.

- Overall, total business angel investment in the UK was £61.3million in 2009/10, for 324 investments in total. The level of angel investment in Northern Ireland since 2008/09 has been very small (compared to VC also), however, NI Halo reports that for 2010/11 total investment was £2.16m with a total of 11 deals. This puts investment per head per capita at £1.26, which is a significant increase – which is in line with the UK average.
- The NI Halo business angel network was restarted after a gap of more than a year in 2009, which explains the sudden increase. The figures for 2010/11 were not driven by one particular strong investment with 2 deals of over £500,000 each and a number of smaller investments. NI Halo report that in a previous scheme similar to NI Halo angel investing totalled £1m over a 3 year period (2005 onwards), however, one single deal amounted for 66% of this. This demonstrates that the landscape may be starting to change with a higher volume of deals.
- In Scotland the business angel network model is different, comprising 20 self controlled angel syndicates supported by Link Scotland. Investment by these business angel syndicates is supported by the Scottish Co-investment Fund, administered by the Scottish Investment Bank. The availability of this funding has increased the ability of angel investors to do more deals and to undertake follow-on investments in existing portfolio companies. Scotland is renowned for having been successful at generating angel investment and is recognised as a best practice region in Europe (with even the US visiting the area as a best practice case study).

3.4 Public companies

- The main advantage that public traded companies have over privately traded companies is probably access to ongoing finance, through raising additional funds at an efficient market price. Prior to publicly traded corporations it was very difficult to obtain large amounts of capital for private enterprises. Other advantages include access to knowledge as external investment often plays a significant role in accelerating the improvement of systems and practices and attraction and retention of staff, through the use of share options and other financial incentives.
- Loughshore Investments have provided information about the number of registered companies on the London Stock Exchange (LSE) and AIM (LSE's international market for smaller growing companies). There are only three companies headquartered in Northern Ireland listed as public companies:
 - Andor Technology
 - First Derivatives plc
 - UTV Media plc
- Northern Ireland accounts for only 0.14% and 0.02% of total publicly listed companies and market capitalisation in the UK. This compares poorly to other regions of the UK and the Republic of Ireland. The market capitalisation¹⁴ per head for Northern Ireland of £170 is very low compared other UK regions and the ROI.

¹⁴ Market capitalization is an estimation of the value of a business that is obtained by multiplying the number of shares outstanding by the current price of a share.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Table 3.7: Publicly listed companies across the UK (LSE and AIM), 2010

Region	No. of companies	Market cap, £m	% total companies	% total Market cap	Market cap per head
London	800	£1,270,175	38.4%	68.1%	162,319
South East	150	£193,016	7.2%	10.3%	22,646
Scotland	129	£75,838	6.2%	4.1%	14,522
East	120	£66,883	5.8%	3.6%	11,469
South West	67	£40,659	3.2%	2.2%	7,710
Midlands	91	£29,754	4.4%	1.6%	2,994
North East	110	£28,599	5.3%	1.5%	3,617
North West	108	£10,388	5.2%	0.6%	1,498
Wales	12	£4,673	0.6%	0.3%	1,554
Northern Ireland	3	£306	0.14%	0.02%	170
UK Total	2058	1,825,941	98.9%	97.8%	29,327
Republic of Ireland	60	£33,122	100%	100%	7,409

*Source: Loughshore Investments, using company listings from LSE and AIM. Population figures from ONS mid year population estimates (2010).

- There are a number of companies worth mentioning which showcase that the area has produced a number of globally competitive firms. The following companies are either public listed companies that no longer have HQ in Northern Ireland (following acquisitions) or were formally public listed companies (before acquisitions): Tayto, Hilton Foods, Moy Park¹⁵ and Viridian.

¹⁵ Now listed on São Paulo stock exchange under parent company Marfrig.

3.5 Summary

- The capital flows of investment into Northern Ireland are comparatively very low against the three measures used here- private equity investment flows, M&A and ECM deals and business angel investment. Although the BVCA data does not capture all private equity investment it does provide an updatable source for monitoring capital flows in the region.
- In knowledge-based economies, economic growth and job creation increasingly depends upon successful innovation, meaning that the results of research and development (R&D) must be effectively translated into commercial outcomes. Access to finance is seen as a key factor in this process of innovation and facilitating the interaction between venture capital and start ups is an important pillar of the CONNET programme. The facilitation of investment through venture capitalists was a vital component of the San Diego transformation.
- There is a strong need to understand and track more closely the supply of VC funds in Northern Ireland, which should be co-ordinated for future updates of the CONNET report.
- It is recommended that the following indicators should be taken forward as the nearest possible measures to the original CONNET key innovation metrics.
- In addition it is recommended that data is still collected for the level of business angel investment in Northern Ireland (this is not a key innovation metric as regional data is unavailable).

Table 3.8: CONNET - key innovation metrics

San Diego: CONNET Key Innovation Metrics	NISP CONNET: Key Innovation Metrics (NI & all UK regions)	Source
Venture Capital Investment Merger & Acquisition Investment Private placement investment Initial and follow-on public equity offerings	Number of private equity investments number of companies	BVCA
	Number of private equity investments per 100,000 VAT registered companies	BVCA
	Number of venture capital investments per 100,000 VAT registered businesses	BVCA
	M&A activity: Number of M&A and ECM activity per 100,000 VAT registered businesses	Corpfm-Experian
	Public listed companies: market capitalisation per head	LSE

4 R&D and research activity

- This chapter examines the levels of R&D and research activity across the Northern Ireland economy, compared to other UK regions and international comparators.
- The San Diego CONNECT programme uses the following key metrics in relation to research:
 - Federal research grants
 - Private research employment and wages.
- The first of these captures the level of research being won by companies and institutions from federal research bodies in the most relevant sectors- the National Institutes of Health (NIH), National Science Foundation (NSF), National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA) and Department of Defence. This innovation metric is not straightforward to apply to Northern Ireland as data breakdowns of research contracts by sector are not easy to collate¹⁶. Instead the analysis focuses on the total levels of research grants and contracts in Northern Ireland and more general indicators around the levels of R&D in the region and the sources of R&D spend.
- For the second indicator we propose using the overall level of personnel employed in R&D as a proxy measure.

4.1 Research & Development (R&D)

4.1.1 Importance of R&D

- It has long been recognised that firms benefit from R&D undertaken by other firms and institutions (spillovers) as well as from their own research. A recent UK study suggests that a doubling of a firms R&D activity would lead to an increase of 7-13% in productivity (measured in terms of company sales)¹⁷.
- This has led the UK Government's economic strategy to place an increased emphasis on reversing the long-term under-investment in the UK's science base, support knowledge transfer between higher education institutions and firms, and address market failures in business investment in R&D.

4.1.2 R&D intensity – a UK perspective

- In 2009 Northern Ireland's total expenditure on R&D equated to 1.7% of regional GDP, ranking it 8th of the 12 UK regions with regard to R&D intensity. Northern Ireland ranks below the UK (2.1%), England (2.1%) and Scottish (1.9%) averages, but ahead of Wales (1.4%). The East of England (4.6%) is the most R&D intensive region with its industry structure weighted towards life sciences and high-tech manufacturing. London ranks lowest which is reflective of its business structure, which is weighted towards low R&D sectors such as finance and business services.

¹⁶ Although the two universities in Northern Ireland could feasibly report the number of grants won under Framework 7, Technology Strategy Board (TSB) and relevant research councils, these statistics could not be compiled for the benchmark areas.

¹⁷ Kafourous M and Buckley P J (2008) Under what conditions do firms benefit from the research efforts of other organisations? Research Policy 37 pp225-239. This was a study of productivity change 1995-02 based on a sample of 117 UK manufacturing firms which reported their expenditure on R&D. Around 60% of the sample were firms in hightech sectors and a similar proportion were in large rather than small firms.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Figure 4.1: Gross domestic expenditure on R&D (GERD), as % of GDP- 2009

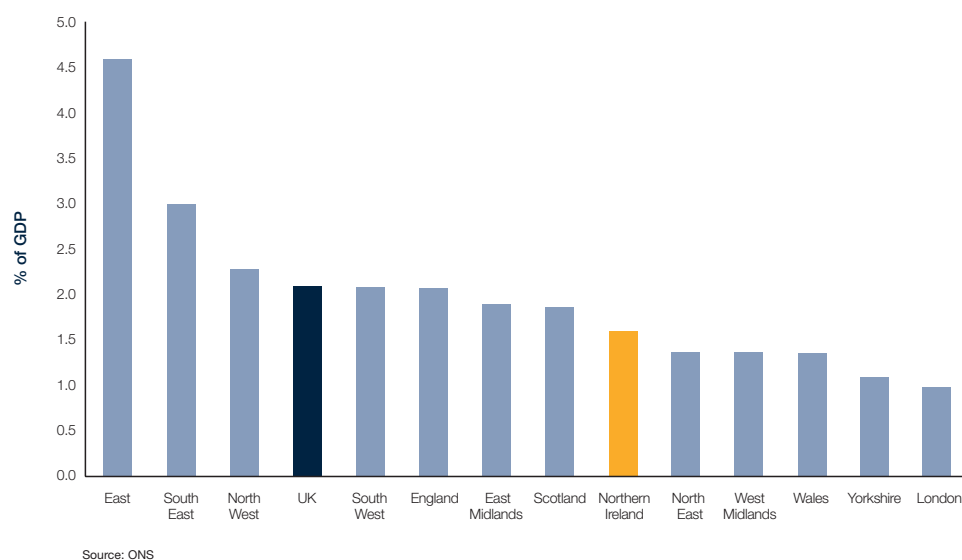
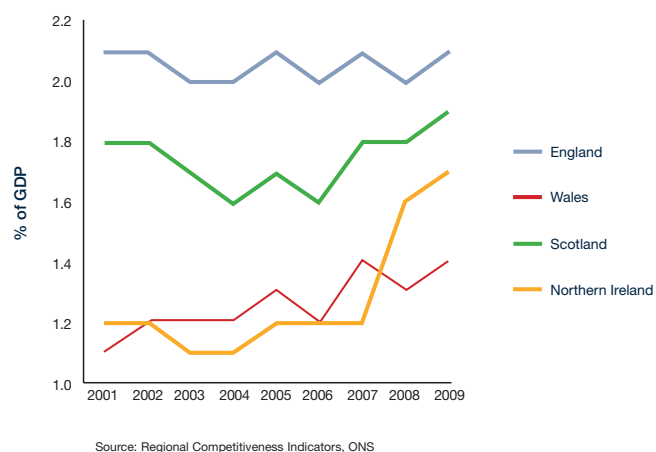


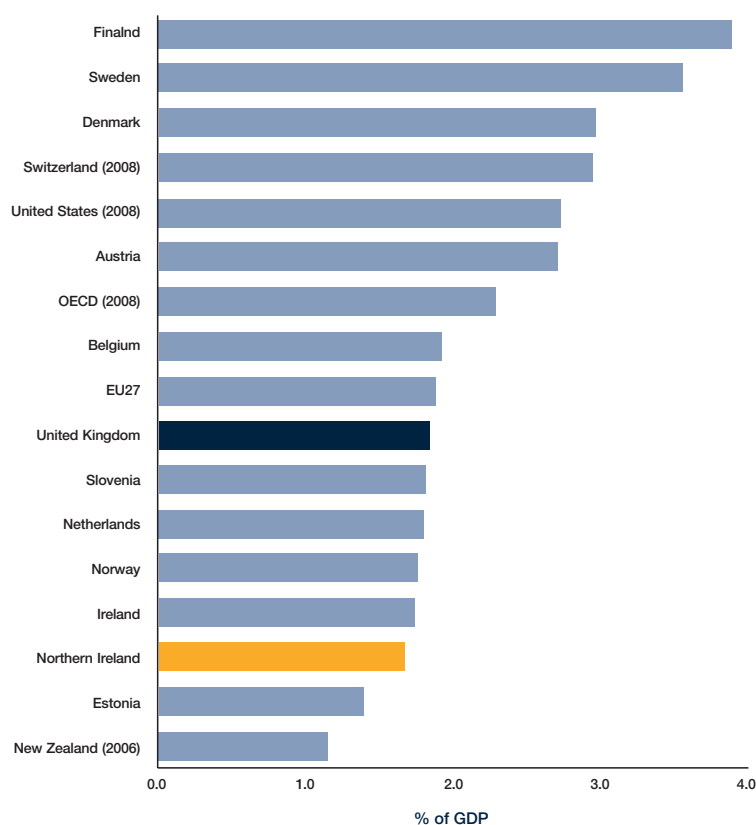
Figure 4.2: Gross Domestic Expenditure on R&D (GERD)- 2001-09



Northern Ireland Knowledge Economy Index: Baseline Report 2011

- Northern Ireland's expenditure on R&D oscillated between 1.1-1.2% of GVA in the six years to 2007. In 2008 this increased significantly to 1.6%, with Northern Ireland overtaking Wales and closing the gap on Scotland. In 2009 R&D intensity increased further to 1.7%, building upon the large increase experienced in 2009.
- When benchmarked against a range of comparable countries (i.e. small open economies) and also the OECD, EU27 and US for context, Northern Ireland is towards the bottom of the rankings for R&D intensity.
- Northern Ireland ranks marginally below Ireland (1.8%) and the UK (1.9%). However, Northern Ireland ranks significantly below the leading Scandinavian countries Finland (4%), Sweden (3.6%) and Denmark (3%).
- European Union signatories to the Lisbon Treaty accept the importance of R&D and have agreed to invest significantly to reach the target of spending 3% of GDP on it by 2010. Of the signatories, only Finland, Sweden and Denmark currently exceed the 3% figure. It is clear from the graph below that Northern Ireland is lagging significantly behind both the Lisbon Treaty target as well as other selected relevant countries.

Figure 4.3: Gross Domestic Expenditure on R&D- 2009

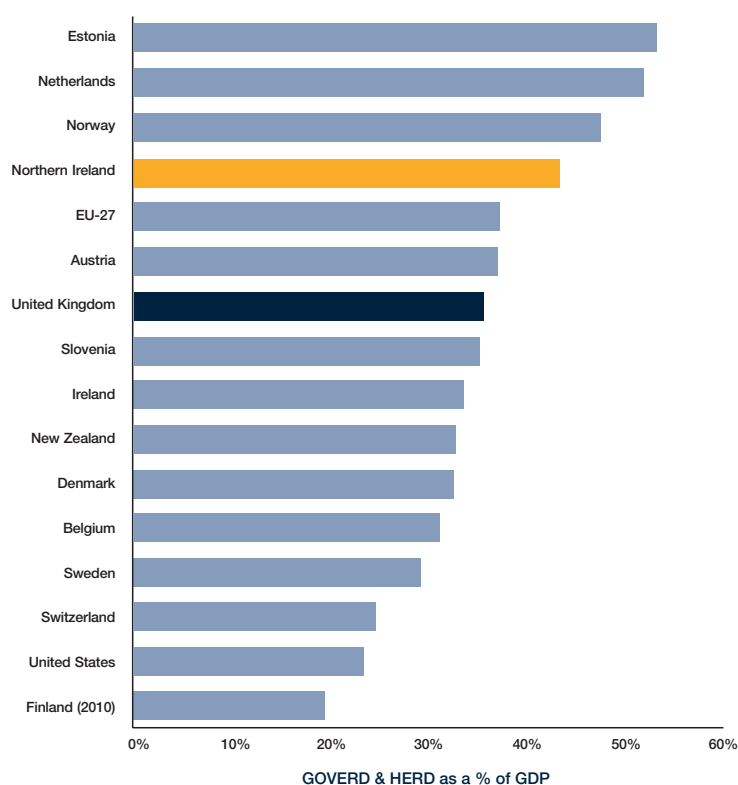


Source: OECD

4.1.3 R&D by Source

- The OECD classifies total R&D (GERD) by source - higher education (HERD), government institutes (GOVERD) and private industry (BERD). Of the three groups, BERD is regarded as making the largest contribution to productivity.
- The chart below shows the composition of GERD for selected economies.

Figure 4.5: GOVERD & HERD as % of GERD



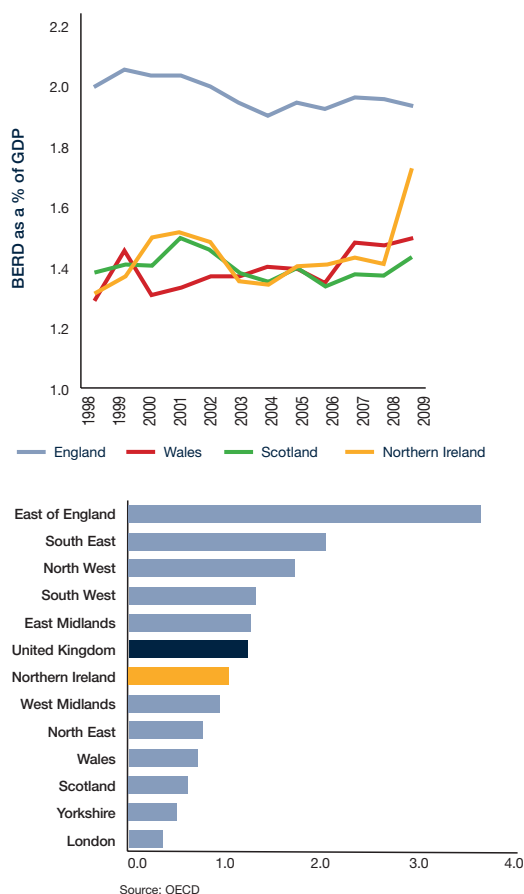
Source: OECD

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- In those economies with the highest levels of R&D, as a proportion of GDP, GOVERD and HERD account for relatively little of total expenditure on R&D, accounting on average for less than a quarter of GERD combined. In Northern Ireland, GOVERD and HERD account for 43% of total R&D expenditure in Northern Ireland.
- The level of HERD in NI is high at 30% of total GERD and well above the 20% average for most other countries and also above the UK average. This implies that most R&D activity is driven by the two large universities in NI rather than by business although it also likely that HERD makes up a high proportion of GERD as there are less Government Research Institutes, than elsewhere in the UK.
- BERD is generally regarded as the most important source of R&D, which is shown by the literature to have the most influence on productivity and economic growth¹⁸.
- Northern Ireland currently ranks 6th of the 12 UK Government Office regions when assessed on BERD as a proportion of GDP, which is fairly high given the level of R&D by HERD.
- Overall R&D expenditure grew sharply in 2009, driven by a growth in BERD. This is accounted for by a large increase (100.4%) in R&D expenditure in cash terms by the Manufacturing sector from £114.3m in 2008 to £228.9m in 2009.
- Northern Ireland is dependent on a relatively small number of companies for a significant proportion of R&D expenditure. The ten biggest spending companies accounted for 57% of the total R&D spend in Northern Ireland in 2009, higher than in 2008 (41%). This emphasises the point that Northern Ireland's R&D base is very low, as it only takes a change in R&D activity by one large firm to significantly shift Northern Ireland's BERD – this can be both a risk and an opportunity. It also implies that much of NI's innovation and R&D is concentrated in large firms rather than small companies that characterise innovative economies.

- The 2010 R&D Scoreboard, compiled by the Department for Business, Innovation and Skills (BIS) is the leading source of information and analysis on the world's top R&D active companies, both in the UK and globally. The Scoreboard lists the 1,000 UK companies investing most in R&D in 2009, of which 6 are present in Northern Ireland. These companies include the following: Glen Electric, Randox Laboratories, Norbrook Laboratories, F G Wilson, Andor Technology and Consilium (and for 2008 figures, Meridio). Most of these companies are large employers (over 250 employees) with the exception of Andor (190 employees), Consilium (83 employees) and Meridio (126 employees).

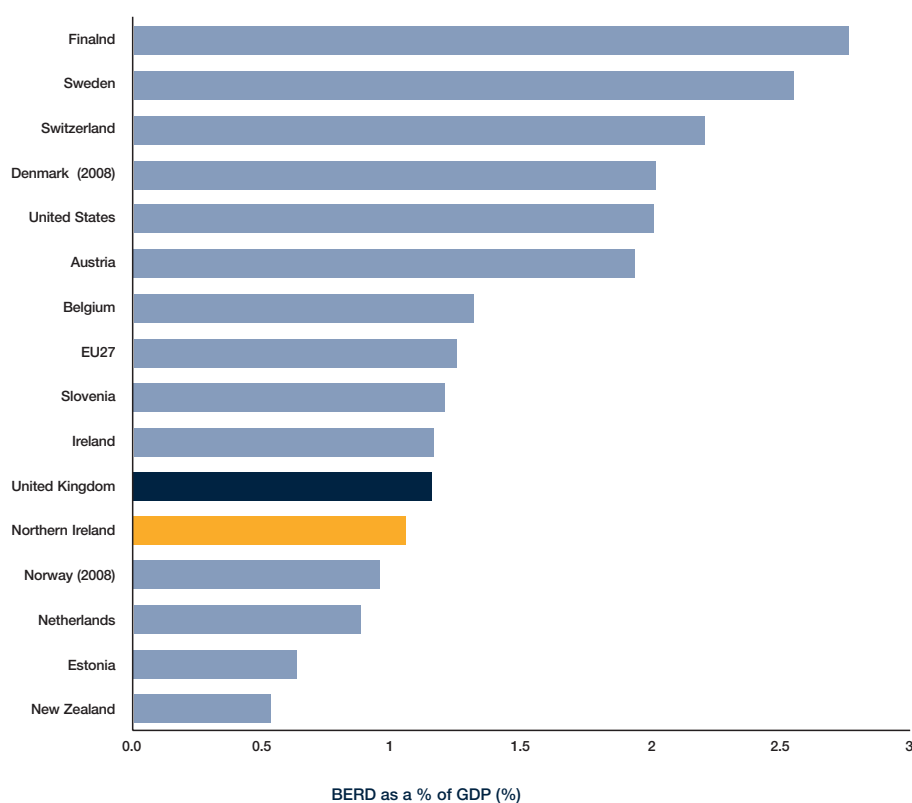
Figures 4.6 and 4.7: BERD as % of GDP, 2009



¹⁸ Spending by business on R&D (BERD) has a proven impact on productivity in the firms undertaking the research. Studies show less observable impact on national or regional productivity from public spending by government, where impacts are much more indirect and diffuse. However, in the literature the importance of BERD is generally over-rated. As NESTA shows, BERD only accounts for 7% of market sector investment in the UK, and only 12% of intangible investment contributing in the widest sense to innovation. Most econometric studies of the impact of R&D show that a residual productivity factor over and above the impact of a company's own R&D is more important than company R&D itself in raising productivity. This is assumed to capture the impact of 'spillovers' or generally available technological change beyond that generated directly by BERD.

- Sweden, Finland and Switzerland all exhibit high rates of BERD, greater than the US, and significantly higher than the UK or the EU-27 average. In the early 1980s the USA had the highest level of BERD. Since then first Switzerland and Sweden, and more recently Finland, have overtaken the USA and Austria has risen from a low base to a level now close to the USA. Finland has shown the greatest improvement, with BERD rising almost fivefold from 0.6% of GDP in 1981 to 2.7% today.
- It is not surprising that BERD is high in those countries with strong pharmaceutical, telecommunications and electronics industries. Switzerland, Sweden and more recently Finland all have globally leading companies which invest heavily in R&D. Pharmaceuticals is perhaps the most science-oriented sector, and countries with large pharmaceutical sectors are likely to have high levels of BERD. This is true of Switzerland where this sector accounts for approximately 40% of BERD (compared with 25% in the UK).

Figure 4.8: BERD as % of GDP

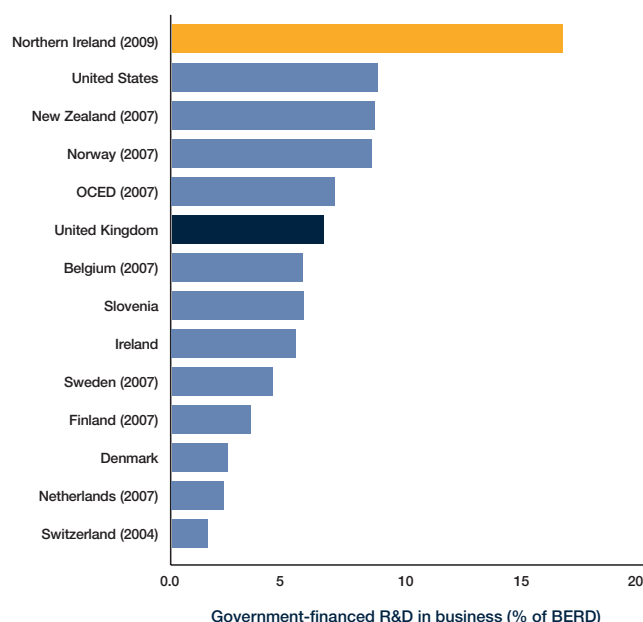


Source: OECD

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- Unlike most other countries, the UK's level of BERD has fallen as a percentage of GVA, and is now well below the US level. This reflects the decline in the share of manufacturing in the UK economy combined with large financial and business services sectors in which innovative activity is not always recorded as R&D and fast growth in financial & business service GVA.
- The chart below shows that most countries with high levels of BERD depend relatively little on public finance for private sector R&D. The fact that direct government support for R&D is low in much of Scandinavia and Switzerland suggests that private companies are willing and able to finance R&D themselves, and perhaps also that the policy framework is sufficiently supportive without direct financial aid.
- In contrast, companies in Northern Ireland depend on government support in financing BERD to a higher degree than elsewhere. Figure 4.9 highlights that the proportion of BERD financed directly by Government in NI is over twice the equivalent proportions for the UK and the OECD average.
- The level of R&D grants from Invest NI, the main source of government-financed R&D in business in Northern Ireland, was £41.5 million. This represented an average grant rate of 34% and total expenditure by those businesses receiving R&D assistance was £139.4m. Given total BERD R&D expenditure in 2009 was £323.7m approximately 43% of monies invested has received some element of grant funding.
- Almost three quarters of business expenditure on R&D in Northern Ireland is conducted by externally owned companies. Considering the fact that, on average, the Government funds 17 pence of every £1 spent of BERD this implies minimal spending on R&D by indigenous companies. Taking this into consideration Oxford Economics estimates that indigenous companies spending on R&D from their 'own funds' or 'privately raised finance' accounts for less than 15% of Gross Expenditure on R&D.

Figure 4.9: % of BERD financed by Government - 2008



4.1.4 R&D Personnel

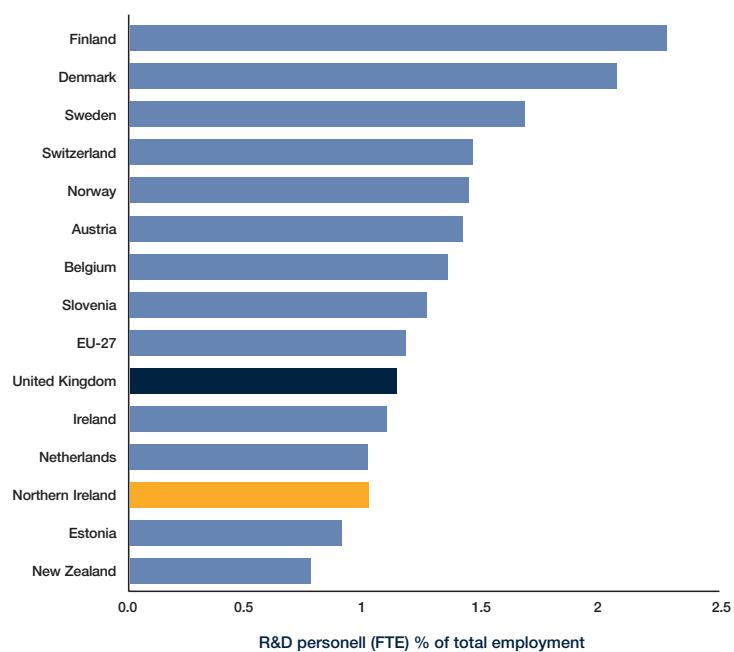
- Northern Ireland has increased its proportion of R&D personnel in the workforce marginally from 0.9% to 1.0% and is now ranked 8th of 12 UK regions. In line with expenditure data the top performing regions are the East of England and the South East, and the bottom performing regions are Wales and Yorkshire and the Humber. However, it is worth highlighting that London ranks third on this measure, but last on R&D expenditure as a percentage of regional GDP – this is as a result of having very high output in financial and business services which makes its proportionate expenditure on R&D appear small relative to other regions.
- In 2009 the Nordic countries had the highest levels of R&D personnel as percentage of total employment and Northern Ireland is substantially below these levels. However, at 1.0% the level of R&D personnel in Northern Ireland does rank above the Estonia and New Zealand, which highlights the importance of university employment and the potential for university-business collaboration (R&D personnel is broken down by researchers, technicians and other support staff).

Table 4.1: R&D personnel employed as a % of total employment

Sub category	2005	2006	2007	2008
Eastern	1.7	1.6	1.8	1.7
South East	1.6	1.6	1.6	1.6
London	1.1	1.2	1.2	1.2
East Midlands	1.1	1.0	1.2	1.1
Scotland	1.1	1.1	1.1	1.1
South West	1.1	1.1	1.1	1.1
Northern Ireland	0.9	0.9	0.9	1.0
North East	0.8	0.9	1.0	1.0
North West	1.0	1.0	1.1	1.0
West Midlands	0.9	1.0	1.0	0.9
Wales	0.9	0.9	0.8	0.8
Yorkshire and Humber	0.8	0.8	0.9	0.8
UK	1.1	1.2	1.2	1.2

Source: Eurostat

Figure 4.10: R&D personnel, as % of total employment - 2009



Source: Eurostat, OECD

4.1.5 Science and technology graduates

- A key factor in the future competitiveness of the knowledge economy in Northern Ireland (following the CONNECT sector definition) is the supply of skilled labour. The level of science and technology graduates within the workforce is a valuable indicator of the level of human capital available to support the knowledge economy.
- Using LFS data the number of science & technology degree holders¹⁹ as a proportion of total employment is lowest in Northern Ireland at 7.6% and significantly below the UK total of 10.2%.

Table 4.2: Science & technology graduates, as % of total employment, 2010

	Science & Technology (NVQ level 4 +)	Science & Technology (% of employment)
Scotland	315,405	13.1%
London	482,243	13.0%
South East	434,772	10.9%
East	274,377	10.2%
South West	239,726	10.0%
North West	290,946	9.5%
East Midlands	191,390	9.4%
North East	100,196	9.0%
West Midlands	199,573	8.6%
Wales	98,240	7.8%
Yorkshire and The Humber	179,686	7.7%
Northern Ireland	57,310	7.6%
UK	2,861,929	10.2%

Source: Using LFS. Science & technology graduates does not include medicine and related degrees.

¹⁹ Biological Sciences, Agricultural sciences, Physical/environmental sciences, Mathematical sciences and computing, Engineering & Technology.

4.2 Research undertaken by HEIs

4.2.1 Research grants & contracts

- The tables below present data on annual research output from Higher Education Institutions (HEIs) examining the amount of research grants and contracts obtained and the number of PhDs awarded.
- Overall HEIs in Northern Ireland have the smallest annual share of total research grants and contracts in the UK, accounting on average for around 2% of the total.

Table 4.3: Research grants & contracts, £000s, 2002-2009

Sub category	2002/03	2002/03	2002/03	2002/03	2002/03	2002/03	2002/03	Long run average share 2002/08, %
London	642,000	672,000	702,000	778,000	839,000	909,000	1,023,000	25.2%
South East	326,000	344,000	358,000	395,000	428,000	482,000	548,000	13.0%
Scotland	339,000	345,000	355,000	379,000	421,000	481,000	561,000	13.0%
East	210,000	225,000	240,000	267,000	306,000	330,000	353,000	8.4%
North West	245,000	260,000	278,000	90,000	296,000	335,000	361,000	8.7%
Yorkshire & the Humber	199,000	209,000	223,000	227,000	251,000	279,000	302,000	7.7%
West Midlands	130,000	143,000	164,000	170,000	175,000	189,000	211,000	5.4%
East Midlands	142,000	138,000	140,000	151,000	162,000	175,000	186,000	5.0%
South West	101,000	105,000	115,000	130,000	142,000	157,000	180,000	4.2%
Wales	94,000	96,000	104,000	119,000	127,000	142,000	156,000	3.8%
North East	87,000	89,000	101,000	98,000	110,000	122,000	136,000	3.4%
Northern Ireland	42,000	51,000	66,000	70,000	70,000	75,000	80,000	2.0%
Open University	14,000	8,000	8,000	10,000	12,000	14,000	15,000	0.4%
UK	2,570,000	2,687,000	2,855,000	2,882,000	3,340,000	3,689,000	4,113,000	100.0%

Source: HESA.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- Examining research grants & contracts on a per capita basis the level in Northern Ireland is higher at £44.7 per 1,000 population, which is higher than the South West (£34.3), the West Midlands (£38.9) and the East Midlands (£41.8) but much lower than the UK average. The per capita level in Scotland and London is very high compared to all other regions.

Table 4.4: Research grants & contracts funding per 1,000 population (£) 2002-2009

Sub category	2002/03	2002/03	2002/03	2002/03	2002/03	2002/03	2002/03
London	87.0	90.6	93.8	103.1	110.4	118.5	131.9
Scotland	67.1	68.0	69.7	74.0	81.8	93.1	108.0
South East	40.4	42.4	43.8	48.0	51.6	57.6	64.9
East	44.9	47.3	50.0	16.0	52.5	58.6	62.7
Yorkshire and the Humber	39.6	41.3	43.7	44.1	48.5	53.5	57.4
North East	34.1	35.2	39.6	38.2	43.1	47.6	52.6
Wales	32.0	32.6	35.2	40.0	42.6	47.5	52.0
North West	30.9	33.0	35.1	38.9	44.6	48.0	51.2
Northern Ireland	24.6	29.8	38.0	40.0	39.6	42.2	44.7
East Midlands	33.3	32.2	32.5	34.5	36.9	39.4	41.8
West Midlands	24.6	26.9	30.7	31.7	32.6	34.9	38.9
South West	20.1	20.9	22.7	25.3	27.4	30.1	34.3
UK	43.2	44.9	47.4	47.6	54.8	60.1	66.6

Source: HESA.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

4.2.2 Research activities

- Expressed as a proportion of total university income collaborative research activities involving public funding is much higher in Northern Ireland at 6.2% compared to the rest of the UK (2.8%). The level of university income from business and community services is also very high compared to the UK, which is driven by income from regeneration and community schemes representing ERDP and other EU monies. Although within this category the proportion of total income derived from facilities and equipment services from Northern Ireland HEIs is also higher than elsewhere in the UK (at 1.2%

compared to 0.4%). The income derived from consultancy contracts is lower than the UK at 1%, although on a par with Wales.

- Interestingly the proportion of income from intellectual property is the highest of all provinces of the UK although this could be skewed by the smaller sample base of universities and those in England may receive more relative income from students for instance (particularly foreign students). However in absolute terms income from IP is higher than Wales and not far behind Scotland, which implies that QUBIS and Ulster Innovation are successful university spin out organisations.

Table 4.5: University income from research activities, £000s and % of total income, 2009/10

Sub category	NI	Scotland	Wales	England	UK
Income from collaborative research involving public funding	32,500	103,800	48,200	564,400	748,800
Total value of contract research	18,200	92,900	29,400	843,000	983,500
Business and community services	33,800	125,300	60,100	1,052,200	1,271,300
Intellectual Property	4,100	6,300	1,600	45,900	57,900
Total income	521,000	2,803,900	1,235,700	22,235,200	26,795,800
As a % of total income Income from collaborative research involving public funding	6.2%	3.7%	3.9%	2.5%	2.8%
Income from contract research	3.5%	3.3%	2.4%	3.8%	3.7%
Business and community services	6.5%	4.5%	4.9%	4.7%	4.7%
Intellectual Property	0.8%	0.2%	0.1%	0.2%	0.2%

Source: HESA HE Business and Community Interaction Survey 2009/10 and Finances of UK HE institutions

Table 4.6: University income from business and community services by sub-category, as % of total income, 2009/10

Sub category	NI	Scotland	Wales	England	UK	2007/08
Consultancy contracts	1.0%	1.6%	1.0%	1.4%	1.4%	400
Facilities and equipment related services	1.2%	0.6%	0.1%	0.4%	0.4%	325
Courses for business and the community	1.4%	1.9%	2.8%	2.2%	2.2%	278
Income from regeneration and development programmes*	2.9%	0.4%	1.0%	0.8%	0.8%	277

Source: HESA HE Business and Community Interaction Survey 2009/10 and Finances of UK HE institutions

4.3 Number of PhDs

- The table below presents the number of PhDs expressed on a per million inhabitant basis. The data on PhDs relates to all subject areas. The rate at around 230 in Northern Ireland is on par with the North East but lower than all other regions except the South West and the West Midlands. The rate in London is particularly high due to the large amount of in commuting.

Table 4.7: Number of PhDs awarded per million inhabitant (2002-2009)

	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
London	327	357	345	419	435	400	448
Scotland	311	313	344	331	348	325	341
Yorkshire & the Humber	268	278	263	262	299	278	293
East	267	273	276	113	300	277	282
South East	248	258	254	255	261	258	267
East Midlands	214	196	242	236	287	250	257
Wales	207	184	222	203	220	224	247
North West	209	217	223	218	242	231	239
North East	207	213	245	239	264	214	232
Northern Ireland	223	202	226	241	225	220	232
West Midlands	211	215	207	188	204	190	193
South West	145	156	147	156	171	151	173
UK	245	251	259	249	284	263	279

Source: HESA.

57

4.4 University spin off activity

- The HE Business and Community Interaction Survey shows that approximately 2,700 new spin-off companies were set up in 2009/10 in the UK to exploit intellectual property originating in higher education institutions (HEIs). There are 4 categories of spin offs from the survey - spin-offs with some HEI ownership, formal spin-offs, not HEI owned and staff start-ups. Of this the vast majority of new start-up companies (2,423) were set up by staff and recent graduates of HEIs. Unfortunately, in Northern Ireland spin off activity is only captured for the first of these categories and the data is compared to England, Wales and Scotland below.
- The level of university spin offs with some HEI ownership for 2008/09 was fairly high on a per million inhabitant basis but for 2009/10 was below the UK average. Ideally examining total spin offs across all categories would be more appropriate for the CONNECT metrics and it should be investigated further why figures are not collected for graduates, staff and formal spin offs.

Table 4.8: Number of new university spin offs per year - with some HEI Ownership

	Total spin offs		Per million inhabitant	
	2008/09	2009/10	2008/09	2009/10
NI	8	5	4.5	2.8
Wales	7	10	2.3	3.3
Scotland	12	23	2.3	4.4
England	154	168	3.0	3.2
UK	181	206	2.9	3.3

Source: HE Business and Community Interaction (HE-BCI) Survey, 2008/10, HESA and QUBIS and University of Ulster.

4.5 Summary

- In Northern Ireland overall R&D expenditure (GERD) has traditionally been low, measured as a proportion of GDP relative to other UK regions. In recent years Northern Ireland has overtaken Wales and narrowed the gap with Scotland demonstrating significant progress in this area. Although expenditure on R&D by businesses accounts for the highest proportion of R&D expenditure by international standards the proportion is low and expenditure by government and higher education is higher. Furthermore almost three quarters of business expenditure on R&D is conducted by externally owned companies and the government funds a large proportion of the total expenditure by businesses (16%).
- The level of university funding per capita through research grants and contracts has improved over the past 10 years. However, it remains well below the UK average. Interestingly university income data illustrates that intellectual property and business and community services and collaborative research income account for a greater proportion of income than England, Scotland and Wales. Although within business and community services consultancy contracts with business in the HE sector are low.
- The number of PhDs per million inhabitants is low in Northern Ireland compared to the UK average although above a number of regions. The level of university spin-offs are difficult to assess against the UK and it is recommended that the collection of graduate, staff and formal spin-offs is organised to monitor these more effectively for future updates.

Table 4.9: CONNECT - Key innovation metrics

San Diego: CONNECT Key Innovation Metrics	NISP CONNECT: Key Innovation Metrics	ROI
(NI & all UK regions) Private sector research employment	Source	ONS
	R&D (BERD) as % of workplace based GVA	ONS
	R&D personnel as % of total employment	Eurostat
	Number of PhDs per million inhabitant	HESA
	Science & technology graduates as % of employees with degrees	LFS
	HEI Research grants and contracts per 1,000 population	HESA

5 Patent activity

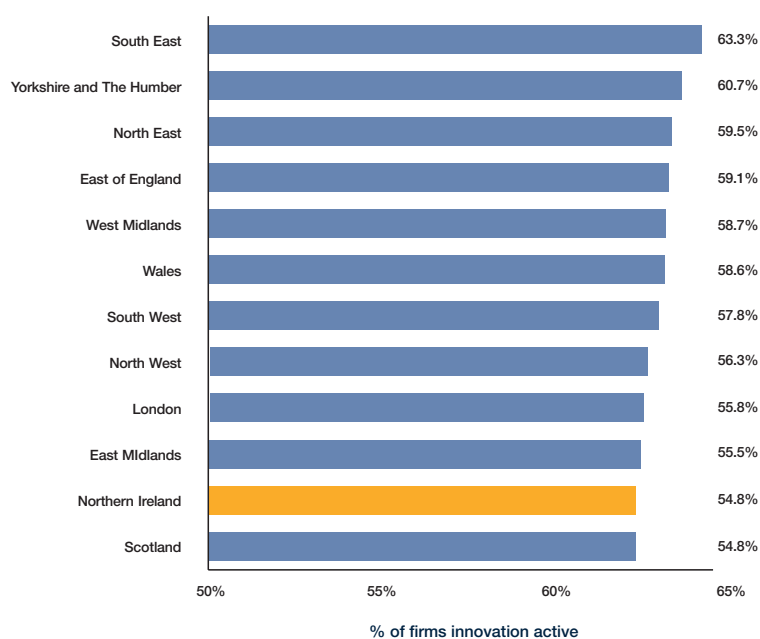
- This chapter examines patent activity in Northern Ireland. The San Diego CONNECT programme measures patent density – the number of patent applications and patent grants per 100,000 residents. This measure is used by the CONNECT programme as a proxy for the level and pace of innovation in the region.
- Patent data (particularly grants) is not as accessible in the UK, however, the OECD does provide data on patent applications to the European Patent Office (EPO), which are the focus of analysis here. In addition a recent study by DETI provides a further overview of patent activity in Northern Ireland. As a precursor the level of companies reporting that they are innovation active is provided for context.

5.1 Innovation activity

- The UK Innovation Survey²⁰ provides information on the level of 'innovation active' businesses by region. Innovation activity is defined here as where enterprises were engaged in any of the following:
 - Introduction of a new or significantly improved product (goods or service) or process;
 - Engagement in innovation projects not yet complete or abandoned; and
 - Expenditure in areas such as internal research and development, training, acquisition of external knowledge, or machinery and equipment linked to innovation activities.

²⁰ This data is to be supplemented with international comparisons. The UK Business Innovation Survey forms the UK's submission to the EU Community Innovation Survey

Figure 5.1: Percentage of firms reporting that they were innovation active, 2009



Source: UK Business Innovation Survey 2009, BIS

- In Northern Ireland slightly more companies reported themselves product innovators (16.8%) than process innovators (10.6%). For both categories there was a lower proportion of companies reporting 'yes' than any other UK region.

5.2 Patent activity

5.2.3 Context

- Historical patent data is a good source from which to examine technological change as it can be interpreted as an output from R&D. Although they do not cover every kind of innovation, they do include many of them. Patents have become one of the most widely used sources of data in the construction of indicators of inventive output, as they are closely linked to invention and provide detailed information in relatively long time series.
- Nevertheless, patent indicators also have several shortcomings that should be highlighted. Two major drawbacks are that not all inventions are patented and not all patents have the same value. It is widely recognised that the value distribution of patents is skewed: a few patents have a high value, whereas a greater number have a lower value.
- In general, inventors first apply for a patent at their national patent office. Following this, they also have 12 months to apply to another patent office, such as the European Patent Office (EPO).
- The OECD produces regional statistics on patent applications to the European Patent Office (EPO) (derived from the EPO Patstat database) and those filed under the Patent Co-operation Treaty (PCT). Although patent applications are not always granted, each one nevertheless represents the inventor's technical efforts. Patent applications can therefore be considered as an appropriate indicator of inventive activities. It takes, on average, just over four years for a patent to be granted by the EPO.
- The following sections examine the patent activity in Northern Ireland in some detail (based on a key study prepared for DETI²¹) and then the OECD data in order to make comparisons between Northern Ireland and other UK regions.

21 Mapping Organisational Capabilities for Innovation and Competitiveness: Research Performance and Patenting in Small Open Economies, Bradford University School of Management, Manchester Institute of Innovation Research, Manchester Business School and University College Cork, Department of Economics, August 2009.

5.2.1 Northern Ireland patent activity – in depth study

- The study 'Mapping Organizational Capabilities for Innovation and Competitiveness' examines patent activity in Northern Ireland in detail by examining the EPO Patstat database in some detail²², against the ROI. The total number of applications, grants, inventors and patent owners are examined below including the rates per million inhabitants.
- Overall, the total number of patent applications is highest in the ROI, which at 4,026 per million inhabitants over the period 1999/08 is much higher than in Northern Ireland (2,714).

Table 5.1: Total applications, grants, inventors, and patent owners (1999-2008) and per million inhabitant (average population 1998-2008)

Patent activity	NI	Per million inhabitant	ROI	Per million inhabitant
Applications	2,714	1,585	16,183	4,026
Grants	1,310	765	5,647	1,405
Inventors	545	318	3,557	885
Patent owners	75	44	793	197

Source: Mapping organisational capabilities using Patstat. Supplemented with average population figures 1998-2008 from ONS and OECD.

- The study also examined the ratio of grants to applications to understand how successful organisations were when seeking patent protection. It reports the following ratios: 0.26 for the ROI and 0.32 for Northern Ireland²³. The number of patent grants by country has varied within the time period, although the average growth (reported in the study) has been higher in Northern Ireland than in the ROI.

²² The EPO database captures patent data for more than 160 countries and patent authorities, including important patent offices such as the US Patent and Trademark Office (USPTO), the Japanese Patent Office (JPO) and EPO. The analysis in the report is based on more than 50,200 patent records corresponding to patents for inventions with at least one inventor or assignee in Northern Ireland, Republic of Ireland, Singapore and New Zealand and granted during the ten year period between 1999 and 2008.

²³ These ratios are only valid for patent records included in Patstat at the point in time of the study's analysis and do not consider patents filed during this period but that are granted after July 2008.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Table 5.2: Total patent grants for country inventors or assignees

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average annual growth
Northern Ireland- total	100	103	79	138	131	150	163	175	154	161	8.5%
Per million inhabitant	60	61	47	82	78	89	97	104	92	96	
ROI- total	464	422	430	545	694	670	636	694	682	680	5.7%
Per million inhabitant	124	113	115	146	185	179	170	185	182	182	

Source: Mapping organizational capabilities using Patstat. Supplemented with average population figures 1998-2008 from ONS and OECD.

- The study also examined the differences between the number for country inventors and assignees²⁴. Overall for Northern Ireland the number of patents for inventors has always been higher than the number for assignees, which indicates to some extent that the share of local patent inventions are assigned to foreign entities.
- Most of the top 20 national patent assignees for Northern Ireland are companies. Randox Laboratories Ltd tops the analysis, which is a privately owned diagnostic reagent and equipment manufacturing company. The Queen's University of Belfast also has a high share of the country's grants at 10.1%. The top 20 national patent assignees for Northern Ireland are presented below, clearly advanced manufacturing and life sciences (including medical devices and pharmaceutical) companies account for a large proportion of patent grants.

²⁴ Assignee of patent is a person who holds, by a valid assignment in writing, the whole interest of a patent.

Table 5.3: Top-20 granted patent assignees from Northern Ireland (1999-2008)

Rank	Rank	Rank	Organization	Activity
1	85	11.5%	Randox Laboratories Ltd	Diagnostic reagent and equipment manufacturing
2	74	10.1%	The Queen's University of Belfast	University
3	66	9.0%	Short Brothers Plc	Aircraft components and engines company
4	33	4.5%	Norbrook Laboratories Ltd	Pharmaceuticals- veterinary and animal health medicines
5	32	4.3%	Camco Drilling Group Ltd	Mechanical engineering
6	28	3.8%	Uutech Limited	University of Ulster spin out company
7	24	3.3%	Valpar Industrial Limited	Plastic manufacturer
8	18	2.4%	Munster Simms Engineering Limited	Precision engineering (pumps and valves)
9	12	1.6%	European Components Co Limited	Transport equipment manufacturer
10	12	1.6%	Morphy Richards Limited	Professional appliances
11	10	1.4%	Glitspur Scientific Limited	Agriculture- bovine and equine (variety of care)
12	10	1.4%	Sepha Pharmaceuticals Limited	Pharmaceuticals
13	9	1.2%	Heartsine Technologies Limited	Medical Devices
14	9	1.2%	University of Ulster	University
15	8	1.1%	E.D. Medical Ltd	Biotechnology
16	8	1.1%	Expotech Limited	Transport equipment manufacturer.
17	8	1.1%	F.G. Wilson	Power generation
18	8	1.1%	T.G. Eakin Limited	Medical devices
19	8	1.1%	Ulster Carpet Mills	Manufacture of textiles
20	7	1.1%	Denroy Group Limited	Plastics manufacturer
	284	38.6%	Other 142 Assignees	n/a

Source: Mapping organisational capabilities using Patstat. Company activity listed by Oxford Economics.

- The analysis of patent grant inventors and ownership reveals that although there are more foreign owned granted patents in Northern Ireland the proportion of local inventors is much higher than foreign or local/foreign co-inventors. The majority of foreign assignees are reported as being from GB (10%), the US (9%), Ireland (8%) and

Canada (7%). In the ROI US ownership is much higher at 22%, which reflects the presence of more US corporations within the business base. Among the top foreign assignees for Northern Ireland patents are Nortel Networks (the Canadian telecommunications company) and Proctor & Gamble (US).

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Table 5.4: Patent grant inventors and ownership for selected countries (1999-2008)

	Local Assignee	Foreign Assignee	Local/ Foreign	Local Inventor	Foreign Inventor	Local/ Foreign
Northern Ireland	56.2%	46.7%	6.0%	86.7%	52.8%	39.5%
Republic of Ireland	59.8%	38.9%	5.2%	70.7%	56.8%	28.4%

Source: Mapping organizational capabilities using Patstat. Total share of local and foreign assignees/ inventors may exceed 100 percent due to collaborations (co-assignees or co-inventors) or add up to less than 100 per cent when no data for assignee country is available.

5.2.2 EPO Patent Applications – UK Regional Analysis

- In 2007, there were approximately 5,400 patent applications to the EPO in the UK. Over 1998/2007 the largest number of patent applications to EPO, by inventor address, has overwhelmingly been in the South East and East, accounting for around 38% of the UK total.

- With regard to patents filed per million inhabitants, the rates in the South West and the East are very high, which are evidently driving UK innovation activity. Although Northern Ireland's rate per million inhabitants is low compared to the other UK regions it has been consistently increasing over the period from a very low base in 1998.

Table 5.5: Patent applications per million inhabitants by UK region, 1998-2007

	1998	2002	2007
North East	60	56	51
North West	68	70	55
Yorkshire and the Humber	53	63	62
East Midlands	77	76	85
West Midlands	74	75	52
East	164	176	148
London	75	65	65
South East	144	163	151
South West	96	110	96
Wales	50	41	41
Scotland	59	64	73
Northern Ireland	14	23	35
UK	89	94	89

Source: OECD, EPO Patent applications by inventor.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- The rate of high technology patent applications per million inhabitant is lowest in Northern Ireland, but is very similar to levels in the North East, the North West and Yorkshire and the Humber and Wales. High technology patent applications in the UK are driven by the East and the South East, representing the significant strength in life sciences.

Table 5.6: High technology patent applications per million inhabitant, 1998-2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
East	111	113	103	123	100	92	84	84	74	70
South East	74	90	101	77	90	89	86	80	74	68
South West	50	69	68	71	55	50	52	44	41	41
UK	42	47	51	49	44	41	39	39	36	35
London	46	52	53	48	38	33	34	35	32	33
Scotland	32	28	34	44	35	35	34	35	36	31
East Midlands	23	29	30	27	22	21	16	24	18	22
Wales	17	16	19	23	16	16	16	14	12	15
North East	6	7	12	11	14	14	9	11	12	14
North West	23	20	26	18	18	14	13	17	12	14
West Midlands	20	18	23	23	23	22	18	13	18	14
Yorkshire and the Humber	10	23	23	21	17	15	15	16	11	13
Northern Ireland	8	10	16	20	12	12	19	12	18	12

Source: OECD, EPO Patent applications by inventor. High technology patents cover ICT, Biotechnology and Nanotechnology (data for environmental technology was not available).

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- Although the volume of patent applications from Northern Ireland on a per capita basis is very low encouragingly there is a high proportion of applications relating to high technology products/services. Indeed 14.3% of all patent applications over 1998-2007 were within Biotechnology, which was the highest of all regions. Therefore, within some of the fastest growing innovation sectors in the global economy, the Northern Ireland economy is punching above its weight and developing products designed to compete in export markets.

Table 5.7: ICT, Biotechnology and Nanotechnology patent applications as % of total patent applications over 1998-2007

	ICT	Biotechnology	Nanotechnology
South West	46.5%	4.8%	0.8%
London	43.7%	12.9%	0.8%
South East	43.5%	7.2%	0.8%
East	43.1%	11.2%	1.3%
Scotland	39.0%	12.8%	1.0%
Northern Ireland	31.2%	14.3%	0.5%
Wales	25.4%	10.3%	0.5%
West Midlands	24.0%	3.1%	0.6%
East Midlands	21.9%	5.3%	0.6%
Yorkshire and the Humber	19.4%	6.7%	0.7%
North West	17.8%	7.0%	0.7%
North East	13.8%	5.1%	0.9%
UK	35.9%	8.1%	0.8%

Source: OECD, EPO Patent applications by inventor.

5.2.3 EPO patents per million inhabitant by national economies

- The table below examines EPO patents per million inhabitants by national economy for 2010. In relative terms, Switzerland reported the highest number of patent applications per million inhabitants (441), followed by Sweden (319), Finland (250) and Denmark (233). The rate in the UK is much lower at 90 although in absolute terms accounts for the highest number of applications excluding the US.

- The OECD provides data on patent applications by selected high technology sectors to the EPO, which are highlighted below for 1998-2007 (2008 data is not yet available). Overall, ordered by ICT patent applications per million inhabitants the rate is particularly high in Finland (skewed by Nokia) at 1,365 and the Netherlands, Switzerland and Sweden (all above 800), which is significantly above the rate in the US (442) and the UK (338).

Table 5.8: EPO Applications and granted applications to the USPTO by country, selected years and selected countries

	Patent applications to the EPO			High technology patent applications to the EPO			Patents granted by the US		
	(number of patent applications)		(per million inhab.)	(number of patent applications)		(per million inhab.)	(number of patents granted)		(per million inhab.)
	2003	2008	2008	2003	2008	2008	1999	2004	2004
Switzerland	2,762	3,351	441	355	205	27	1,547	896	121
Sweden	2,029	2,928	319	456	337	37	1,816	540	60
Finland	1,278	1,327	250	578	199	38	1,199	636	121
Denmark	1,071	1,275	233	260	106	19	574	349	65
Austria	1,358	1,932	232	224	99	12	645	426	52
Netherlands	3,459	3,711	226	1,012	342	21	1,553	1,227	75
Belgium	1,340	1,519	142	278	205	19	805	484	46
EU-27	50,462	59,468	120	10,446	5,375	11	31,541	18,153	32
Norway	342	563	119	69	19	4	306	194	42
United States	32,601	31,602	104	11,150	2,967	10	105,015	83,784	283
United Kingdom	5,555	5,511	90	1,399	482	8	4,524	2,195	37
Iceland	31	28	89	13	2	8	33	18	62
Ireland	223	324	74	51	37	8	221	179	43
Slovenia	73	119	59	6	8	4	115	10	5
Estonia	11	35	26	7	1	1	5	8	6

Source: Science, Innovation and Technology in Europe, 2010, Eurostat. NI figures supplemented from OECD database. Data is available from Eurostat for national economies only. High technology patent applications are a subset of patents defined by Eurostat. A full definition is in Annex B.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Table 5.9: EPO Applications by selected technologies, 1998-2007 and per million inhabitants (average 1998-2007 population)

	ICT		Biotechnology		Nanotechnology	
	No. of applications	per million inhabitant	No. of applications	per million inhabitant	No. of applications	per million inhabitant
Finland	7,113	1,365	411	79	44	8
Netherlands	15,128	938	2,239	139	339	21
Switzerland	6,780	927	1,453	199	202	28
Sweden	7,996	892	1,194	133	143	16
US	127,801	442	33,990	118	3854	13
Denmark	2,358	438	1,727	321	43	8
Austria	2,924	359	721	88	75	9
United Kingdom	20,144	338	4,535	76	468	8
Belgium	3,397	327	1,402	135	140	14
Iceland	86	296	53	183	7	24
Norway	1,148	252	279	61	29	6
Ireland	909	228	170	43	18	5
New Zealand	378	94	260	65	10	3
Northern Ireland	161	94	74	43	3	2
Slovenia	106	53	42	21	8	4
Estonia	59	43	26	19	2	1

Source: EPO applications, OECD.

5.3 Summary

- Patent activity is used by CONNECT in San Diego as a proxy for the level and pace of innovation in the region. Over the past decade patent applications from Northern Ireland have been very low compared to all UK regions and internationally. They have also been dominated by a few organisations rather than across the economy.
- Encouragingly, although the volume of patent applications is very low those applications from biotechnology and ICT in Northern Ireland do account for high proportions of the total.
- The following key innovation metrics are proposed for monitoring the CONNECT programme, which can be updated on an annual basis.

Table 5.10: CONNECT - Key innovation metrics

San Diego: CONNECT Key Innovation Metrics	NISP CONNECT: Key Innovation Metrics (NI & all UK regions)	Source
Patent activity- applications and grants	% of firms stating that they are innovation active	CIS
	Number of patent applications per million inhabitant (to the EPO)	EPO
	Number of high technology patent applications per million inhabitant (to the EPO)	EPO

6 Conclusions

- The Northern Ireland Knowledge Economy Index: Baseline report 2011 is a status report on the health of the nation's Innovation performance and infrastructure. The report draws on current data to present an overview of specific trends in research, technology and innovation and show how Northern Ireland compares both regionally and internationally in specific areas. The key innovation metrics presented in the report are to be updated annually to track the health of the Northern Ireland knowledge economy.
- The CONNECT Programme, run from NISP, is based on the highly respected San Diego CONNECT initiative and focuses on fostering entrepreneurship by accelerating the growth of promising technologies and early stage companies.
- The intention is that the results will provide a greater awareness of how Northern Ireland ranks on key metrics and provide stakeholders of the CONNECT Programme with a body of evidence to assist in constructing an 'agenda for action' that the public and private sectors can use to help create the appropriate conditions for knowledge based growth in Northern Ireland. The list of key innovation metrics to be taken forward are summarised at the end of this Executive Summary in Table 1. The implications and key messages of the baseline report for the knowledge economy in Northern Ireland and those involved in the sector and the CONNECT initiative are summarised below.

6.1 Economic context

- In the past three years the Northern Ireland economy has suffered a contracting economy, a house price collapse, increased unemployment and an end to the growth in public expenditure. Due to its overreliance upon the public sector as an engine of growth over the past forty years the local economy is particularly exposed to the 'aftershocks' of the global recession.
- The current economic context is set against a backdrop of low consumer sentiment, cautious business investment, and an increasingly competitive market for internationally mobile companies and austerity measures in the public sector curbing spending growth.

- To recover and move towards a more sustainable growth path, new sources of growth are urgently needed that are based on innovation and trading internationally in global markets.

6.2 The innovation agenda in Northern Ireland

- The approach to Innovation policy in Northern Ireland is somewhat blurred. Although innovation is prominent in most Government strategy documents, the Regional Innovation Strategy for Northern Ireland was published almost a decade ago. Innovation is concentrated in high-tech industry which is dynamic, ever evolving and rapidly changing with new markets developing all the time. However, it is not only the industry that has changed – the Northern Ireland economy is fundamentally different than it was a decade ago and faces an entirely different set of challenges in today's global marketplace.
- The nature of government support is changing in Northern Ireland with the ability to provide grants to firms for capital projects through the Selective Financial Assistance Programme ending in 2013 and EU funding programs evolving in response to shifting economic priorities. With an ever more connected global economy providing ever more aggressive global competition the need to innovate and to look beyond local shores for opportunities is very evident. In aspects of the knowledge economy Northern Ireland holds a comparative advantage but the competition is increasing all the time. Developing this aspect of the economy which is harder for developing nations to compete for, at least initially, will be essential to ensuring economic growth and continued prosperity.
- In today's economic climate without the cushion of a public sector with an abundance of available finance, a strong innovation policy with a clear strategic direction led by the private sector is more important than ever.

6.3 Sizing the 'knowledge economy'

- The Northern Ireland economy is dominated by the public sector, which accounts for over a third of employment and has done since the start of the troubles. Therefore Northern Ireland, relatively, has a smaller private sector in comparison to other UK regions and correspondingly has one of the smallest 'knowledge economies' in the UK. The 'knowledge economy' in Northern Ireland is estimated to account for approximately 4.4% of total employment and 2.5% of the local business stock, compared to 5.7% and 7.1% respectively in the UK.
- Sectors in which Northern Ireland has a relatively large footprint in the 'knowledge economy' include 'transport and defence' with firms such as Bombardier and BE Aerospace located locally, and in the IT sector, particularly the 'manufacture of computing and electronics' and 'software & digital content'. There are also a number of leading 'life sciences' companies such as Almac and Norbrook embedded in the Northern Ireland economy.
- Despite the small nature of the 'knowledge economy' it plays a crucial role in the economy and is a key contributor to productivity growth. A Knowledge economy worker will, on average, earn a 52% wage premium above the Northern Ireland mean wage and average productivity is over double.
- Additionally, the 'knowledge economy' has wider economic impact through indirect and induced effects via business to business expenditure through the supply chain and consumer expenditure resulting from increased income. It is estimated that although the knowledge economy in Northern Ireland is relatively small at just 30,600, the sector supports an additional 27,000 jobs through indirect and induced effects. The ability to reduce imports in the supply chain provides the potential for even higher multipliers as the sector grows and attains a critical mass.

6.4 Investment Activity

- Access to finance is a key constraint for business-led innovation, which is inherently risky and may require a long-term horizon. Well-functioning

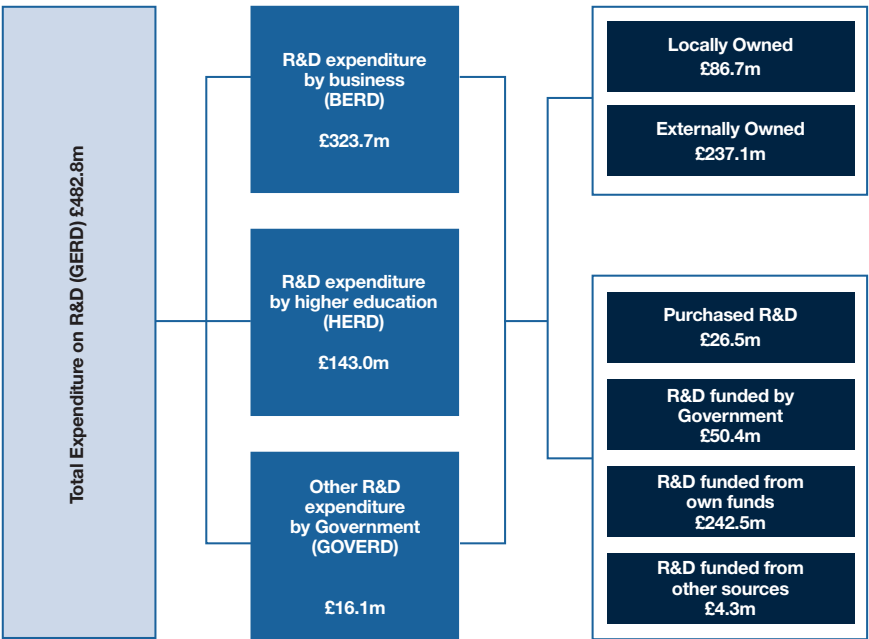
venture capital markets and other investment such as 'business angels' are key sources of finance for many innovative start-ups and need to be developed further. The facilitation of investment through venture capitalists was a vital component of the San Diego transformation and the CONNECT programme.

- The capital flows of investment into Northern Ireland are comparatively very low against all activity investigated- private equity investment flows, M&As and ECM deals and business angel investment.
- Access to finance is a key factor in the innovation process and facilitating the interaction between venture capital and start ups is vital to this. The supply of venture capital has not been comprehensively reviewed here and arguably the lack of supply of venture capital funds could be a key constraint on uptake, rather than lack of demand. The dynamics of the venture capital market should be explored further to understand how the levels of investment in Northern Ireland can be improved.
- Business Angel Investment is becoming an increasingly important source of private equity finance for local businesses. In 2010/11 Angel Investment has more than doubled from £0.8m in 2009/10 to £2.2m in 2010/11. The increase has been driven by a larger number of small deals.
- Northern Ireland is an economy based upon small to medium sized enterprises with 98.2% of businesses employing less than 50 people. There are currently only 3 publically listed companies from Northern Ireland. This compares to 60 in the Republic of Ireland and 129 in Scotland indicating that NI has much fewer 'leading' companies than would be expected after adjusting for its small population size. Similarly private equity investment at more mature stages of the business cycle (MBO/ MBI and Replacement Capital) is also very low.
- With small businesses being squeezed by stricter lending criteria in the aftermath of the global financial crisis, private equity finance through venture capital and business angel investment will become increasingly important for 'cash hungry' innovative businesses in the 'knowledge economy'.

6.5 Research and development activity

- The link between research and development (R&D) activity and innovation and the resulting impacts on productivity are well established in the economics literature, which is reflected in the increasing policy emphasis on R&D in both developed and developing economies across the globe.
- In Northern Ireland overall R&D expenditure (GERD) has traditionally been low measured as a proportion of GDP relative to other UK regions, varying between 1.1-1.2% of GVA in the six years to 2007. This compares to 1.8% and 3.9% in the ROI and Finland. However, in recent years Northern Ireland has overtaken Wales and narrowed the gap with Scotland demonstrating progress in this area.
- Overall R&D expenditure is dominated by Government (GOVERD) and higher education expenditure (HERD). In Northern Ireland this accounts for over half of R&D expenditure – which is extremely high by international standards. The schematic in Figure 1 below illustrates the structure of R&D activity in Northern Ireland.

Figure 6.1: The structure of R&D activity in Northern Ireland (2009, DETI)



- Companies in Northern Ireland depend on government support in financing BERD to a higher degree than other national economies. The proportion of BERD financed directly by Government in NI is over twice the equivalent proportions for the UK and the OECD average. Almost three quarters of business expenditure on R&D in Northern Ireland is conducted by externally owned companies. Considering the fact that, on average, the Government funds 17 pence of every £1 spent on R&D this implies minimal spending on R&D by indigenous companies – estimated at less than 15% of Gross Expenditure on R&D.
- In total the public sector accounts for 44% of all R&D spending in Northern Ireland, which is very high by international standards – and an unsustainable proportion if R&D spending in Northern Ireland is to reach levels comparable with leading innovative regions such as the Nordic countries or the United States. In other words, if R&D expenditure is to reach benchmarks close to those set by leading economies future spending on research and development will need to be driven by the private sector.
- The idea that ‘market failures’ related to access to finance lead to under-investment in research has long been the principal rationale for government funding of research and development (R&D). However, the presence of other failures that impede the operation of the innovation system can also constitute crucial obstacles to the effectiveness of the innovation effort (e.g. skills shortages).

6.6 Research activity in universities

- The level of funding per capita through research grants and contracts has improved over the past 10 years. However, it remains well below the UK average. Interestingly University income data illustrates that intellectual property, business and community services and collaborative research income account for a greater proportion of income than in England, Scotland and Wales.
- The latter point is increasingly important as innovation also rarely occurs in isolation. It is a highly interactive and multidisciplinary process and increasingly involves collaboration by a growing and diverse network of stakeholders, institutions and users. In small open economies firms and institutions often lack sufficient critical mass when trying to compete in global markets in isolation. However, industry-academic and inter-industry collaborations can often act as enablers for firms to compete in global markets that they would otherwise have been excluded from as well as the different skill profiles of different companies complementing each other in new product development.
- The major policy challenge is to recognise the essential role of universities in the innovation and enterprise rather view them simply as providers of essential public goods. This requires a greater focus of policy makers on ensuring independence, competition, excellence, entrepreneurial spirit and flexibility in universities. It also relies on increasing collaboration between universities and business and the commercialisation of research ideas.

6.7 Patent Activity

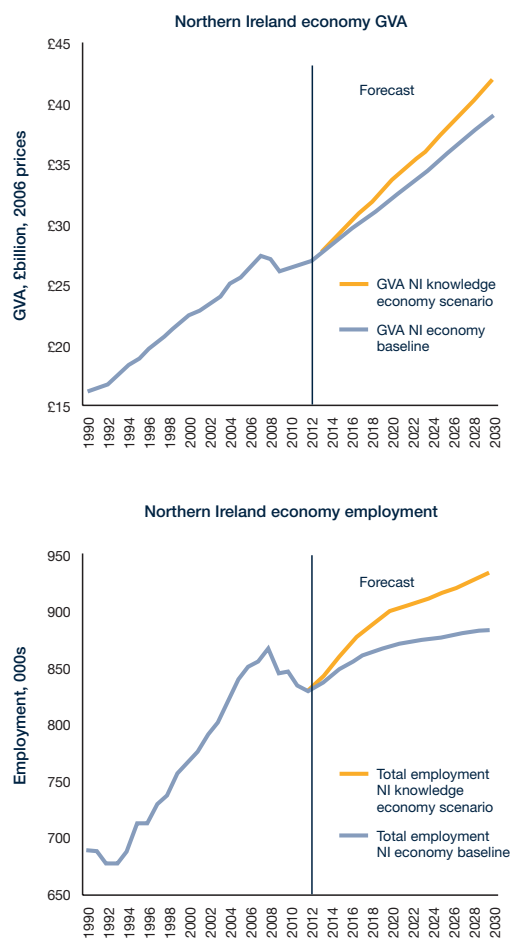
- Patents are a good indicator of the degree of entrepreneurialism in an economy as essentially patents are designed to protect the intellectual property rights of new inventions and products being designed for commercial purposes. In the past decade the number of patents granted per capita has been half that of the Republic of Ireland.
- Although patents granted per capita has grown by 8.5% per annum over the past decade, the overall level of patent activity (measured by patent applications) in Northern Ireland remains the lowest of the UK regions. This is further highlighted by the fact that almost a third of all patents granted in the past 10 years have been by three organisations (Randox, the Queen's University of Belfast and Short Brothers).
- Northern Ireland also ranks bottom of the UK regions with regard to 'high technology' patents granted per capita. However, within the patent applications submitted by Northern Ireland over the period 1998/2007 patent applications within ICT and biotechnology account for 31.2% and 14.3% of total applications respectively. For biotechnology this proportion was higher than all other UK regions.
- Therefore, within some of the fastest growing innovation sectors in the global economy, the Northern Ireland economy is punching above its weight and developing products designed to compete in export markets.

6.8 Aspiring to transform

- The key CONNECT innovation metrics to take forward, based on the San Diego model, are listed in Table 6.1. These should be updated on an annual basis to track the health of the Northern Ireland knowledge economy.
- For illustrative purposes Table 6.2 examines the growth implications for Northern Ireland against the innovation metrics of moving up towards the UK and best performing regional levels. Overall the transformation required to make Northern Ireland the most knowledge intensive region of the UK is:
 - 25,500 more people employed directly in the knowledge economy
 - 6,000 more knowledge economy businesses
 - £800m more spent on R&D annually
 - 200 more PhD students per annum
 - 42,000 more science and technology graduates working in the economy
 - 200 more patent applications annually
- To achieve this step change in the Northern Ireland economy would have a material effect on the economy. The indicative scenario NI knowledge economy scenario below is a variant on the Oxford Economics regional model based on assuming that the knowledge economy in Northern Ireland transforms (25,500 additional jobs) and clearly shows that the transformation would have a material effect on the economy by 2030. A further 24,000 jobs in the economy would be created as businesses make purchases and staff spend their wages, which would generate an additional £3 billion in GVA. This scale of change would have a profound impact on the Northern Ireland economy, helping to close the productivity gap with the UK.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

The impact of a knowledge transformation-baseline and scenario forecasts



- Moving forwards, the tougher UK macroeconomic environment and implications for public expenditure means that a transformation of the Northern Ireland economy is imperative. Although Northern Ireland does lag behind at present there are some strengths within the sector and the wider economy (low wages coupled with high skills) and a diverse platform to build on.
- Competition in the global economy is strengthening all the time and it is essential that Northern Ireland can compete on knowledge and ideas. If Northern Ireland does not innovate and sell on the basis of its innovation then other places will (such as those strong European countries) and the region will be left further behind. Understanding how Northern Ireland compares is the first step in building an evidence base to set a trajectory of ambition and identify market failures and potential roles for policy, programmes and business led initiatives. San Diego went from a failed city to one of the most successful cities in the world, which should inspire Northern Ireland to look towards emulating this transformation to become one of the UK's most innovative regions.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

Table 6.1: CONNECT - Key innovation metrics

Key indicators	NI- Current position	UK	NE	NW	YOH	EM	WM	EE	L	SE	SW	W	S	Baseline date & source
Knowledge Economy- Core characteristics (CONNECT definition)														
Knowledge economy employment, as % of total employment	4.4%	5.7%	6.3%	5.3%	4.4%	5.1%	6.1%	6.2%	5.4%	8.1%	6.2%	4.8%	4.2%	2009, BRES/Census of Employment
Knowledge economy businesses, as % of total business stock	2.5%	7.1%	5.5%	6.1%	5.4%	5.9%	6.3%	8.1%	9.6%	9.7%	6.5%	4.3%	5.6%	ABS/ONS, 2010
Knowledge economy business start ups per 100,000 population*	11	36	22	27	22	24	27	41	73	50	30	17	25	IBD/ONS, 2009
Knowledge economy average wage level	£32,600	£41,600	£33,100	£35,700	£33,400	£38,600	£35,400	£44,400	£53,700	£49,200	£37,600	£35,400	£33,500	LFS/ASHE, 2010
Investment Activity														
Number of private equity investments and venture capital investments (number of companies)	20	823	46	65	50	37	72	47	212	125	46	41	61	BVCA, 2010
Number of private equity investments per 100,000 VAT registered businesses	24	32	61	26	27	21	34	19	54	32	19	36	32	BVCA, 2010
Number of venture capital investments per 100,000 VAT registered businesses	17	15	21	12	7	10	20	11	24	18	9	23	12	BVCA, 2010
M&A activity: Number of M&A and ECM deals per 100,000 VAT registered businesses	360	1,800	1,950	1,240	2,680	530	530	2,330	3,340	1,220	2,460	960	1,890	Experian/Corpin, 2010
Public listed companies: Market capitalisation per head	£200	£28,300	n/a	£10,400	n/a	n/a	n/a	£11,500	£162,300	£22,600	£7,700	£1,600	£14,500	LSE, 2011
R&D and Research Activity														
R&D as % of workplace based GVA	1.7%	2.1%	1.4%	2.3%	1.2%	1.9%	1.4%	4.6%	1.1%	3.0%	2.1%	1.4%	1.9%	ONS Regional Competitiveness Indicators, 2009
R&D (BERD) as % of workplace GVA	1.1%	1.2%	0.8%	1.7%	0.5%	1.3%	1.0%	3.6%	0.3%	2.0%	1.3%	0.7%	0.6%	ONS Regional Competitiveness Indicators, 2009
R&D personnel as % of total employment	1.0%	1.2%	1.0%	1.0%	0.8%	1.1%	0.9%	1.7%	1.2%	1.6%	1.1%	0.8%	1.1%	Eurostat, 2008
Number of PhDs per million inhabitant*	232	279	232	239	57	42	193	282	448	267	173	247	341	HESA, 2009
HEI Research grants and contracts per 1,000 population*	45	67	53	51	57	42	39	63	132	65	34	52	108	
Number of science and technology graduates (NQ Level 4+) as % of total employment	7.6%	10.2%	9.0%	9.5%	7.7%	9.4%	8.6%	10.2%	13.0%	10.9%	10.0%	7.8%	13.1%	LFS, 2010
Innovation and Patent Activity														
% of firms stating that they are innovation active	54.8%	58.2%	59.5%	56.3%	60.7%	55.5%	58.7%	59.1%	55.8%	63.3%	57.8%	58.6%	54.8%	BIS, 2009
Number of patent applications per million inhabitant (to EPO)	35	89	51	55	62	85	52	148	65	151	96	41	73	OECD, 2007
Number of high technology patents per million inhabitant (to EPO)	12	35	14	14	13	22	14	70	33	68	41	15	31	OECD, 2007

Magenta shading denotes region with highest value

* In some instances London is a significant outlier and the data is skewed by commuting patterns hence the second highest region is also highlighted

Table 6.2: CONNECT- Selected key innovation metrics, illustrative growth

Key Indicators	Current position	Increase needed to reach UK level	Increase needed to reach top performing UK region*
Knowledge economy employment, number of employees	30,500	9,000	25,500
knowledge economy businesses, total no. of businesses	2,000	4,000	6,000
Knowledge economy business start ups (number of companies)	200	400	700
Knowledge economy average wage level	£32,800	£37,400	£40,200
INVESTMENT ACTIVITY			
Number of private equity investments (number of companies)	20	3	27
Number of venture capital investments (number of companies)	14	n/a	6
Number of M&A and ECM activity (number of companies)	30	100	280
R&D AND RESEARCH ACTIVITY			
Total expenditure on R&D, £million	£500	£100	£800
Total expenditure on Business R&D (BERD), £million	£300	£50	£750
R&D personnel, number of employees	6,500	900	2,500
Number of PhDs per annum*	400	100	200
HEI Research grants and contracts, £000s*	£79,956,000	£39,106,000	£113,231,000
Number of science and technology graduates (NVQ Level 4+)	57,000	20,000	42,000
INNOVATION AND PATENT ACTIVITY			
% of firms stating that they are innovation active	46,000	3000	7,000
Number of patent applications to EPO	60	100	200
Number of high technology patents applications to EPO	20	40	100

Top performing region comparison denotes region with highest value, except for knowledge economy business start ups where London acts as an outlier in the data, which is largely due to commuting patterns. In addition for the average wage levels due to the differences in the cost of living the aspirational figures for the UK and London (the highest region) have been adjusted to 75% and 85% of the total.

Annex A: Knowledge economy sector definition

- The definition of the knowledge economy has been based on that used to define the industrial clusters covered by the CONNECT Innovation report for San Diego.
- The San Diego clusters include the following: Biomedical Products, Biotechnology & Pharmaceutical, Communications Equipment Manufacturing, Computer & Electronics, Defence and Transportation, Environmental Technology, Recreational Goods, Software and Other Technical Consulting.
- These clusters are based on the definitions used by the San Diego Association of Governments (SANDAG), which use North American Industry Classification System (NAICS) codes.
- The definition here has been based on matching UK Standard Industrial Classification (SIC) codes, used to classify economic activity in the UK, to the NAICS codes. In addition there were a number of CONNECT sectors removed or merged as either SIC codes did not cover them appropriately or there was duplication of SIC codes across sectors, which would have double counted the figures. Therefore the final sectors and their definitions were identified as follows:

Table A.1: Knowledge economy definition

Sector	SIC Definition
Medical Devices	26600 Manufacture of irradiation, electromedical and electrotherapeutic equipment
	32500 Manufacture of medical and dental instruments and supplies
	26701 Manufacture of optical precision instruments
	74202 Other specialist photography
	72190 Other research and experimental development on natural sciences and engineering
	26511 Manufacture of electronic instruments and appliances for measuring, testing, and navigation, except industrial
	26513 Manufacture of non-electronic instruments and appliances for measuring, testing and navigation, except industrial
	26600 Manufacture of irradiation, electromedical and electrotherapeutic equipment
	32500 Manufacture of medical and dental instruments and supplies
	26701 Manufacture of optical precision instruments
Pharmaceuticals/Biotechnology	21100 Manufacture of basic pharmaceutical products
	21200 Manufacture of pharmaceutical preparations
	72110 Research and experimental development on biotechnology

Software & digital content	58210 Publishing of computer games
	58290 Other software publishing
	62011 Computer programming activities
	62012 Business and domestic software development
	63120 Web portals
	18201 reproduction of sound recording
	18202 reproduction of video recording
	18203 reproduction of computer media
IT Services	62020 Computer programming, consultancy and related activities
	62030 computer facilities management
	62090 other information technology and computed service activities
	63110 Data processing, hosting and related activities
Communications	26301 Manufacture of telegraph and telephone apparatus and equipment
	26309 Manufacture of communications equipment
	61900 Other telecommunications activities
Computing and advanced electronics	26200 Manufacture of computers and peripheral equipment
	26512 Manufacture of electronic industrial process control equipment
	26110 Manufacture of electronic components and boards
	26400 Manufacture of consumer electronics
	26512 Manufacture of electronic industrial process control equipment
	27110 Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus

Northern Ireland Knowledge Economy Index: Baseline Report 2011

	27200 Manufacture of batteries and accumulators
	27310 Manufacture of fibre optic cables
	27900 Manufacture of other electrical equipment
Other technical consultancy services	71121 Engineering design activities for industrial process and production
	71122 Engineering related scientific and technical consulting activities
	71200 Technical testing and analysis
	74100 specialised design activities
	74901 Environmental consulting activities
	28131 Manufacture of pumps
	28132 Manufacture compressors
	28150 Manufacture of bearings, gears, gearing and driving elements
	29100 Manufacture of motor vehicles
	29201 Manufacture of bodies
	29202 Manufacture of trailers and semi-trailers
	29310 Manufacture of electrical and electronic equipment for motor vehicles
	29320 Manufacture of other parts and accessories for motor vehicles
	30110 Building of ships and floating structures
	30120 Building of pleasure and sporting boats
	30200 Manufacture of railway locos
	30300 Manufacture of air and spacecraft and related machinery
	30400 Manufacture of military fighting vehicles

- The following table presents the Eurostat definition of high technology sectors, which is similar to the CONNECT sectors and is used to make international comparisons in Chapter 2.

Table A.2: Eurostat definition- High Technology Sectors

Sector	SIC Definition
High-technology Manufacturing	24.4 Manufacture of pharmaceuticals, medicinal chemicals and botanical products. 30 Manufacture of office machinery and computers. 32 Manufacture of medical, precision and optical instruments, watches and clocks 35.3 Manufacture of aircraft and spacecraft
High-technology Services	64 Post and telecommunications 72 Computer and related activities 73 Research and development

NISP tenants and employment

- The total level of employment at NISP based on tenants which predominantly operate in the CONNECT sectors is 1,380. The largest employers are Citigroup (375), Fidessa (54), L&T Infotech (45) and Meridio (60). The total number of businesses present at NISP is 98.

Annex B: Technical Notes

BVCA data

- The British Venture Capital Association (BVCA) data is obtained from their members. Overall a 97% response rate was achieved by BVCA, which includes virtually every major private equity firm in the UK. In order to ensure only qualifying investments were included in the analysis certain criteria were applied to the data received and are outlined below.
- The BVCA survey includes all investments 'made' or 'advised by' the BVCA full member firm, 'regardless of whether the investing fund is UK or overseas-based'. This means that the figures relate to investments undertaken by BVCA full member firms based in the UK, and also to those undertaken through an overseas office where the UK office was the lead adviser, regardless of where the investment fund was domiciled. As a result, more cross-border investments have been included in the BVCA data which therefore reflect more accurately the activity of BVCA full members, particularly those that invest through pan-European or global funds.

Private Equity Definitions

- The term private equity is generally used in Europe to cover the industry as a whole, including both buyouts and venture capital. Venture capital is a subcategory covering the start-up to expansion stages of investment.
- Private equity describes equity investments in unquoted companies, often accompanied by the provision of loans and other capital bearing an equity-type risk.

Additional VC Data

- As raised in the main report there are considerable concerns about using BVCA data given that not all VC companies in Northern Ireland are members.
- The following data has been obtained from the Chartered Accountants Ireland Ulster Society regarding venture capital into Northern Ireland in 2010. Overall in 2010 total flows of venture capital are estimated to be approximately £8 million. The flows collected from the Irish Venture Capital Association demonstrate that funds in the Republic of Ireland are considerably higher.

Table B.3 Estimated VC Investment in Northern Ireland, 2010

Data Source	Fund name	Other Investor(s) who made co-investments	Value co-invested	Total capital invested by the fund
Directly from HALO	HALO	Numerous		1,662
Directly from CFM	Clarendon Fund Managers	Other VC's (excl local), Privates, UK Funds	1,715	280
IVCA and Direct	Crescent Capital	Siemens in Axis 3	1,000	3,155
BVCA	Enterprise Equity		1,000	900
Directly from Esynergy	e-Synergy	Privates, etc	300	680
	Innovation Ulster Limited (UoU)			393
	Totals invested above in deal range 0-5m		4,015	7,070
	Other known deals not included above			
	Sophia Search	Privates		900
		TOTAL Capital invested		7,970

Table B.4: IVCA Venture Pulse 2010 - Funds raised by Irish SMEs

2010	€ '000
Disclosed	247,159
Undisclosed	63,052
Total	310,211

Source: Chartered Accountants Ireland Ulster Society.

Northern Ireland Knowledge Economy Index: Baseline Report 2011

M&A and ECM data

- M&A refers more specifically to mergers and acquisitions, but will include Acquisition, Acquisition - Tender Offer, Demerger, Development Capital, Divestment, Employee Buy-In, Employee Buy-Out, Investor Buy-In, Investor Buy-Out, Investor Buy-Out Tender Offer, Leveraged Buy-Out, Management Buy-In, Management Buy-In / Buy-Out, Management Buy-Out, Merger, Minority Stake, Minority Stake - Tender Offer, Reverse Takeover and Secondary Buy-Out.

- The following data explores the number of companies that have taken advantage of the EIS by region and the level of investment obtained. Overall the number of companies accessing the scheme in Northern Ireland is very low compared to the UK average although the rate is also low in Wales, Yorkshire and the Humber and the North East. The level has been consistently high in London, the South East, Scotland, the East of England and the South West.

Enterprise Investment Scheme

- The Enterprise Investment Scheme (EIS) is a UK scheme which is designed to help smaller higher-risk trading companies to raise finance by offering a range of tax reliefs to investors who purchase new shares in those companies. The uptake of companies accessing the scheme is another indicator of the level of investment from angels to innovative start-up businesses; overall the Annual Report on the Business Angel Market reports that approximately 70% of angels take advantage of EIS²⁵.

Table B.5: Enterprise Investment Scheme, amount of funds raised, £m

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
London	431	243	179	199	205	206	315	285	224
South East	189	129	149	100	107	152	127	108	96
Scotland	54	40	39	46	45	47	43	54	32
East of England	68	51	40	40	45	51	58	54	31
North West	79	68	51	80	48	51	47	46	26
Yorkshire & the Humber	40	38	36	20	21	19	18	38	21
West Midlands	35	37	46	37	29	23	30	23	19
South West	70	58	46	38	28	35	37	45	19
North East	17	18	24	12	17	12	14	15	13
East Midlands	56	25	23	16	22	27	22	15	11
Wales	17	11	12	9	7	8	12	15	8
Northern Ireland	10	43	22	30	29	17	8	8	4
UK	1,065	761	667	627	606	647	732	706	503

Source: HM Revenues & Customs, claims received by November 2010

²⁵ Annual Report on the Business Angel Market in the UK, p.8

Northern Ireland Knowledge Economy Index: Baseline Report 2011

- The Halo scheme is still relatively new in NI and as of yet does not capture a significant share of UK EIS deals. The figures are higher than the angel deals above as Halo covers mostly start-up companies and many of the deals taking advantage of EIS will not be captured under the scheme.

Table B.6: Enterprise Investment Scheme, number of companies taking up the scheme by region and per million inhabitant

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
London	137.1	111.6	92.0	87.0	86.3	87.6	94.1	90.0	76.7
South East	75.8	64.9	58.4	50.1	49.9	50.3	50.2	50.6	41.8
Scotland	52.9	44.8	36.8	33.2	36.8	34.2	30.5	32.7	27.5
East of England	52.7	39.4	37.8	32.0	30.4	33.0	31.1	33.8	26.2
South West	51.7	45.5	40.8	35.6	30.4	33.0	30.4	32.2	23.4
North West	40.4	34.1	29.8	27.2	27.1	21.5	19.8	22.0	18.2
West Midlands	30.2	28.8	25.1	23.5	19.7	19.3	21.6	20.6	17.6
Yorkshire & the Humber	29.2	33.8	24.8	20.9	19.7	16.6	17.5	19.1	17.4
East Midlands	35.7	28.4	25.6	19.3	25.4	21.3	18.3	17.5	16.9
North East	25.6	26.8	19.3	11.0	15.7	16.1	17.6	19.9	16.7
Wales	26.1	23.4	21.2	17.8	19.7	19.7	16.9	20.2	14.7
Northern Ireland	25.6	27.2	21.2	16.4	21.6	10.4	17.2	14.2	9.0
UK	56.3	48.3	41.4	36.5	36.5	35.5	35.6	36.1	30.0

Source: HM Revenues & Customs, claims received by November 2010.

Other research activities

- The 7th Framework Programme for Research and Technological Development (FP7) has a total budget of over € 50 billion and will last for seven years from 2007 until 2013. This money is accessible to not only HEIs but to research actors all over Europe and beyond, in order to co-finance research, technological development and demonstration projects. The other main source of research funding in the UK is the Technology Strategy Board (TSB), which companies can bid directly into.
- Unfortunately, data on FP7 is not available on a regional basis to compare. However, figures for 2007-2010 are available from Northern Ireland from Invest NI. In total the (approximate) breakdown of FP7 funding from 2007-2010 is as follows:
 - 2007 - €13.5 m
 - 2008 - €6 m
 - 2009 - €5 m
 - 2010 - €5 m

Patent Data Notes

- The patent analysis in section 5 largely focuses on EPO data as this makes a patent a member of the 'triadic patent family', data on patent families is generally less biased as the 'home advantage' disappears to a certain extent. A patent family is a set of patents taken in various countries to protect a single invention in more than one country. This data also emphasises the value of such triadic patents, which is supposedly higher than the value of other patent applications or patents granted because applying for a patent at these three offices involves additional costs and administrative work.
- **Triadic patents** are a series of corresponding patents filed at the European Patent Office (EPO), the United States Patent and Trademark Office (USPTO) and the Japan Patent Office (JPO), for the same invention, by the same applicant or inventor. [1] Triadic patents form a special type of patent family.
- **High technology patents** (used in Table 5.8) relate to different criteria than biotechnology, ICT, and nanotechnology in Table 5.9. They count activities in technical fields such as: Computer and automated business equipment; micro-organism and genetic engineering; aviation; communications technology; semiconductors; lasers. For full list see: http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an6.pdf

Acknowledgements

NISP wishes to thank Miriam Ferrari and Mark Magill for their contribution to the development and production of the NI Knowledge Economy Index: Baseline Report.

Northern Ireland Science Park

The Innovation Centre
Queen's Road
Queen's Island
Belfast
BT3 9DT

www.nisp.co.uk

**Proof of Concept Centers:
Accelerating the Commercialization
of University Innovation**

January 2008

Ewing Marion
KAUFFMAN
Foundation

Proof of Concept Centers:

Accelerating the Commercialization

of University Innovation

Christine A. Gulbranson, director, Advancing Innovation

Ewing Marion Kauffman Foundation

David B. Audretsch, director

Max Planck Institute of Economics

Research assistance provided by Isabel Groff and Samantha Dalton, and Derek Ozkal

January 2008

1. Introduction

Innovation drives economic growth. Economic growth leads to longer, healthier lives by transforming yesterday's luxuries into better, cheaper, and more efficient goods and services. University research is a key component of our nation's innovative capacity. In an increasingly dynamic and global economy, the institutional infrastructure is inefficient at moving university innovations to the marketplace. University researchers often face convoluted procedures with insufficient guidance to commercialize their innovations. As angel investors and venture capitalists increasingly invest in later-stage enterprises,¹ researchers face difficulty finding early stage funding to develop and test prototypes and conduct market research. In order to fill this funding gap and accelerate the commercialization of university innovations, a new type of organization has emerged—the proof of concept center.

What follows is an examination of two such centers: the Deshpande Center at the MIT School of Engineering and the von Liebig Center at the University of California San Diego Jacobs School of Engineering. This analysis provides valuable insights into how proof of concept centers can facilitate the transfer of university innovations into commercial applications.

Filling a Nee6d

Globalization has shifted the competitiveness of leading developed economies away from standardized manufacturing activities and toward knowledge-based industries and services (Friedman, 2006). As Thurow (2002, pp. 38-39) observes, "The world is moving from an industrial era based on natural resources into a knowledge-based era based on skill, education, and research and development." Knowledge has emerged as a crucial source of economic growth, employment, and employment in the global economy because it is the basis for innovation.²

Where does the crucial resource of knowledge come from? While investments by private firms in research and development (R&D) are a crucial source of knowledge, so too are investments made in research and education at universities. However, as Senator Birch Bayh observed some three decades ago, investments in university research do not automatically spill over to generate innovative activity and economic growth. "A wealth of scientific talent at American colleges and universities—talent responsible for the development of numerous innovative scientific breakthroughs each year—is going to waste as a result of bureaucratic red tape and illogical government regulations..."³ Audretsch et al. (2006) suggest that it is

1 See PricewaterhouseCoopers, and National Venture Capital Association. MoneyTree™ survey report. 2007 and VentureOne, "Venture Capital Industry Report." DowJones, 2006.

2 Investments in knowledge are the driving force of economic growth in Romer (1986) and Lucas (1993).

3 Introductory statement of Birch Bayh, September 13, 1978, cited from the Association of University Technology Managers Report (AUTM) (2004, p. 5).

the knowledge filter that stands between investment in research on the one hand, and its commercialization through innovation, leading ultimately to economic growth, on the other.

Seen through the eyes of Senator Bayh, the magnitude of the knowledge filter is daunting, “What sense does it make to spend billions of dollars each year on government-supported research and then prevent new developments from benefiting the American people because of dumb bureaucratic red tape?”⁴

Thus, if university research does not passively spill over for commercialization and innovation, then institutions are needed to facilitate the spillover of university research. As Litan, Mitchell and Reedy (2007, p. 57) emphasize, “A perennial challenge related to university-driven innovation has been to ensure that university structures help, not hinder, innovation and its commercialization.”

The purpose of this paper is to examine two important examples of institutions devoted to facilitating the spillover and commercialization of university research, the Deshpande Center at MIT and the von Liebig Center at the University of California San Diego (UCSD). Both of these centers are mechanisms designed to fill the “funding gap” of seed-stage investing as angel investors and venture capital funds shift their focus to larger and later-stage investments (Fishback, et al. 2007). In order to fill this funding gap and accelerate the commercialization of university innovations, a new type of organization has emerged—the proof of concept center.

The proof of concept center accelerates the commercialization of innovations out of the university and into the marketplace. It does this by providing seed funding to novel, early stage research that most often would not be funded by any other conventional source. Unlike some accelerators, there is no central shared lab space; each of the funded investigators continues to perform their research in their own respective laboratories. The proof of concept center facilitates and fosters the exchange of ideas between the university innovators and industry via various mentors associated with the center.

An analysis of two such centers—the Deshpande Center at MIT and the von Liebig Center at UCSD—provides valuable insight into how proof of concept centers can facilitate the transfer and spillover of university research into innovative activity and commercial applications.

2. The von Liebig Center at UCSD

In 2001, the William J. von Liebig Foundation awarded UCSD’s Jacobs School of Engineering a \$10 million gift to create the William J. von Liebig Center. The von Liebig Center’s stated mission is “to accelerate the commercialization of UCSD innovations into the marketplace, foster and facilitate the exchange of ideas between the University and industry, and prepare engineering students for the entrepreneurial workplace.”⁵ To accomplish these goals, the Center uses three complimentary approaches: seed funding, advisory services, and educational programs.

Seed Funding

The von Liebig Center provides seed funding ranging from \$15,000 to \$75,000 to support the commercialization of UCSD discoveries with near-term market prospects. These funds are not used for basic research, but rather to evaluate the commercial potential of existing research. Von Liebig funding allows recipients to focus on development, testing, or prototype construction, and/or conduct specific market research. This evaluation may lead to industry collaboration, licensing, the formation of a new company, or the abandonment of the technology for commercial application.

4 Statement by Birch Bayh, April 13, 1980, on the approval of S. 414 (Bayh-Dole) by the U.S. Senate on a 91-4 vote, cited from (AUTM) (2004, p. 16).

5 From the Center’s Web site, available at <http://www.vonliebig.ucsd.edu/about/mission.shtml>.

The von Liebig Center typically funds ten to twelve projects annually, which range from 35 percent to 60 percent of the proposals submitted to the Center. In order to be considered for funding, a project must include at least one Jacobs School of Engineering faculty member.⁶ The first step in the funding process is to submit a Statement of Intent,⁷ which outlines the project. After the Statement of Intent is submitted, the Center commercialization director assigns an advisor to the faculty member to help prepare the proposal and presentation to the review panel. The full funding application⁸ is submitted the following month. A five- to eight-member review panel consisting of both technical and business expertise then reviews the application. The review panel recommends candidates to the Center based on the technology's novelty and need, the potential market size, the market definition, the technology's maturity, the utility of the grant, the intellectual property position, and the principle investigator's credibility (PI). The final funding decision is made with input from advisors and Center staff.

After a grant is awarded, a von Liebig advisor works with the principle investigator to prepare a commercialization plan that includes technical and business milestones as well as the budget needed to complete the milestones over a twelve-month period. The advisor then requests the authorization of funds corresponding to the first milestone from the commercialization director. Further payments are contingent on reaching established milestones. Upon completion of the project, PIs are requested to submit a two-page summary of the major findings of the project.

Advisory Services

As of 2007, the von Liebig Center has six paid advisors⁹ that work at the Center part-time at wages well below their open-market value as experts in their field. These advisors support approximately ten projects each. Advisors are selected based on their backgrounds in a technical discipline, having considerable experience in start-up and early stage technology ventures, and possessing significant connections to local companies and investment sources. These connections are extremely valuable because they link the technology and researchers to important external networks. The advisors and Center staff work in partnership with representatives from the University technology transfer office (TechTIPS), who are responsible for protecting the intellectual property, and negotiating and executing the license agreements to the start-ups or licensees. The Center also works in coordination with external community organizations (CONNECT, Tech Coast Angels, and others) for further coaching and guidance, and to identify entrepreneurs and investment capital that will help the nascent companies move down the commercialization pipeline. The von Liebig Center makes these advisory services available to all researchers at the Jacobs School even if they do not receive funding from the Center. The Center also provides incubation space and needed meeting locations for pre-companies to operate before they secure capital and execute the license agreement.

6 The Center will work with researchers in other disciplines to find a partner in the Jacobs School who may be interested in collaboration. The Center is planning to expand beyond the engineering school to engage researchers across the campus in 2008.

7 A Statement of Intent includes the name of the principle investigator (PI), the project title, and a brief outline of up to 500 words describing the project.

8 The full funding application requests that the PI describe the project goals, the project plan, the commercialization potential of the technology, the backgrounds of the team members, any intellectual property associated with the technology, and a preliminary budget summary. The budget may include only direct project expenses, including the salaries and fees of graduate and undergraduate students, but may not include faculty salaries, patent and legal costs, UCSD overhead costs, or equipment costs over \$5,000.

9 The Center's current six advisors are Hal DeLong (Life Sciences), Mike Elconin (IT), Steve Flaim (Life Sciences), Roger Moyers (IT/Materials), Jack Savidge (Structural Materials) and Mary Zoeller (IT).

Educational Programs

The Center's educational programs can be divided into three categories:

courses, lectures and seminars, and conferences. The von Liebig Center currently supports four graduate-level courses¹⁰ designed by engineers to prepare students for the challenges of an entrepreneurial work environment. Instructors with both academic and industry experience teach these courses. Approximately 400 students have completed one or more of the courses, and a small number of students also have had the opportunity to work for the Center as interns. Of these, at least ten have started companies, and another six have gone into non-traditional fields, such as technology investment banking and strategy consulting.

The Center hosts lectures and seminars to educate students, faculty, and researchers. The Center's most prominent series is the von Liebig Forum, which brings in high-profile innovators from industry and academia to give presentations and interviews.

The von Liebig Center also hosts conferences for faculty, researchers, and graduate students such as the National Collegiate Inventors and Innovators Alliance's "Invention to Venture" conference in San Diego. These educational programs are all designed to further the student and faculty levels of awareness, education, and familiarity with relevant and practical issues related to early stage commercialization.

3. The Deshpande Center at MIT

The Deshpande Center was founded at the MIT School of Engineering in 2002 from an initial \$17.5 million donation by Jaishree and Gururaj Deshpande. The Center was created with the mission to increase the impact of MIT technologies on the marketplace. The Deshpande Center achieves its mission through the Grant Program, Catalyst Program, Innovation Teams (I-Teams), and Events.¹¹

Grant Program

The Deshpande Center provides up to \$250,000 to prepare MIT technology projects for commercialization. The Center holds two rounds of grant proposals each year and awards two types of grants. The Deshpande Center provides Ignition Grants (up to \$50,000) for novel projects that may be used for exploratory experiments and proof of concept. Innovation Grants (up to \$250,000) are awarded to take an innovation into full development. Innovation Grants are only awarded once a project has established proof of concept, and identified an R&D path and an intellectual property (IP) strategy. This allows a project to attract venture capitalists or companies interested in investing in its technology.

The Deshpande Center typically awards sixteen grants each year,¹² which is approximately 18 percent of the proposals submitted to the Center.¹³ Originally the Center was exclusively focused on research created at the School of Engineering, but in spring 2005 the Center began accepting proposals from all MIT faculty. A multidisciplinary committee selected from inside the Institute and from the Catalyst (mentors) Program evaluates all applications. After the committee recommends grant candidates, a catalyst is assigned to each project and a full proposal is submitted.¹⁴ Grant recipients are required to participate in the Catalyst

10 The Center offers four courses: ENG201-Venture Mechanics, ENG202-Enterprise Dynamics, ENG203-Applied Innovation, and ENG207-Corporate Entrepreneurship for Global Competitiveness. Detailed information for these courses is available on the Center's Web site at http://www.vonliebig.ucsd.edu/education/education_courses/

11 From the Center's Web site, available at <http://web.mit.edu/deshpandecenter/about.html>

12 Fourteen projects have been awarded multiple grants.

13 Since 2002, sixty-four projects have been funded out of over 365 reviewed proposals.

14 The full proposal is similar to the von Liebig proposal and should be no longer than ten pages in length and includes an executive summary, the market opportunity of the innovation, the proposed approach to innovation, the commercialization process, the impact of the technology, data on similar or previous technologies, the progress to date of the research, the research plan and milestones, resources and budget, other funding provided, team and collaboration information, and a budget proposal.

Program, attend Center events, establish IP if appropriate, communicate the project's progress through various means, and avoid conflicts of interest.

Catalyst Program

Unlike the von Liebig Center, the Deshpande Center uses volunteers to provide advisory services through its Catalyst Program. The Deshpande Center has approximately fifty Catalysts with technology innovation and entrepreneurial experience. Catalysts do not represent any company interests; they provide mentorship and assistance to MIT research teams to facilitate the commercialization process. Catalysts also agree to keep discussions in confidence and manage conflicts of interest.

Innovation Teams and Events

The educational aspect of the Deshpande Center is divided into events and Innovation Teams. The Center hosts several events for grant recipients, including IdeaStream, Open House, and the Catalyst Party. IdeaStream is an annual networking event that showcases MIT technologies to venture capitalists, entrepreneurs, and other researchers. Open House and the Catalyst Party are informal events that promote the exchange of ideas and the formation of new collaborations.

The Center's involvement in Innovation Teams (I-Teams) is part of a three-way partnership with the School of Engineering and the MIT Entrepreneurship Center. The I-Teams program is open to graduate students across MIT and is always filled to capacity. Six Deshpande grantees are chosen to be part of the I-Teams program each year and are given the opportunity to work with student teams to discover and define their commercialization plan. Data is not available to assess the number of I-Teams participants who pursue entrepreneurial careers after graduation.

4. Comparing and Evaluating the Centers

Table 1 provides a comparison between the Deshpande and von Liebig centers. While both centers were initially funded from philanthropic donations, the initial funding of the Deshpande Center was 75 percent greater than for the von Liebig Center. However, both centers have funded about the same number of projects.

Table 1: Comparison between the von Liebig and Deshpande centers as of November 2007

	The von Liebig Center	The Deshpande Center
Location	UCSD – Jacobs School of Engineering	MIT – School of Engineering
Initial funding	\$10 million Gift in 2001 from the William J. von Liebig Foundation	\$17.5 million Donation in 2002 from Jaishree and Gururaj Deshpande
Budget	~\$1.2 million per year • Administrative Staff ~\$475K • Grants ~\$420K • Advisors' Salary ~\$240K • Academic Courses ~\$45K	~\$1.7 million per year • Administrative Staff ~\$320K • Grants ~\$1.3M • Operational Expenses ~\$80K
Amount of grants	Seed Funding – \$15K - \$75K	Ignition Grants – ≤\$50K Innovation Grants – ≤\$250K
Total amount of grants awarded	Over \$2.8 million	Over \$7 million

	The von Liebig Center	The Deshpande Center
Number of proposals funded	66 Projects Approximately 11 grants per year 35 percent-60 percent approval rate of proposals	64 Projects (78 Grants, 39 Ignition Grants, 39 Innovation Grants) Approximately 16 grants per year Approximately 18 percent approval rate of proposals
Time period of accepting proposals	1-2 proposal rounds per year (spring and fall)	2 proposal rounds per year (spring and fall)
	The von Liebig Center	The Deshpande Center
Advisory services	6 Advisors work at the center approximately 1 day a week Advisory services available to all faculty and research staff at Jacobs School independent of funding considerations	Pool of 50 volunteers are assigned as advisors in the Catalyst Program
Networking events	The “von Liebig Forum: Profiles in Innovation” – speaker series that showcases entrepreneurs, scientists, and innovators Open House – informal gathering for UCSD and business community Community Workshops – i.e. IP transfer between University and Industry Lunches – Award luncheon/networking event Other events, including seminars and additional speaker/presentation events	IdeaStream Symposium – Networking event for grant recipients, venture capitalists, entrepreneurs, and other researchers Open House – Informal gathering for MIT and business community Catalyst Party – Informal gathering of grant recipients and Catalysts Other optional events, including Ignition Forum, joint seminars with student groups, and team-building events
Educational programs	4 graduate-level courses to introduce engineering students to entrepreneurship (Venture Mechanics, Enterprise Dynamics, Applied Innovation, Corporate Entrepreneurship for Global Competitiveness). Over 400 students and graduate student interns have enrolled in at least one of these courses.	I-Teams Course – Collaboration with MIT Entrepreneurship Center that consists of teams with 3-5 science, engineering, and management graduate students evaluating the commercial feasibility of innovation research emerging from MIT research labs
Number of start-ups and licenses	16 Startups, 4 Licenses	10 Startups, 1 License
Number of employees in startups	64+	150+
Capital leverage	Spinouts have acquired over \$71 million in private capital	Spinouts have acquired \$88.7 million in private capital
Sustainability	Percentage of University royalty income from the commercialization of any technologies that receive Center services University support and private donations, targeting \$2 million by 2008 and \$10 million by 2010	Donations from companies that have spun out Future private donations

There are many obstacles in evaluating the two centers with respect to quantitative metrics of success. First, both centers have only been in existence for approximately five years since they both began operations in 2002; thus, there has not been enough time to evaluate the end result of many projects. Second, there are no accepted benchmarks to define success. While the formation of a business or the licensing of a technology is easy to identify as a success, it is difficult to determine failures. For example, if a researcher receives funding and ultimately discovers that there is no clear market opportunity for a particular technology, this allows the researcher to obtain quicker feedback and begin working on new technologies. Furthermore, there is no quantitative way to measure how much faster a particular technology reached the market by using a center or other intangibles such as the likelihood that a student will pursue an entrepreneurial endeavor later in life as a result of involvement with a centersponsored course, lecture, seminar, or project. Third, as is typical of entrepreneurship promotion programs, there are no clearly defined time expectations for proposals to come to fruition. Certain technologies require more time than others to develop and cross-industry comparisons must account for market conditions that are unique to each industry.

Despite these difficulties in precise measurements, there are many clear indications of success at the von Liebig Center and Deshpande Center. Both centers exhibit a well-defined organizational structure that provides capital, guidance, and contacts to university innovators. This basic framework accelerates the commercialization process because it provides customizable support for researchers and fills an early stage funding gap. Anecdotal evidence via interviews supports this claim. For example, one project interviewed for this paper was denied funding from a governmental agency yet received funding from the proof of concept center. The proof of concept center funding allowed the concept to be proved. Once this occurred many outside investors became interested in funding the project's further development. Furthermore, the success of the centers can be seen in the power they have given grantees to leverage more capital for their technologies. By legitimizing a researcher's technology, both centers have enabled and accelerated the acquisition of private capital for university technology. Together the centers have awarded nearly \$10 million in grants and have already seen twenty-six spinout companies accumulate more than \$159 million in capital.

There also are areas where both centers can improve their efficiency and usefulness. Some participants felt that the Catalysts provided by the Deshpande Center were not appropriate matches for these participants' technologies. This might be a sign that the von Liebig Center model of paying advisors ensures that they provide better assistance. Some participants also questioned the amount and number of proposals funded by each center as being too few, but in general respondents spoke positively about both centers.

6. Conclusions

Both the von Liebig and Deshpande centers originally focused on the cultivation of innovation in the engineering schools. This concentration allowed the centers to maximize their effectiveness by limiting the areas of expertise needed by advisors. Attempting to fund proposals from multiple disciplines creates the need for a center to have advisors who are experts in multiple fields, but neglecting non-engineering disciplines does not yield the maximum impact in terms of commercialization. This also creates a challenge in determining which proposals to fund since comparing prospective technological innovations among disciplines is difficult without extensive knowledge of all the fields that could submit proposals. Perhaps the most important cost for these centers is the opportunity cost of the proposals they choose not to fund. By limiting the proposals to the school of engineering, a proof of concept center can minimize missed opportunities resulting from selection bias with review boards only funding technologies with which they are familiar. However, this concerted approach comes at the cost of missing opportunities to fund technologies that originate outside the engineering schools. The von Liebig Center has combined the need for a concerted approach with a desire to fund the best technologies at the university by opening proposals to all UCSD faculty members but requiring them to partner with a Jacobs School of

Engineering faculty member. The Deshpande Center has opened proposals to all MIT faculty members, which necessarily increases the difficulty of proposal evaluation.

To replicate and improve on the successes of the von Liebig and Deshpande centers, it is important to understand the unique conditions that allowed each to prosper. Both centers benefit from locating at universities that excel in research and are located within a strong network of angel investors and venture capitalists. It is important to recognize that the strength of both centers comes from providing far more than capital. Both centers combine seed funding with advisory services and educational initiatives, and they plug innovators into outside funding and collaboration networks. This unified approach is vital to ensure the commercialization of university technology because each component is complementary.

With this in mind, the creation of a new proof of concept center must be located in a university that 1) produces innovative and marketable technology, 2) is not adverse to collaboration with external networks and groups, and 3) has technology transfer offices that are willing to work with a center to assist in the commercialization process. Furthermore, locating the center in the engineering school, at least initially, allows the center to focus its efforts on research that has a greater likelihood of translation into products.

The proof of concept center also must be able to find an administrative team and advisors who are “hubs” in the local venture capital, technology, and industry networks. The localized knowledge of a center’s staff may actually be more useful in accelerating the commercialization of university technology than the seed funding. It also is important that a strong social network exists in the surrounding community, including advisors, angel investors, venture capitalists, and interested firms for grantees to partner with. This component is necessary to allow proof of concept centers to invest in risky or unproven technologies with the realization that an outside supportive infrastructure is present for further development and commercialization. By providing the initial seed funding to reach proof of concept, these centers allow researchers the ability to then obtain follow-on funding.

With these considerations in mind, there are a number of locations that may be best suited for a new proof of concept center, including, but not limited to the University of Texas Austin, Johns Hopkins, University of Illinois, Northwestern, and University of Wisconsin-Madison. Regardless of the center’s location, its success will be determined by the strength of its staff and its surrounding social network infrastructure.

References

- Association of University Technology Managers (AUTM) (2004), *Recollections: Celebrating the History of AUTM and the Legacy of Bayh-Dole* (Northbrook, Ill.: Association of University Technology Managers).
- Audretsch, David B., Max Keilbach and Erik Lehmann (2006), *Entrepreneurship and Economic Growth* (New York: Oxford University Press).
- Fishback, Bo, Christine A. Gulbranson, Robert E. Litan, Lesa Mitchell and Marisa Porzig (2007), *Finding Business “Idols”: A New Model to Accelerate Start-Ups*, Kauffman Foundation Report, 4.
- Friedman, Thomas L. (2005), *The World is Flat* (London: Lane).
- Litan, Robert E., Lesa Mitchell and E.J. Reedy (2007), “The University as Innovator: Bumps in the Road,” *Issues in Science and Technology*, Summer, 57-66.
- Lucas, Robert (1993), “Making a Miracle,” *Econometrica*, 61, 251-272. Romer, Paul (1986), “Increasing Returns and Long-Run Growth,” *Journal of Political Economy*, 94, 1002-37.
- Thurow, Lester (2002), *Fortune Favors the Bold* (New York: HarperCollins).

Response from Northern Regional College

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Northern Regional College	028 2563 6221			
Organisation Address	Organisation Type (Include one or more X)			
Trostan Avenue Building Trostan Avenue Ballymena Co Antrim BT43 7BN	Business	<input type="checkbox"/>	University	<input type="checkbox"/>
	Business Support	<input type="checkbox"/>	FE College	<input checked="" type="checkbox"/>
	Government	<input type="checkbox"/>	Research	<input type="checkbox"/>
	Other (Please Specify)			<input type="checkbox"/>

Please provide some background information on the organisation

Officially opened in 2007, the Northern Regional College is one of the six incorporated colleges of Further and Higher Education in Northern Ireland and is based in the North East region of Northern Ireland.

NRC Regional Profile

- NRC is the sole further education provider in the North East region.
- NRC covers a population of 450,000 or 25% of the Northern Ireland total.

NRC Campuses

- Ballymena, Ballymoney, Coleraine, Larne, Magherafelt and Newtownabbey

What Drives NRC

- DEL FE Means Business (2004) prioritised DEL's aim for the FE sector to focus on its role as the primary agent of life long learning in order to strengthen economic development, enhance social cohesion and advance individuals skills and learning.

NRC Provision

- Further & Higher Education
- Apprenticeships- Vocational Training
- Essential Skills (Literacy, Numeracy & ICT)
- Specialist Provision for Employers
- Pre-start, Start-up and Growth Support for Students, Early Stage Entrepreneurs and Businesses

Staff Levels – NRC Corporate Development Plan (2010)

Staff Group	Full Time	Part Time	Total
Senior Management	18	0	18
Academic Staff	244	352	596
Support Staff	228	181	409
Total	490	533	1023

NRC Corporate Development Plan (2010)

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

Research and Development - Work directed toward the innovation, introduction, and improvement of products and processes

NRC has developed a range of programmes aimed at supporting businesses with their R&D needs. The imperative for NRC is to focus on the development side of the curve in researching and testing ways to increase productivity/competitiveness through a range of interventions including:

- Product design and prototyping
- Process improvement programmes
- Up-skilling/re-skilling employees

In developing and implementing these programmes NRC has engaged with a number of funders to create opportunities for local, regional and international companies to exploit. Examples include:

1. EU/UK/NI/Cross-border and Local Government

NRC has been awarded funding for two Interreg projects. RIM21 under Interreg IIIA and KITE under Interreg IVA both in partnership with Sligo IT and KITE also includes Ayr College. Each project has the specific aim of developing programmes to support innovation development with small enterprises.

2. UK/NI – Connected

NRC as part of a consortium of colleges is working with the two Universities (QUB and UU) to develop research capability to support local SMEs

3. UK/NI – DEL Employer Support Fund

Carbon Zero, Accelerating “Enterprise Live Projects”, Innotech NI, Open Source

4. UK/NI and Cross-Border – Innovation Vouchers

As a recognised Knowledge Provider NRC offers technical assistance to small SMEs (less than 50 employees)

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

NRC has sought to continually develop its R&D capability and capacity and views all such programmes as an opportunity to meet the twin objective of satisfying company R&D needs and increasing knowledge and resource pool available.

For example: - EU INTERREG IVA KITE Programme €1.47M enabled NRC to:

- Invest in additional modern technology and equipment
- Invest in new e-learning software
- Develop industry specific training programmes
- Train teaching staff in the use of e-learning and online teaching methods

Equipment includes: Automated Cell consisting of 6 Axis Robot, Press brake and Robot spot welder, Laser cutting machine, Laser scanning machine and 5 Axis CNC machine

3. What support is available to assist organisations to access opportunities for research and development?

Financial – Funded support including EU Interreg, FE/HE Connected Fund, Invest NI Innovation Vouchers. This funded support provides the resources to enable the technical and knowledge transfer support to happen.

Technical – Access to Centre of Excellence (Engineering Manufacture) resources

- Computer Aided Design (CAD/SolidWorks)
- Computer Numerical Control M/C tools (5 Axis)
- Computer Co-ordinate Measurement (CCM)
- Robotics
- Rapid Prototyping
- Pneumatics
- Electro-pneumatics
- Hydraulics
- Programmable Logic Controls (PLCs)

Knowledge Transfer – Access to research lecturer's time (lecturer placement), Tutor-led student research and HE student-led research.

4. How beneficial is the available support in assisting organisations?

Benefit to Companies

- Increased productivity and competitiveness
- Enhanced staff skills and knowledge
- Shared risk
- Developed relationship with technical knowledge provider

Benefit to NRC

- Funding enables up-to date and technically relevant equipment to be purchased
- Research enables staff development to take place along side assisting company
- College reputation in supporting industry is enhanced
- Increase pool of employers willing to engage with NRC as a strategic partner

- Progressive curriculum relevant to modern business techniques is offered to students

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

Eligibility Criteria

Many funded programmes have specific eligibility criteria e.g. innovation vouchers for limited companies with 50 or less FTEs..... While eligibility criteria can be useful in targeting resources at specific companies (sector/size); measures to ensure compliance can act as a barrier.

Timescales

Many funded programmes have strict qualifying times for entry, progress and exit. In some cases this is not flexible enough to meet the needs of employers. This can act as a barrier for some companies

Managed Expectations

Supply organisations need to provide a realistic assessment of the support they can offer and manage expectations to ensure the company receives the support it thinks it is getting. Failure to meet this requirement puts companies off and acts as a barrier to future partnership work.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

DEL - Mainstream the DEL Employer Support Programme - with block funding given to colleges to increase research lecturing time enabling a significant up-take in the time available to engage with employers.

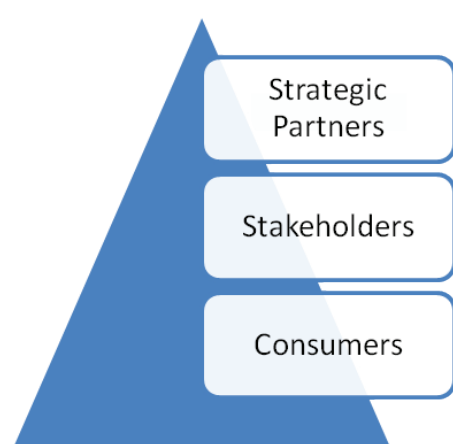
DETI/Invest NI – Increase visibility and accessibility of R&D grants available to all employers. Many SMES are still not aware of Innovation vouchers.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

- More attractive tax credits
- Improved co-ordination – to ensure same message is conveyed to all stakeholders and to avoid duplication
- Increased resources allocated to FE colleges under Connected project

8. How can business and academia work to support research and development opportunities?

NRC Economic Engagement Strategy. In order to classify the nature of economic engagement activity the following LSDA classification model has been adopted.



- Uses provider as source of support
- Collaborates in the development of new provision for the benefit of own company and wider sector
- Contributes in cash/kind to renew or up-date resources
- Provides work placements
- Advises on curriculum and its assessment
- Participates in college governance
- Uses day release or regular provision
- Buys bespoke training

The NRC Economic Engagement Strategy conforms to this classification and is aimed at supporting the overall aim of:

1. Classifying of all organisations in each of these categories by faculty / school
2. Expanding the overall number of organisations which engage with each Faculty/ School
3. Developing the relationships between the faculty/school and organisations through the development of more added value services, thereby adding to the pool of organisations that NRC regularly work with and providing opportunities to move organisations up the Economic Engagement Pyramid.

Examples of Strategic Partnership working include:

Ryobi Aluminium Castings (UK) Ltd – Development programmes include:

- Lecturer Placement since 2006
- Winner Regional and national Training Awards 2006 – 07 (Robotics)
- Winner Regional Training Award 2010 (B.I.T. PROGRAMME)
- Six Year Strategic Partnership to design and deliver bespoke training programmes in:

Robotics	Pneumatics	Mech/Elect Up-skilling
Die-casting	Geometrical Tolerancing	Torque
Business Improvement	Limits and Fits	M/C Maintenance
Techniques	Statistical Process	Standard Operating
Hydraulics	Control	Procedures

Schrader Electronics Ltd – Development programmes include:

- Lecturer Placement since 2009
- Valve Core Process Line Analysis & Improvement
- Three Year Strategic Partnership to design and deliver bespoke training programmes in:

Robotics	Techniques	CNC
NEBOSH Cert	Garage Training	Mech/Elect Up-skilling
Business Improvement	Programme	

Equipment Donation by Schrader Electronics:

- Final Assembly Production Machine.
- Offload Packing Cell.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Pure Roast Coffee Ltd

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Pure Roast Coffee Ltd	028 9262 1466			
Organisation Address	Organisation Type (Include one or more X)			
Rathdown Road Lissue Industrial Estate Lisburn BT28 2RE	Business	X	University	
	Business Support		FE College	
	Government		Research	
	Other (Please Specify)			

Please provide some background information on the organisation

Coffee roasters

Section 2 Questions to Consider

- What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**
None
- How appropriate are the available opportunities for developing the Northern Ireland economy?**
Opportunities in NI are restricted – Potential exists outside of NI
- What support is available to assist organisations to access opportunities for research and development?**
Invest NI Grants aid
- How beneficial is the available support in assisting organisations?**
We were successful in being supported by Invest NI receiving grants circa £36k which allowed us to develop new blends and secure export business in Dubai and the UK
- What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?**
Not being aware of the opportunities available
- What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?**
The current Invest NI structure in our opinion works satisfactorily

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

Don't Know

8. How can business and academia work to support research and development opportunities?

Not Applicable to us

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

None

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Queen's University Belfast

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
The Queen's University of Belfast	(0)28 9097 2565			
Organisation Address	Organisation Type (Include one or more X)			
Research and Enterprise Directorate Queen's University Belfast Lanyon North BT7 1NN Contact: Mr Scott Rutherford (Director, Research and Enterprise)	Business	<input type="checkbox"/>	University	<input checked="" type="checkbox"/>
	Business Support	<input type="checkbox"/>	FE College	<input type="checkbox"/>
	Government	<input type="checkbox"/>	Research	<input type="checkbox"/>
	Other (Please Specify)			<input type="checkbox"/>

Please provide some background information on the organisation

Queen's is a broadly-based, research-driven university with a dynamic world-class research and education portfolio and strong international connections. The University promotes the widest possible access to this portfolio of excellence in an environment of equality, tolerance and mutual respect, and it fully embraces its leadership role in Northern Ireland and beyond.

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

The following opportunities for collaborative R&D activities are available:

EU Framework 7

- (i) Cooperation Programmes:
 - Collaborative research: European Excellence
 - Coordination between national research programmes
 - Joint Technology Initiatives
 - Technology Platforms
- (ii) People programmes:
 - Initial Training Networks
 - Marie Curie development grants/ fellowships
 - Marie Curie Industry-Academia Partnerships and Pathways (IAPP)
 - Marie Curie international fellowships/ exchange programmes

- (iii) Ideas programmes (European Research Council):
 - Starter fellowship grants
 - Advanced fellowships
- (iv) Capacities programmes:
 - Research infrastructures
 - Research for the benefit of SMEs
 - Regions of knowledge and support for regional research-driven clusters
 - Research potential of Convergence Regions
 - Science in society
 - Support to the coherent development of research policies
 - International cooperation

Other EU Programmes

InterReg

UK Programmes

Technology Strategy Board - Collaborative R&D thematic calls

Technology Strategy Board – Knowledge Transfer Partnerships

UK Research Councils (variety of schemes involving both academia and industry)

- Medical Research Council (MRC)
- Engineering and Physical Sciences Research Council (EPSRC)
- Science and Technology Facilities Council (STFC)
- Natural Environment Research Council (NERC)
- Biotechnology and Biological Sciences Research Council (BBSRC)
- Arts and Humanities Research Council (AHRC)
- Economic and Social Research Council (ESRC)

Other government funding sources include:

- ConnectEd programme
- Innovation Voucher programme
- Knowledge Transfer Partnerships
- Fusion
- Innova programme
- US Ireland R&D programme
- Invest NI Collaborative R&D programme.
- Invest NI Competence Centre programme

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

In general terms the programmes and initiatives listed above are appropriate to support R&D activities that are both research driven and business led. The major problem is often a lack of awareness and understanding as to how each programme fits into a wider context and indeed

what the NI strategy is for optimising returns from programmes that are not only regional, but national and international. Stepping back and assessing how businesses and academia engage in R&D holistically is currently missing.

Funding opportunities and programmes on the supply side are, for the most part, as strong as other regions of the UK and cover the appropriate stages of the innovation process. Note that Northern Ireland benefits from ERDF funding which some other regions of the UK do not. The key issues are demand-side oriented with too few active R&D companies in the region and those sectors with R&D active companies are currently below critical mass. R&D intensity is located in too few companies within Northern Ireland and efforts to incentivise this in key market sectors should be encouraged.

3. What support is available to assist organisations to access opportunities for research and development?

Programmes managed through Invest NI are adequately resourced with support for organisations wishing to engage and apply. Standard materials, advice, application templates are accessible and dedicated staff are in place to support access to programmes – e.g. Innovation Vouchers, EU, Proof of Concept programmes are all staffed with specialist advisors.

A number of R&D funded programmes require national or international consortia (e.g. EU Framework programmes) and there is little dedicated or coordinated assistance available within Northern Ireland to support consortia building and navigate through the complexities of Framework applications. Invest NI have a small EU support service but little exists by way of coordinated support across the rest of Northern Ireland, which contrasts adversely with the arrangements in the Republic of Ireland, where there has been long-standing national level resource. Developing a position of influence within Brussels is also a long-standing issue for Northern Ireland.

A recent supplementary DEL EU Support fund was provided to the two Universities and has allowed for application support from consultancies to be established. The light-touch review approach and flexibility for use within the Universities has been initially positive. However, the funding level was extremely small and was provided for through cuts to other funding university streams. This merely causes other constraints elsewhere and will not address the issues facing Northern Ireland in terms of EU funding. Significant additional funding to embed dedicated EU resources within the Universities (i.e. close to the University research base) is an imperative.

One of the most critical forms of support for R&D activities within Northern Ireland is provided through the Higher Education Innovation Fund (HEIF), now in its third round. This funding provides critical support for the University research base through dedicated knowledge transfer staff and associated activities. HEIF funding has been recently reviewed in England and maintained at existing levels, despite the economic downturn, as the return on investment was noted as over £3 for every £1 of government investment. Despite this, recent funding within Northern Ireland over the current CSR period was reduced for HEIF. If collaborative R&D between academia and companies, together with the commercialisation of research (i.e. licensing and spin-outs) is to be taken seriously within Northern Ireland then HEIF funding must be recognised as the core funding mechanism through which academia-business related R&D is brokered and developed.

4. How beneficial is the available support in assisting organisations?

Whilst there are many programmes available to support collaborative R&D and dedicated support available to support organisations more could be done to drive success.

The prevalence of bureaucracy and risk aversion within the region undermines the support provided for generating collaborative R&D applications. The approval of applications takes too long and too many approvals, often repeated several times, are carried out with little or no added value. This is too slow for most business outcomes.

The same can be said of collaborative R&D grant awards where the emphasis is upon process rather than outcomes for the Northern Ireland economy. The process of monitoring, reporting and financing R&D activities is overly bureaucratic and audit demands are stifling and time consuming, often preventing talented people from driving innovation. The recent evaluation of the Knowledge Transfer Partnerships (KTP) programme, above and beyond any other region in the UK, has resulted in a significant drop in KTPs between the universities and SMEs within the region. As a result, Queen's, which led the UK by a considerable distance, has seen other UK regions catch up dramatically. The evaluation and appraisal is still ongoing over a year later.

Proof of Concept (POC) funding, which supports researchers in developing new products and services for commercial application, is similarly constrained by multiple audit levels. Again, talented staff are immersed in processing audit paperwork rather than commercialising research for the benefit of the region.

Finally, efforts to generate Foreign Direct Investment (FDI) would benefit from a more coordinated and better planned approach within the region, and founded upon clear knowledge of the strengths of the research base. Companies invest in R&D where genuine research strengths exist and existing support would be better utilised planning a smaller number of visits, with greater focus and higher quality.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

The prevalence of risk aversion and overly bureaucratic grant schemes in the public sector are covered above in general terms. More specifically, bureaucracy dissuades potential applications and the use of appraisal techniques should be more flexible – applying green book appraisals to some R&D project proposals leads to highly speculative and largely meaningless assumptions on income streams.

Entrepreneurial ambition remains below the level of critical mass needed to drive a highly effective knowledge economy in technology intensive sectors. Programmes coordinated by NISP Connect (and which are largely reliant upon the universities) provide a starting point for developing increased entrepreneurial talent, social capital and business planning. NISP Connect should continue to focus its activities on developing entrepreneurs and developing productive networks in partnership with stakeholders within the innovation ecosystem.

Other barriers facing business are particularly specific to Northern Ireland, which has a peripheral location in the context of major markets. As such, major customers and market opportunities remain less evident or not as well understood. Relatively small numbers of senior-level commercial R&D opportunities also leads to a risk of 'brain drain'.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Dedicating specific, dedicated skilled resources to understand R&D intensive and innovative economies (such as Finland, Sweden and Israel) and to subsequently inform public policy within Northern Ireland. A focus on implementation and long-term patience is critical. A ten-year strategy should be developed which focuses firstly upon drafting a new policy – with clear ownership and buy-in from stakeholders across the region and across departments. Resource allocation to support the strategy should be aligned carefully and should be accompanied with a clear implementation plan. The implementation plan should be structured with short, medium and long-term milestones which are acted against and monitored/ reviewed regularly through clear accountability structures.

Possible actions include:

- (i) Initiatives to attract a greater number of product management and R&D jobs to Northern Ireland to create higher value added employment, up-skill the workforce

and enhance market intelligence in sectors capable of export growth. Novel financial incentives and instruments may be required, that go beyond the current portfolio of R&D grants, which apply to all other regions, in order to differentiate Northern Ireland.

- (ii) Successful, R&D intensive economies tend to have a much higher proportion of STEM graduates and technicians employed in new product design and high value added manufacturing than is the case in the U.K. and Northern Ireland. In turn this generates increased exports sales and superior returns to these economies. Continued investment in supporting universities to produce an enhanced number of STEM graduates which meet industry needs will be important. It is critical that policies support productive academic-industry relationships to ensure that the education base is well equipped to teach an optimal curriculum.
- (iii) Seed sector specific initiatives for key Northern Ireland market sectors with either limited capability and critical mass or which are well established in the local economy (e.g. Agri-foods). Identifying key sectors should recognise that MATRIX reports are now several years out of date and may need refreshment.
- (iv) Create and promote technology based, high value-added careers within the region, potentially influencing pay scales for STEM graduates and technicians, in sectors identified for growth, so that they would receive equivalent or better terms and conditions than those received in other service professions such as law and accountancy.
- (v) Reduce government bureaucracy to significantly speed up the appraisal, approval, monitoring, claiming and audit processes associated with supporting collaborative R&D. Seek to change, in the long term, public sector approaches, developing a culture which is tolerant of risk and inevitable failures which are necessary in a portfolio approach to stimulating a knowledge based economy, where early stage intellectual property and knowledge can be successfully commercialised.
- (vi) Foster closer collaborative R&D approaches between academia and businesses through sustained long-term investment in Knowledge Transfer activities through the HEIF resourcing mechanism and as a minimum in line with other regions of the UK. Drive an outcome based approach to commercialisation activities and incentivise through policy greater permeability between the research base and businesses. (E.g. Knowledge Transfer secondments, shared facilities, Enterprise Fellowship schemes).
- (vii) As is the case in the Republic of Ireland, the Northern Ireland government should offer proactive assistance to find collaborative R&D partners for Northern Ireland businesses and researchers to facilitate EU wide collaborations and opportunities. Ideally, expertise should be embedded close to the research base to facilitate a deeper understanding of research and its applicability to commercial partners. A sustained, long term and realistic approach to EU funding is required.
- (viii) Incentivise new and repeat R&D in existing companies (for all sectors) who sell into external markets, sustaining and creating additional high value added activities.
- (ix) Encourage more technology based entrepreneurs to take risks in an increased number of start-up opportunities. Recognise that there will be a high failure rate and that successes require both early-stage investment and long-term support. Focus ongoing financial support on a small number of specific, high quality opportunities that will emanate from a population of 1.8 million. Focus on high quality people, projects and market opportunities.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

This is covered in section 6 above.

8. How can business and academia work to support research and development opportunities?

The current range of programmes to support R&D is sometimes disconnected, overly complex and can operate in isolation – programmes could benefit from being considered holistically and comprehensively with a focus on greater simplification. Businesses are often not sufficiently engaged to identify knowledge and opportunities; mechanisms should be established to better coordinate business engagement and create greater simplification and accessibility to the research base.

Additional support for 'IP knowledge forums' to broker knowledge transfer/ exchange from within the academic research base to potential implementers (N.I. businesses and entrepreneurs) would facilitate better mutual understanding. As mentioned above, the current reduction in funding of HEIF over the CSR period, and out of kilt with the rest of the UK, has serious implications for helping businesses and academia work together. The adverse effects of this are already taking effect within Northern Ireland.

Ensuring that appropriate resources and incentives for the universities and colleges to fully engage in knowledge transfer/ exchange activities with locally based companies is critical to building a knowledge economy. The current incentives and resources are not sufficient to ensure that the regeneration of the local knowledge based economy can occur.

A variety of funding schemes currently exist to incentivise collaboration between business and academia. These include: POC projects, KTP projects, R&D collaborations, contract research collaborations, consultancy activities and CAST awards available to N. Ireland businesses. These are currently mired by prevarication, time-consuming appraisal processes and an over-emphasis upon process-driven audit. Such schemes should be grown exponentially but with much greater emphasis upon outcomes rather than process and with significantly reduced bureaucracy. Northern Ireland is seriously disadvantaged in this regard when compared to other regions and nations.

Recent initiatives from Invest NI to fund industry-led Competence Centres in key sectors are a positive step. A greater number of these centres should be funded, utilising a model which fully sustains business relevant capabilities within research institutions. With a clearer strategy, which is more timely and focussed, more could be achieved through Competence Centre models.

In line with the issues concerning bureaucracy highlighted in the document, a significant reduction in the amount of expenditure on consultancy activities and increased accountability within organisations funding/ delivering collaborative R&D (public and private) would greatly improve efficiency.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

The above response covers all relevant details.

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from Qwizdom UK Ltd.

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
Qwizdom UK Ltd	028 9048 5015			
Organisation Address	Organisation Type (Include one or more X)			
Carrowreagh Business Park 8 Carrowreagh Business Park, Carrowreagh Road, Belfast, BT16 1QQ	Business	<input type="checkbox"/>	University	<input type="checkbox"/>
	Business Support	<input type="checkbox"/>	FE College	<input type="checkbox"/>
	Government	<input type="checkbox"/>	Research	<input type="checkbox"/>
	Other (Please Specify)			<input type="checkbox"/>

Please provide some background information on the organisation

Qwizdom UK is an educational technology company selling hardware & software solutions into domestic & international markets.

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

I have limited knowledge of opportunities available. Senior Management at Qwizdom that had previously dealt with this have left the organisation.

I have been on a number of trade missions with Invest NI and from my limited knowledge I believe Invest NI offer businesses funding for R&D when exports are more than 250K sterling per annum.

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

Based on the performance of the NI economy and the reliance on public sector jobs, I would say the available opportunities are not appropriate.

3. What support is available to assist organisations to access opportunities for research and development?

As previously mentioned, I am aware that Invest NI offer funding for R&D whenever a business meets specific criteria.

4. How beneficial is the available support in assisting organisations?

From my knowledge of the Qwizdom UK business, the funding received has been useful.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

They do not know what funding is available.

They do not know where to go to find out.

They do not know if they meet the criteria.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

Invest NI could work more closely with companies, providing transparent information that helps companies.

To be fair, this data is probably available online but many businesses will require some hand holding in order to be successful in their application for funding.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

More funding will motivate businesses to be pro-active in the area of R&D.

Most businesses understand the importance of innovation, if the funding was there, they would be

Encouraged to do more.

8. How can business and academia work to support research and development opportunities?

Mentor

Simple application process

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

N/a

Section 4 Contact Details

All written responses should be sent to:

Jim McManus Tel. 028 9052 1574

Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from South East Regional College

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
South Eastern Regional College	02891 276600			
Organisation Address	Organisation Type (Include one or more X)			
Carrowreagh Business Park 8 Carrowreagh Business Park, Carrowreagh Road, Belfast, BT16 1QQ	Business	X	University	
	Business Support	X	FE College	X
	Government	X	Research	
	Other (Please Specify)			
	Education, Skills, Training			

Please provide some background information on the organisation

A top 20 UK College, SERC has been described as the 'cutting edge' college of the Northern Ireland Further Education sector. With 30,000 annual enrolments and 1,200 staff, SERC is the delivery arm for the government to ensure that the NI economy has the skills to grow, innovate and operate on a global platform. We intend to do this by helping people overcome educational disadvantage, building a hub for scientific and technological capabilities, professionalising the workforce, encouraging innovation, enterprise and entrepreneurship and overall supporting and developing careers.

Section 2 Questions to Consider

1. What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?

SERC is aware of several opportunities at EU, UK, cross border, Northern Ireland and local government levels for business and academia to become involved in research and development. The College aware of and is currently active in the following opportunities:

INTERREG IV – Priority 1 . Innovation and the knowledge economy
Priority 2 Environment and risk prevention

European Social Fund - Developing a skilled and adaptable workforce

Grundtvig – enriching adult education programmes

Erasmus

Leonardo

Comenius

British Council – science networks

UKIERI – International partnerships

Connected – HE/FE Project

DEL Innovation Fund
Innovation Vouchers
Knowledge Transfer Partnerships

2. How appropriate are the available opportunities for developing the Northern Ireland economy?

The opportunities are appropriate, however they do need to be better sign posted so that businesses and education can make more use of them.

3. What support is available to assist organisations to access opportunities for research and development?

It depends on the funding stream. For example Innovation vouchers or Knowledge Transfer Partnerships offer support on application. Some of the European funding streams can be complex and sometimes there is little support in making applications. There is however support through the internet, and often support for finding partners.

4. How beneficial is the available support in assisting organisations?

The support that is on offer is beneficial .

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

There are three main barriers from SERC's perspective:

1. The knowledge of the funds and what they can be utilised for.
2. Funding – often is match funding and often the College cannot afford this opportunity
3. Finding internal resources as the process can be time consuming

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

- 1 Better signposting
- 2 More support in making applications
- 3 More understanding of how the funding can help your business
- 4 More marketing of the opportunities

There is an opportunity to create **Regional Applied Research Centres** at each College which if properly researched could be a source of advice and support for SMEs. These centres could play a vital role in promoting, signposting, facilitating, and delivering research and development opportunities for the business sector. This would strengthen the partnerships between business and FE as well as capitalising on the existing partnerships the Colleges have developed under FE Means Business strategy.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

I suspect there are enough policies, but more knowledge needs to be made available to people. For example there are tax incentives for organisations that undertake research, and patent ideas. If more businesses were aware that they would incur less Corporation Tax on ideas that they developed, then this may encourage more research and development.

8. How can business and academia work to support research and development opportunities?

The linkage between Universities and the business sector with regard to research is well established, however the linkage between Colleges and the business sector with regard to **applied research** is less well known. There is a need to market this more proactively and showcase some examples of how Colleges are doing this very effectively.

The Colleges have resources that lend themselves to research and development opportunities for the business sector, for example Rapid Prototyping machines. If **Regional Applied Research Centres** were established within each Regional College, it is likely that more SMEs would engage in research. Colleges can then sign post to Universities if this is required.

This facility would encourage stronger links between the business sector and academia, and promote the FE means Business strategy.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from South West College

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
South West College	0845 603 1881			
Organisation Address	Organisation Type (Include one or more X)			
2 Mountjoy Road Omagh Co. Tyrone BT79 7AH	Business	<input type="checkbox"/>	University	<input type="checkbox"/>
	Business Support	<input type="checkbox"/>	FE College	<input checked="" type="checkbox"/>
	Government	<input type="checkbox"/>	Research	<input type="checkbox"/>
	Other (Please Specify)			<input type="checkbox"/>

Please provide some background information on the organisation

The South West College is one of Northern Ireland's 6 Further Education Colleges with a catchment area covering Tyrone and Fermanagh. The College is recognised as one of the principal skills providers within Northern Ireland for business and industry. The College currently has 18,500 student enrolments, a staffing complement of some 500 full-time staff and a similar number of part-time staff. South West College has campuses in Dungannon, Cookstown, Enniskillen and Omagh and a budget of £32 million.

As a result of the merger of the former Omagh, East Tyrone and Fermanagh Colleges, the College now offers a diverse curriculum to support the regional and local economy. The College aims to provide a caring and supportive environment for all learners and a professional business-like relationship with all employers and other external stakeholders. The South West College strives to provide a quality product to all its students and will continue to work closely with the community in which it serves.

The sectoral strategy for further education in Northern Ireland 'FE means Business' identifies as one of its three strategic objectives that FE should be a key driver of local, sub-regional and regional economic development. In addition to the provision of training and education, the strategy establishes that FE colleges should actively work with local employers to offer; technical support, business management, assistance with product development, incubation and bespoke training. South West College is renowned for its strong links with industry and is suitably placed as a leading economic development resource and a professional provider of a range of programmes supporting development, innovation, up-skilling and technical transfer in the region. This has seen the College awarded UK Association of Colleges Beacon awards for Employer Engagement and College/School Partnerships (Nov 2011) and the winner of the Best Green Educational and Sustainability Awareness Category at the International Green Awards (Nov 2011).

Section 2 Questions to Consider

1. **What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**

The South West College, through the InnoTech Centre, assists small and medium enterprises (SMEs) access support for research and development.

At an EU level the College has delivered technical mentoring, technology development and training to business as part of several Interreg funding programmes. Examples include Beyond Computing, HATCH, the iFactory, Tradelinks and the Western Innovation Network (WIN). The College has also assisted SMEs in areas of specialist research such as that of the North West Environment and Energy Consortium's Waste Management project which focused on anaerobic digestion, and biomass related projects such as BIOENERGIS and RENEW. While the College is aware of EU framework 7 projects it has not been involved in any submissions to date.

On a cross-border basis the College has delivered 11 Enterprise Ireland 'Innovation Vouchers' over a 3 year period and has recently assisted 2 companies (one from Galway and another from Monaghan) with successful applications for Intertrade Ireland's FUSION programme. All of these projects, as well as the afore mentioned cross-border Interreg funded EU projects, have been with small enterprises where the College staff have delivered technical support and assisted the companies become involved in research and development.

On a Northern Ireland basis the South West College is delivering on numerous programmes that are providing SMEs with access to the College's knowledge and technology resources. Examples include Invest NI Innovation Voucher Scheme, Invest NI Grant for R&D scheme, Invest NI's Technical Development Incentive, the former Invest NI Growth Programme, the Invest NI and Technology Strategy Board (TSB) funded Knowledge Transfer Partnership (KTP) Programme and the ESynergy investment fund. The College was a tier 1 delivery partner in Invest NI's Enterprise Development Programme in conjunction with the other FE Colleges and Enterprise NI. As a prime example of best practise, the College has found that innovation vouchers are an ideal route to establish business and academia research and development links and assist businesses to bring their new innovative ideas to the market using the College's technical expertise. The College is the top FE delivery organisation in Northern Ireland and has delivered 78 projects with SMEs.

The College has been successful in tendering for and delivering SME economic development initiatives for numerous local government councils to assist businesses to become involved in research and development. Examples are the Cookstown Council 'Cookstown Engineering Innovation Programme', Dungannon and South Tyrone Borough Council's 'Innovation Promoters Programme' and 'SME Innovation Programme', the Lisburn City Council 'Lead Market' programme and Omagh & Fermanagh District Council's joint 'Survive and Thrive' programme. Within all the programmes mentioned above the College has delivered bespoke practical R&D solutions for each company assisting them to develop new products and services with a view to export markets.

This province wide on-the-ground practical presence, provided with the support programmes offered over years has developed the College's capacity to provide innovation and knowledge-based services assisting business to become more competitive and embrace research and development.

2. **How appropriate are the available opportunities for developing the Northern Ireland economy?**

As a College we feel that many of the programmes support the Northern Ireland economy to become more innovative. We do however feel that there are numerous advisory programmes and services who are providing generic business support. In our opinion what businesses require is technical knowledge transfer and support to make their business even more

identifiable in an ever increasing global market. This is why we feel that we are one of Northern Ireland's key centres for industry research and development, providing a practical service suited to the needs of the SMEs.

3. What support is available to assist organisations to access opportunities for research and development?

To date the South West College has assisted businesses to undertake research and development through its InnoTech Centre. This has been funded through the Department for Employment and Learning's Innovation Fund Employer Support Programme. The College's staff also have a good working relationship with key staff within Invest NI to signpost businesses to sources of funding that may be available to them.

4. How beneficial is the available support in assisting organisations?

Within the South West we have focused on technical solutions to supporting businesses with research and development. With 98% of Northern Ireland's business being small and medium enterprises (SMEs) many companies do not have the scale to establish research and development departments. Within the South West College, through our InnoTech Centre we have positioned ourselves as the R&D department for SMEs. They avail of our services when they need assistance with product and service development and we focus on bringing the latest technical knowledge to them.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

The main barriers facing SMEs is that many of them have not undertaken research and development before. Many businesses do not understand that their product development and product improvement is a form of research and development and do not realise that they can get funding assistance to help them capitalise on their innovative ideas.

Once they access funding small business require specialist technical expertise of staff who understand what it is like to operate a small company with limited resources, yet at the same time have the latest technical knowledge that the business needs to make their idea become reality.

From a College perspective the programme based style of funding is not conducive to establishing a research and development centre that can build up a reputation and have the capabilities of making a difference to SMEs. Often once the funding programme has completed the project/programme activity ceases and the SMEs are left without the vital support. At the South West College we have established the InnoTech Centre through seed funding from the Department for Employment and Learning's Innovation Fund Employer Support Programme. It is not feasible to offer this service on a full cost recovery basis as SMEs need hand-holding as you take them through the process of developing new products and services. The College has shown goodwill to the local economy in Northern Ireland by investing its own money to maintain the Centre but it is difficult to predict how long this can be maintained. This lack of consistent research and development funding is one of the main barriers faced by the College in assisting companies accessing opportunities to be involved in research and development.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

It is vitally important that the government support Northern Ireland's Further Education Colleges to continue to support SMEs. As previously stated many businesses do not understand the process of new product and service development to identify market niches and unique selling points for their proposed new innovations. SMEs often feel overwhelmed in liaising with the Universities and appreciate the practical approach that an FE College can offer. Therefore the assistance such as that offered by the South West College's InnoTech

Centre is vital to meet the needs of businesses to become actively involved in research and development.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

The South West College feel that increased collaboration is required on a cross-border basis, especially around the bordering counties. Many SMEs are based in different jurisdictions yet separated by a few miles. Fermanagh has one of the highest rates of start-up companies yet very few flourish and grow. It is important that SMEs collaborate rather than compete as it is through enhanced collaboration that companies can fully exploit opportunities that exist to develop better products that can be more economically viable on a global scale.

An exciting example of this is that of the Kilkeel Development Association, where 9 SMEs have partnered to research a sustainable vision, incorporating renewable technologies and sustainable development. This Invest NI innovation voucher funded research and development project is being delivered by the South West College's InnoTech and Carbon Zero Centres in association with Queen's University Belfast, the University of Ulster and the College of Agriculture and Rural Enterprise. It is only by developing collaborative links between SMEs and research institutions that SMEs can bring forward their visions and make them a reality.

In attempting to address this need for greater cross-border collaboration the South West College, in collaboration with IT Sligo, Cavan Innovation and Technology Centre (CITC), Dumfries & Galloway College and the Building Research Establishment (BRE), is developing a Centre for Regional Enterprise and Sustainable Technology in Enniskillen Co. Fermanagh. This Centre will provide leadership to SMEs in the region to enhance collaboration and assist SMEs to grow.

8. How can business and academia work to support research and development opportunities?

As stated in question 8, a greater degree of collaboration is required from businesses, academia and also government agencies to support and exploit research and development opportunities. The Kilkeel Development Association's Sustainable Kilkeel Vision project is an excellent example of joined-up, collaborative research, with 9 SMEs, numerous academic institutions, and funding through Invest NI's innovation voucher scheme. It is through collaboration such as this that market focussed research and development can become more coherent providing greater tangible outcomes.

The South West College has provided an on-the-ground practical R&D support presence through its InnoTech Centre. This Centre is assisting business to become more competitive and embrace research and development and it is by continuing this service to SMEs that NI's businesses can continue to bring new innovations to the market.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011

Response from University of Dublin



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

15th 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,

A handwritten signature in black ink that reads 'Kevin McGuigan'. The signature is written in a cursive, flowing style.

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 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.¹ 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%.²

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 businesses³ 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 Panel⁴, and the Oxford Economics Skills Reports⁵, 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)⁶

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
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
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/>

Response from University of Ulster

Northern Ireland Assembly Committee for Enterprise, Trade & Investment

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

Section 1 Organisation Details

Organisation Name	Telephone Number			
University of Ulster	028 9036 6702			
Organisation Address	Organisation Type (Include one or more X)			
c/o Mr Timothy Brundle University of Ulster Shore Road Newtownabbey Co. Antrim BT37 0QB	Business	X	University	X
	Business Support	X	FE College	
	Government		Research	X
	Other (Please Specify)			

Please provide some background information on the organisation

The University of Ulster is a unitary institution with four main campuses across Northern Ireland at Belfast, Coleraine, Jordanstown and Derry~Londonderry. It is a leading modern university with a strong regional mission with a national and international context. It has performed exceptionally well in developing and enhancing the relevance and quality of its research, innovation and taught programmes. It is widely acknowledged for its achievements in widening participation and increasing access through collaborative and partnership working. It has established excellence in chosen research areas and it has contributed substantially to developing regional, economic and societal capacity through technology and knowledge transfer.

The University's provision is the largest on the island of Ireland with activity being carried out across six faculties: Art, Design and the Built Environment; Arts; Computing and Engineering; Life and Health Sciences; Social Sciences; and the Ulster Business School. Courses have a strong vocational element and the majority includes a period of industrial or professional placement. Currently over 25,000 students are registered on programmes ranging from first degree to doctoral level across the four campuses, with a further 4,000 students registered on franchise programmes with partner institutions, both at home and internationally. The University has a major direct and indirect impact on the economy and community in Northern Ireland. It employs over 3,500 staff and has an annual turnover of some £200 million.

The University is a major contributor to research and innovation capacity within Northern Ireland in support of local business and industry. Its Research Strategy focuses on selective prioritization based on performance and its research base has strengthened and expanded rapidly in terms of funding and quality. Research Institutes have been established in 16 disciplines across the University. Following the publication of the results of the 2008 Research Assessment Exercise, the independent and authoritative Times Higher league tables of research quality placed the University in the top third of UK Universities, ahead of many longer established universities. Of the 25 disciplines submitted in RAE 2008, 21 had research assessed as world leading i.e. 4* and Biomedical Sciences, Nursing and Celtic Studies were ranked in the top three for the exercise.

At its heart, the University of Ulster is about the creation of knowledge through research and its dissemination through teaching and innovation. Our focus is on teaching and research that advances and develops disciplines and impacts directly on policy and professional practice. We advance knowledge by achieving international excellence in our chosen areas of research and transfer knowledge in support of economic, social and cultural development. The production of high quality, high impact research is essential to maintain the intellectual and civic mission of the University, and is foundational to the reputation of the University. Ulster's research strengths are concentrated and consolidated in 16 Research Institutes (RIs) that provide the overarching structure for a stimulating and supportive environment for both staff and students. The Research Institutes reflect the University's existing strengths in research and are intended to better enhance the University's reputation for research excellence at national and international level. The diffusion of research outputs into the economy are led internally by the University's Office of Innovation, and externally by its wholly-owned award-winning knowledge venturing and investment company, Innovation Ulster Ltd.

Section 2 Questions to Consider

1. **What opportunities are you aware of at EU, UK, cross-border, Northern Ireland and local government levels for business and academia to become involved in research and development?**

The University of Ulster is an active participant in a global range of Research, Development and Innovation programmes worldwide, funded by Governments, industry and in partnership with other academic institutions. Ulster conducts research on behalf of, and in collaboration with, a wide range of partners from indigenous start up enterprises to some of the world's largest companies. The University has 25 current Framework projects with a total value of £5.85 million for the Ulster elements of the research programmes. We have 47 current Research Council awards with a total value of £11.29 million. In 2010/11, QR from DEL for STEM subject areas £12.48 million, which is matched from the University's internal funds. The University also has a total of 446 current research grants in STEM subject areas with a total value of £64 million. These are from a wide range of external funding bodies. The University of Ulster is targeting research funding from FP7 or Horizon 2020, large UK charities and research councils (RC), the Technology Strategy Board, the Health and Social Care R&D Office, Invest NI, the US-Ireland Research & Development Fund, DEL, philanthropists and industry both in Northern Ireland and internationally. EU funding will be an increasing element of our Research support and indeed much of current funding from Invest NI is provided from ERDF.

2. **How appropriate are the available opportunities for developing the Northern Ireland economy?**

The University has worked across its partner organisations within Northern Ireland to develop research volume, research capacity and research capability within the institution and also within its client companies. However, Invest NI is not actively bringing research opportunities to the University and could do more to identify sources of match funding for its client companies' applied research and innovation projects. Such sources would include the European Union, Research Councils and the Technology Strategy Board. There also needs to be closer connections between Invest NI and the Universities to develop a shared understanding of Northern Ireland's research strengths and to work together to engage SMEs in R&D programmes. There is recognition of the need to align publicly funded research with NI's economic priorities in order to increase the potential for greater knowledge transfer between business and academia. This should increase the rate of commercialisation of publicly funded research and public sector Intellectual Property. The Draft Economic Strategy calls for the establishment of an Innovation Council to ensure that, at the highest level, the Executive, Academia and Business work together to further embed innovation across the NI economy.

More must be done to increase research funding in Northern Ireland and to reverse the NI Executive's declining financial support for innovation. Northern Ireland also needs more venture capital to create value from its investment in the creation of knowledge. The majority

of FDI-acquired, most research intensive, and fast growing companies in Northern Ireland are backed by venture capital – this observation is common throughout Europe. Therefore, Invest NI must make more provision and DFP needs to develop a better understanding of the importance of private equity to knowledge exploitation. Furthermore, Northern Ireland is the only region in the UK without an incubator and none of the current draft of economic policy documents make provision for this. We have increasing science park provision, but no infrastructural support for knowledge-based start ups.

3. What support is available to assist organisations to access opportunities for research and development?

Each researcher within the University will conduct market research in pursuit of research funds, including the monitoring of bulletin boards, journals and websites. Additionally, the University maintains an internal Research Office to assist its Research Institutes identify research funding opportunities, develop proposals and provide administrative support for projects. The University's Office of Innovation identifies opportunities for industrial collaboration and private sector sponsorship. The University's Development Office seeks philanthropic and charitable support for research development. Each team works not only on behalf of the University, but also on behalf of our clients and collaborators. However, as is highlighted above, there is scarce third party support available to organisations in Northern Ireland to identify and progress research opportunities. Additionally, support could also be made available to encourage private sector research brokerage, partnering and R&D proposal development particularly with respect to securing EU R&D funding.

4. How beneficial is the available support in assisting organisations?

Research capacity building and improvements in the acquisition of research skills have been achieved through the funding of long-term research programmes and attracting leading external researchers to work alongside domestic researchers. The University of Ulster has attracted considerable research talent to Northern Ireland over the years and such expertise is core to attracting high value FDI companies. The University welcomes the research support available via DEL, the HSC R&D Office and Invest NI. However, local public investment in innovation in universities in Northern Ireland has fallen by 16% over the past three years, which needs reversed.

Numerous incentives are available from Invest NI to assist companies engage in R&D for the first time and to develop their competitiveness through research collaboration, product development and innovation throughout their enterprises. The University applauds Invest NI's Innovation Voucher Scheme, which has provided opportunities for SMEs to consider the impact that investment in research and innovation. We have supported our Innovation Voucher clients' progression into other research and innovation programmes, ranging from the Invest NI Grant for R&D and Technology Strategy Board Knowledge Transfer Partnership Schemes. With 185 Innovation Vouchers completed, Ulster has the highest proportional level of engagement on both sides of the border. In addition, the University has the largest engagement of any academic institution on the Island of Ireland in InterTradeIreland's FUSION programme. Strategically, we view such consultancy engagements as a way to establish long-term collaborative relationships with organisations. Where possible, the aim is to take collaborative development further into KTP programmes and R&D Grant funding from Invest NI and high profile funders. Again, Ulster has a track record of successful engagement with companies in KTP and R&D Grant funded projects. We have welcomed the objective in the Draft Economic Strategy to *"provide £54m funding for University research and for investing in collaborative HE/FE engagement with business in 2011/12"*. Further, Invest NI's emergent Centres of Competence scheme are welcomed, which aims to develop Northern Ireland's market-orientated research capacity.

5. What are the main barriers faced by organisations in accessing opportunities to be involved in research and development?

The environment for accessing major grants is highly competitive. From an academic perspective, it is important to note that many Research Councils allow two applications, before eliminating applications if the institution has been previously unsuccessful. Other barrier is that no Northern Ireland academic sits on any of the Research Council Boards, which is not the case elsewhere in the UK. Another barrier is that unlike the rest of the UK, Northern Ireland is not a member of the National Institute of Health Research and so cannot apply for the millions of pounds that they allocate to research. With respect to EU projects, the primary barrier is the very high level of bureaucracy associated with research funds. For businesses, the high administrative burden particularly in EU projects makes them inoperable. Much can be done by public sector Departments and Agencies across Northern Ireland to minimise the administrative requirements, rather than pass them on to citizens.

6. What can government do at UK, cross-border, Northern Ireland and local level to assist organisations and to improve opportunities for research and development?

The NI Assembly should do some major things that would encourage an increase in R&D activities:

- Join the NHS National Institute for Health Research, where provides £80m research funding per year;
- Extend funding mechanisms to encourage cross border collaboration as such joint funding pots encourage researchers to work together, whether they are in industry, academia or government;
- Ensure that SEUPB reduce their bureaucratic burden of INTEREG and Peace funding programmes;
- Ensure that full economic costs are paid for research, including for charitable research income;
- Reverse the reduction in financial support to Universities for business outreach and innovation, including provision of a greater continuity of support between research and its translation into industry;;
- Introduce incentives to encourage research collaborations between Ulster and QUB;
- Increase the number of postgraduate studentships in Northern Ireland with some targeted at the north and west; and
- Provide for funding of 2* research in the REF as such research tends to underpin research impact for economic and social growth.

7. What additional or alternative policies or actions could be considered to assist organisations to become involved in research and development?

Local and international companies, small and large, look to universities for research, facilities and expertise and as the source for the newest innovations and thinking, and to solve practical business problems. To get innovations to market, companies must invest their product development skills and resources in further development. The company needs to be able work closely with the university to get the information and materials that are important for further product development, and it needs intellectual property protection to reduce the risk of another company competing after it has made a significant investment. Providing these essential elements is what university innovation offices do - whether the client is an independent company or a university spin out - finding a good partner, getting them the information they need to develop a good product, and providing intellectual property protection so an expensive, risky project still makes good business sense.

The main motivation for a university to transfer technology and knowledge into the economy is an extension of its core mission – to teach, to generate and share new knowledge, and to be of service to society. With increasing success, and increasing levels of research collaboration, reliance on university technology and knowledge transfer efforts has grown, and at times innovation has generated significant income for the company partner and the university. However, despite the necessity for such functions within the Northern Ireland economy, their public financial commitment is reducing.

8. How can business and academia work to support research and development opportunities?

Universities are powerful economic actors with important roles in the innovation ecosystem. The University of Ulster is developing an international reputation for our excellence in research, for our new ideas, and for our business acumen. We strive to be leaders in the development and application of professional knowledge. Our ability to maintain our economic relevance and institutional competitiveness relies heavily on our ability to innovate and to make the most of our excellent research.

In pursuit of innovation, professionals in university knowledge transfer offices throughout the world work with academics to identify potential uses of new discoveries and provide the business skills to maximise the social and economic benefits of these discoveries through commercialisation. Partners in science parks and economic development agencies assist fledgling spin-out companies and support local high-growth start-ups, particularly those in need of university experts and resources. Through teaching, universities are providing the science, innovation and business skills needed for our regional development. In addition to the recruitment of Graduates and enhancement of staff capabilities, our clients engage in alliances with Ulster for four main reasons:

1. To leverage their R&D funding: public funding is often available to businesses for research activities conducted in collaboration with universities. Many public programmes encourage or even stipulate a contribution from industry. In Northern Ireland, it is estimated that 56% of available research funding over the next three years will require partnerships between industry and academia.
2. Businesses are keen to access basic scientific knowledge: collaborating with Ulster enables insights into emerging technologies and business techniques, both of which enhance the business's knowledge base.
3. Businesses aim to improve their problem-solving capability through university advice and assistance in ongoing R&D programmes: Ulster's researchers are enlisted to solve problems, run tests, participate in development work and provide feedback on intermediate outputs. Many see Ulster's role in *'contributing to project completion'* as more important than *'suggesting new projects'*.
4. Working with Ulster results in broader business benefits beyond the narrow objectives of specific projects. The University is not only a source of new techniques and knowledge that enable industry to develop new market offerings, but equally, alliances with Ulster provide opportunities to screen potentially valuable recruits for positions in their companies.

The Northern Ireland Assembly and Executive clearly recognize the importance of knowledge exchange between Universities and business and the wider community and provide funding to support this activity through the Higher Education Innovation Fund (HEIF). The objective of HEIF is to encourage universities to increase their capability to respond to the needs of business (including companies of all sizes) and the wider community, with a clear focus on the promotion of wealth creation. The long-term aim of this funding is to improve Northern Ireland's innovation performance as a key element in raising productivity and delivering economic growth.

Section 3 Additional Information

Please provide any additional information which you believe will be of assistance to the Committee during the course of the Inquiry

Section 4 Contact Details

All written responses should be sent to:

Jim McManus
Committee Clerk
Room 375
Parliament Buildings
Belfast
BT4 3XX

Tel. 028 9052 1574

Email: committee.eti@niassembly.gov.uk

To Arrive no later than 16th December 2011



Northern Ireland
Assembly

Appendix 5

Research Papers



Northern Ireland
Assembly

Research and Library Service Research Paper

Paper 636-11

14 October 2011

NIAR 636-11

Aidan Stennett

Framework Programme 7

The following paper provides information on Framework Programme 7 and the regional distribution of participants and funding under the scheme.

Research and Information Service briefings are compiled for the benefit of MLAs and their support staff. Authors are available to discuss the contents of these papers with Members and their staff but cannot advise members of the general public. We do, however, welcome written evidence that relate to our papers and these should be sent to the Research and Information Service, Northern Ireland Assembly, Room 139, Parliament Buildings, Belfast BT4 3XX or e-mailed to RLS@niassembly.gov.uk

Key Points

Framework Programme 7 is the principal delivery mechanism of research policy and funding at European level.

As of 1 April 2011, 110 projects in Northern Ireland have participated in the programme, with a requested financial contribution of €30m.

Participation in Northern Ireland is greatest in the Higher Education sector with 71 participants, 65% of total participation in Northern Ireland, requesting €21m.

FP7 has a particular focus on SMEs, targeting 15% participation from SMEs in the Cooperation sub-programme. To date €1,779.7m, or 14.4% of the Cooperation budget, is going to SMEs.

Over the entire FP7 programme 10,127 participant SMEs; receiving an average contribution of €249,000.

With regard to the 15% target, Northern Ireland is in the 5-10% category, and someway short of reaching its target (see Figure 17).

The three major barriers to participation identified by SMEs as:

- Finding the correct cooperation partner;
- Accessing funding; and
- The cost of participating.

The European Commission has reformed FP7 to assist SME participation, with the most recent changes made in January 2011.

Horizon 2020 will replace FP7, with simplification likely to be a key priority.

Executive Summary

Framework Programme 7 is the principal delivery mechanism of research policy and funding at European level.

FP7 has been in operation since 2007 and will be replaced in 2013. The programme's budget FP7 is €50.5bn across its seven year lifespan, with an additional €2.7bn made available through the Euratom programme for the first five years.

Five programmes make up FP7:

- The Cooperation Programme,
- The Ideas Programme;
- The People Programme;
- The Capacities Programme; and
- The Euratom programme.

Of these, the greatest proportion of funding is earmarked for the Cooperation Programme - €32,365m.

Activities funded through FP7 must have a '*European Added Value*'. To meet this objective projects often have a transnational element, incorporating consortia of participants from different member and non-member states.

FP7 does allow for '*individual teams*' to be funded for research that has no transnational element. The work of such teams is deemed to meet the '*European Added Value*' criteria if it promotes competition on a national or European level amongst scientists working in '*fundamental frontier research*'.

FP7 is open to:

- research groups at universities or research institutes;
- companies intending to innovate;
- small or medium-sized enterprises (SMEs);
- SME associations or groupings;
- public or governmental administration (local, regional or national);
- early-stage researchers (postgraduate students);
- experienced researchers;
- institutions running research infrastructures of transnational interest;
- organisations and researchers from third countries;
- international organisations; and
- civil society organisations.

In the first four years of FP7 12,000 projects have been funded – involving 69,000 participants. The level of participation has led to a funding request of €20.4bn.

Germany, England and France have had the greatest involvement in FP7 measured by number of participants and funding requested.

Northern Ireland has the lowest number of participating FP7 projects (110) of all the UK regions and requested the lowest level of financial contribution (€30m) as of April 2011.

The greatest number of participants in Northern Ireland was located in the ICT (and SEC joint calls) and the People: Marie-Curie streams.

The largest proportion of money requested by Northern Ireland participants was in the Health stream – €5.9m equivalent to 20% of the total money requested by Northern Ireland participants (€30m).

Participation in Northern Ireland is greatest in the Higher Education sector with 71 participants (65% of total participation) in Northern Ireland – this mirrors the proportion coming from this sector in the UK as a whole.

A total of 28 participants (25% of total Northern Ireland participation) came from the private commercial sector. This again reflects the situation in the UK as a whole.

As of 1 April 2011 a total of €21m was requested by the Higher Education sector and €6.7m was requested by the private commercial sector in Northern Ireland.

SMEs contribute significantly to the European Economy accounting for 99.8% of all European companies and contributing to 65% of Europe's GDP.

FP7 has a target of ensuring 15% of the funding available under the 'Cooperation' programme is made available to SMEs. To date €1,779.7m, or 14.4% of the Cooperation budget, is going to SMEs. Over the full FP7 programme 10,127 of participants SMEs, receiving an average EU contribution of €249,000.

With regard to the 15% target, Northern Ireland is in the 5-10% category, and somewhat short of reaching its target (see Figure 17).

The three major barriers to SME participation have been identified by SMEs as:

- Finding the correct cooperation partner;
- Accessing funding; and
- The cost of participating.

The European Commission recognises that barriers do exist and is undertaking a process of reform to address these barriers. In January 2011 it introduced the following changes:

- Allowing more flexibility in how personnel costs are calculated so that EU research grant-holders can apply their usual accounting methods when requesting reimbursement for average personnel costs;
- SME owners whose salaries are not formally registered in their accounts can now be reimbursed, through flat-rate payments, for their contribution to work on research projects.
- A new steering group of senior officials from all the Commission departments and agencies involved will remove inconsistencies in the application of the rules on research funding.

Horizon 2020 will replace FP7 post 2013. Consultation on its direction raised the following issues:

- Simplification was considered as a key priority;
- An approach that links research and innovation to EU policy on tackling societal change, which includes climate change, energy security and efficiency, demographic aging, and resource efficiency;
- Continuity of existing programmes that are considered successful;
- Calls for funding opportunities are less perspective and more open;
- EU support across the innovation chain;
- Support for both 'curiosity-driven' and 'agenda-driven' research; and
- Support for 'bottom-up' innovation.¹

The expected date for the adoption of draft proposals is 30 November 2011.

1 European Commission Green Paper on a Common Strategic Framework for EU Research and innovation Funding Analysis of public consultation (10 June 2011) http://ec.europa.eu/research/csfr/pdf/consultation-conference/summary_analysis.pdf

Contents

- 1 Introduction
- 2 Seventh Framework Programme for Research and Technical Development
 - 2.1 What is the Seventh Framework Programme?
 - 2.2 How is FP7 funding accessed?
 - 2.3 Who can apply for funding under FP7?
- 3 Country Participation in FP7
 - 3.1 Regional Participation in FP7
- 4 Small and Medium Enterprises in FP7
 - 4.1 SME Participation in FP7
- 5 Northern Ireland's participation in FP7, further details
- 6 Barriers to SME participation in FP7
- 7 Horizon 2020

1 Introduction

The Seventh Framework Programme (FP7) is the EU's main instrument for funding research across Europe. This paper provides background information on the programme and the distribution of participation and funding under the scheme.

2 Seventh Programme for Research and Technical Development

2.1 What is Framework the Seventh Framework Programme?

FP7 was launched in 2007 and will end in 2013. The programme collects all EU research related initiatives together under one roof, and is aimed at contributing to wider EU goals – growth, competitiveness and employment.

The budget for FP7 is €50.5bn across its seven year lifespan, with an additional €2.7bn made available through the Euratom programme² for the first five years.³

FP7 is made up of four main programmes plus a fifth programme targeting nuclear research. The programmes, and their constituent parts, are as follows:

- The Cooperation Programme, which focuses on research into:
 - Health;
 - Food, agriculture and biotechnology (KBBE);
 - Information and Communication Technologies (ICT);
 - Nanosciences. Nanotechnologies, Material and new production technologies (NMP);
 - Energy;
 - Environment (including climate change) (ENV);
 - Transport (including aeronautics) (TPT);
 - Socio-economic sciences and humanities (SSH);
 - Security (SEC); and
 - Space (SPA).
- The Ideas Programme which covers activities implemented by European Research Council, focusing upon Frontier research actions;
- The People Programme which is targeted towards improving the human resource potential in European research and development landscape. The programme focuses on:
 - The initial training of researchers;
 - Life-long training and career development-
 - Industry-academia pathways and partnerships;
 - International cooperation; and
 - Excellence awards.
- The Capacities Programme which is targeted on improving the European research infrastructure including its optimisation and development, focussing on:
 - research infrastructure;
 - research for the benefit of SMEs;
 - regions of Knowledge and support for research-driven clusters;
 - the research potential of Convergence Regions;
 - Science in society;

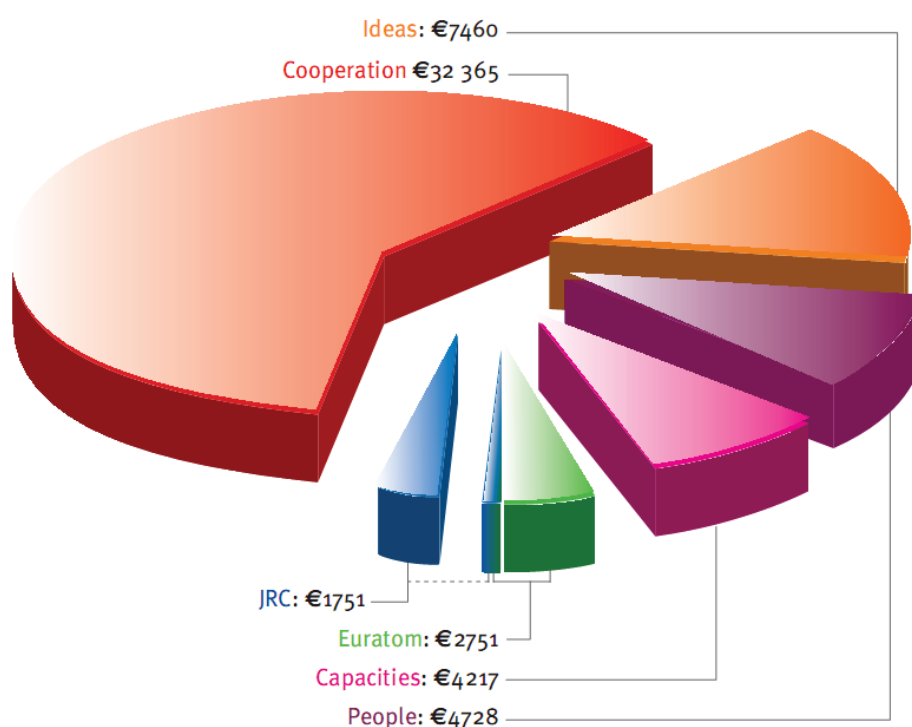
2 Euratom is shorthand for the The European Atomic Energy Community which, amongst other things, works within the area of atomic research.

3 European Commission, FP7 Tomorrow's answers today http://ec.europa.eu/research/fp7/pdf/fp7-factsheets_en.pdf (accessed 16/08/11)

- Supporting the coherent development of research policy; and
- International cooperation.
- The Euratom programme, which is made up of two sub-programmes:
 - Fusion energy research; and
 - Nuclear fission and radiation protection, the nuclear activities of the Joint Research Centre (JRC) included within this sub-programme. ⁴

Figure 1 provides a breakdown of FP7 funding. The largest proportion (€32,365m) of funding is targeted toward the Cooperation Programme; this is further broken into programme streams as illustrated in Figure 2. Within Cooperation the largest proportion of funding is targeted toward the Information and Communications Technology programme stream (€9110m), followed by Health (€6050m) and Transport (€4180m).⁵

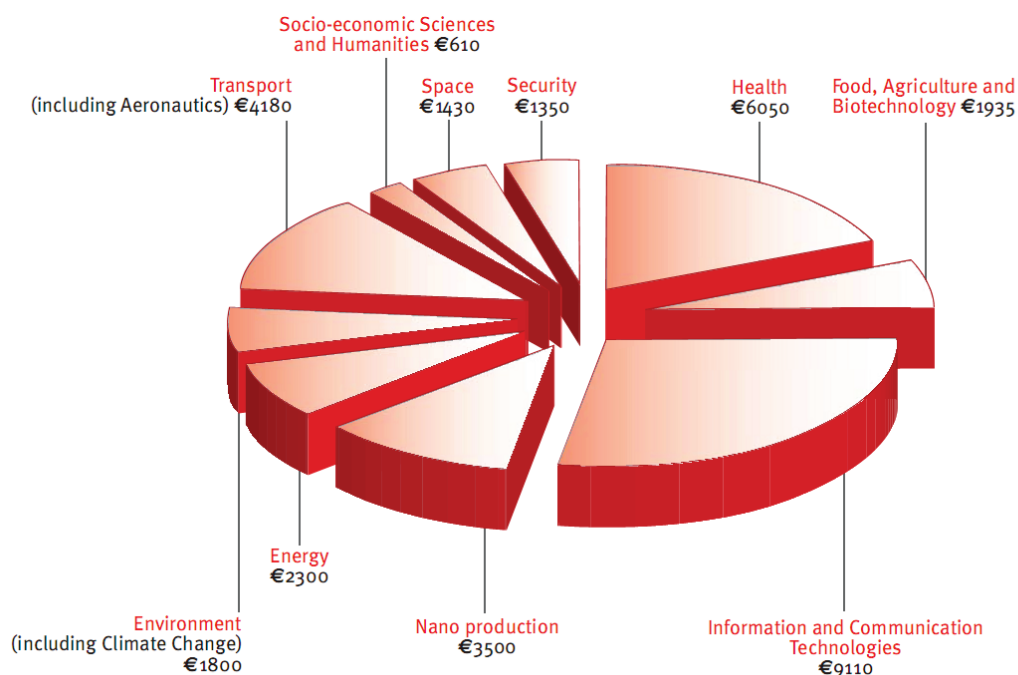
Figure 1: FP7 funding breakdown by programme (€m)⁶



4 European Commission, FP7 Tomorrow's answers start today http://ec.europa.eu/research/fp7/pdf/fp7-factsheets_en.pdf

5 Ibid

6 Ibid

Figure 2: FP7 funding breakdown of Cooperation programme (€m)⁷

2.2 How is FP7 funding accessed?

The FP7 budget is allocated to grant funding. Grants are provided to ‘research actors’ throughout Europe and abroad, to co-finance research projects. Grants are determined on the basis of calls for proposals and peer review.

Activities funded through FP7 must have a ‘European Added Value’. The foremost aspect of this is that funded activities often have a transnational nature in the sense that research projects are carried out by consortia which include participants from different European and non-European countries. Similarly, fellowships funded under FP7 should involve cross-border mobility.⁸

The minimum conditions for consortia participation in ‘indirect actions’⁹ require that:

...at least three legal entities must participate, each of which must be established in a Member State or associated country, and no two of which may be established in the same Member State or associated country.¹⁰

However, when indirect actions call for ‘specific cooperation actions dedicated to international cooperation’ at least four entities must participate, two must be from member states (but not the same member state) or an associated country. In addition, in this scenario, at least

⁷ Ibid

⁸ European Commission, FP7 in brief – How to get involved in the EU 7th Framework Programme for Research (2007) http://ec.europa.eu/research/fp7/pdf/fp7-inbrief_en.pdf

⁹ Indirect actions refer to the types of activities funded through FP7, namely: collaborative projects, networks of excellence, coordination and support actions, support for frontier research, support for training and career development of researchers, and research for the benefit of specific groups (in particular SMEs). See Annex III of <http://cordis.europa.eu/documents/documentlibrary/90798681EN6.pdf> for further details

¹⁰ Official Journal of the European Union REGULATION (EC) No 1906/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 laying down the rules for the participation of undertakings, research centres and universities in actions under the Seventh Framework Programme and for the dissemination of research results (2007-2013) (2006) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:391:0001:0018:EN:PDF> Article 5

two of the participants must be from an '*established international partner*' (but not the same country).¹¹

The legal entities must also be independent from each other. '*Independent*' is defined as follows:

*Two legal entities shall be regarded as independent of each other where neither is under the direct or indirect control of the other or under the same direct or indirect control as the other.*¹²

'Control' is defined as:

*...the direct or indirect holding of more than 50% of the nominal value of the issued share capital in the legal entity concerned, or of a majority of the voting rights of the share-holders or associates of that entity.*¹³

Or:

*...the direct or indirect holding, in fact or in law, of decision-making powers in the legal entity concerned.*¹⁴

However, entities will be deemed independent if:

*...the same public investment corporation, institutional investor or venture-capital company has a direct or indirect holding of more than 50% of the nominal value of the issued share capital or a majority of voting rights of the shareholders or associates.*¹⁵

Similarly entities will be deemed independent where they are owned or supervised by the same public body.

Unlike its predecessor, FP6, FP7 does allow for '*individual teams*' to be funded for research that has no transnational element. The work of such teams is deemed to meet the '*European Added Value*' criteria if it promotes competition on a national or European level amongst scientist working in '*fundamental frontier research*'.¹⁶

Help and advice is offered to researchers and organisations wishing to apply for FP7 funding through their National Contact Point, details of which are available on the CORDIS website.¹⁷

2.3 Who can apply for funding under FP7?

FP7 is open to a range of individuals and organisations:

- research groups at universities or research institutes;
- companies intending to innovate;
- small or medium-sized enterprises (SMEs);
- SME associations or groupings;
- public or governmental administration (local, regional or national);
- early-stage researchers (postgraduate students);

11 Ibid Article 7

12 Ibid Article 6

13 Ibid

14 Ibid

15 Ibid

16 European Commission, FP7 in brief – How to get involved in the EU 7th Framework programme for Research (2007) http://ec.europa.eu/research/fp7/pdf/fp7-inbrief_en.pdf

17 European Commission, FP7 in brief – How to get involved in the EU 7th Framework programme for Research (2007) http://ec.europa.eu/research/fp7/pdf/fp7-inbrief_en.pdf

- experienced researchers;
- institutions running research infrastructures of transnational interest;
- organisations and researchers from third countries;
- international organisations; and
- civil society organisations.

As noted above a range of countries may also participate in FP7 by virtue of being an associated country or through international cooperation provisos.

An 'Associated country' is defined as 'a third country which is party to an international agreement with the European Community, under which it makes a financial contribution to FP7'.¹⁸ On this basis the following countries can participate in FP7: Albania; Croatia; Iceland; Israel; Liechtenstein; the Former Yugoslav Republic of Macedonia; Montenegro; Norway; Serbia; Switzerland; and Turkey.

The following countries may also participate, on the basis of participating in an EC agreement on Science and Technology: Argentina, Australia; Brazil; Canada; China; Egypt; India; Japan; Republic of Korea; Mexico; Morocco; New Zealand; Russia; South Africa; Tunisia; Ukraine; and the United State of America.

The following countries can participate on the basis of being part of the European Neighbourhood policy: Algeria; Armenia; Azerbaijan; Belarus; Georgia; Jordan; Moldova; Palestinian-administrated areas; and Syrian Arab Republic.¹⁹

3 Country Participation in FP7

The size of the FP7 project is illustrated by the number of applications received. In the first four years there were 245 concluded calls for proposals receiving 77,000 proposals, out of which 12,000 – involving 69,000 participants – were retained for negotiation. The level of participation has corresponded to an EU funding request of €20.4bn.

Figures 3 and 4 provide two different measures of the comparative performance of countries participating in FP7. In both figures the data for each country is shown by type of participant as follows: higher or secondary education (HES); private for profit (excluding education) (PRC); public body (excluding research and education) (PUB); research organisation (REC); and other (OTH).

Figure 3 ranks the 27 EU Member States by the number of FP7 participants; whereas Figure 4 ranks them by the financial contribution they have received through the programme. In both cases, Germany, England and France have the greatest involvement in FP7. In the case of Germany there has been a relatively even (in participant and financial split) between the higher or secondary education sector, the private sector and research sector. In the UK, the higher or secondary education sector has been the largest source of participants and received the largest financial contribution. In France's case the number of participants and overall funding received is weighted towards the research sector. Throughout the 27 Member States the public sector tends to supply the smallest proportion of participants and receive the smallest proportion of finance. The Republic of Ireland has the 16th highest number of participants and received the 13th highest amount of funding.

¹⁸ European Commission CORDIS – FAQs What are 'Third countries' and other non-EU entities that can participate in FP7? http://cordis.europa.eu/fp7/faq_en.html#14 (accessed 17/08/11)

¹⁹ FP7 People Network Which Countries can participate in FP7? <http://www.fp7peoplenetwork.eu/2008112419/content/which-countries-can-participate-in-fp7.html> (accessed 17/08/11)

Figure 3: EU27 Member State participants 2007-2010 by type of participant organisation

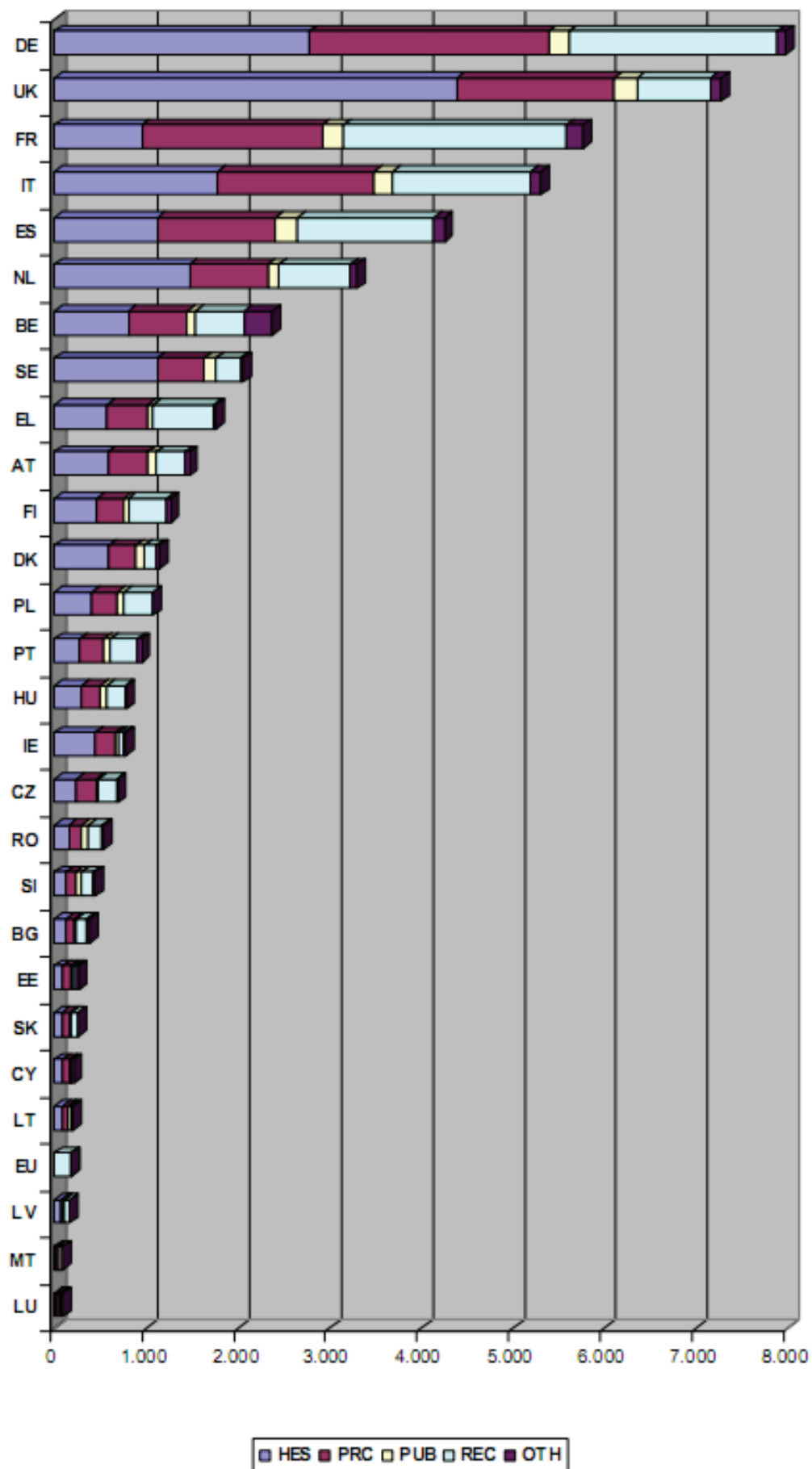
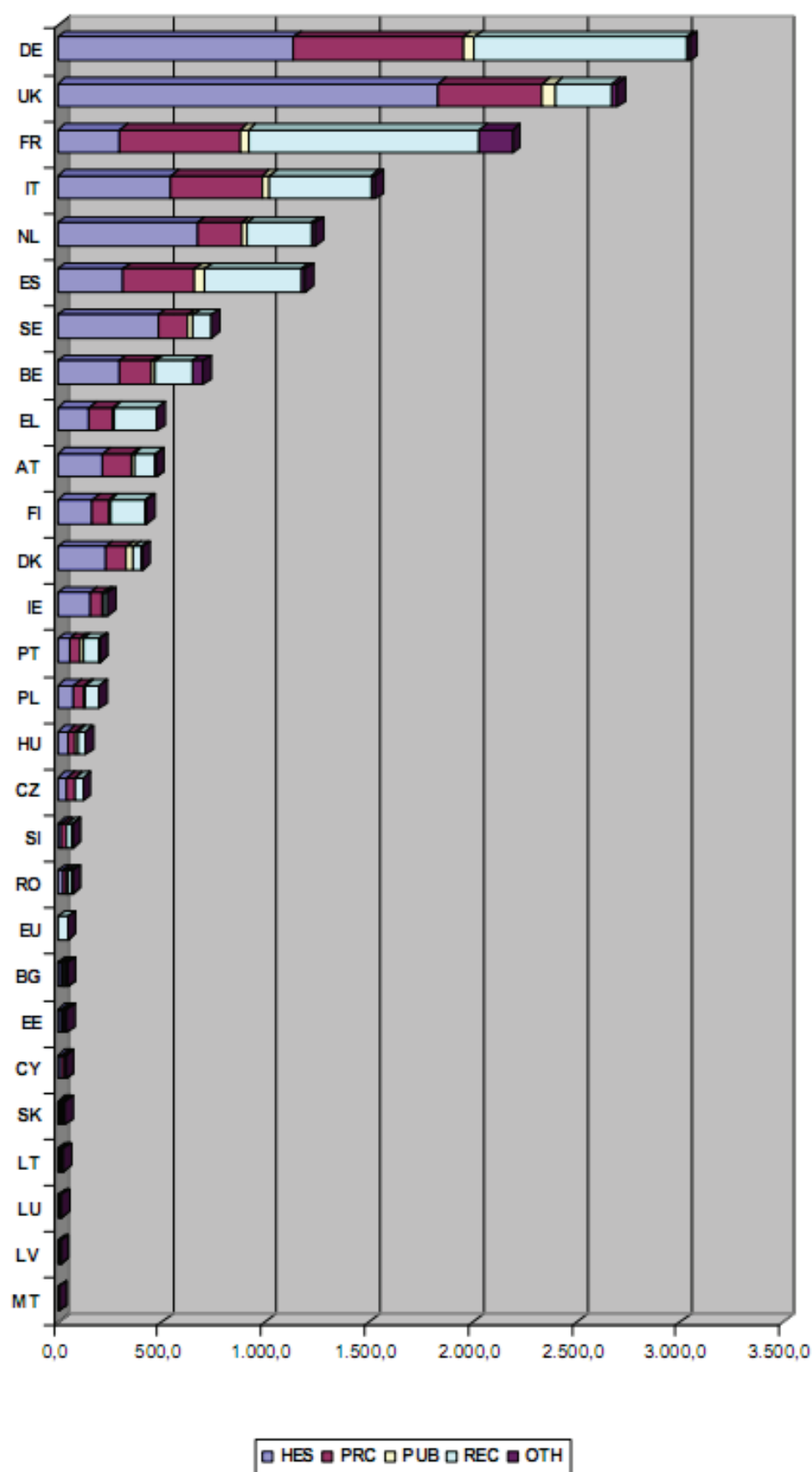


Figure 4: EU27 Member State financial contribution in FP7 signed grant agreements 2007-2010 by type of participant organisation



3.1 Regional Participation in FP7

Figure 5 shows the European regional distribution of FP7 beneficiaries in the cooperation programme, the figure measures the number of signed contracts per region. The regional division used is NUTs II.²⁰

Northern Ireland falls into the 51-100 category (fourth lowest category of number of signed contracts) and is in a comparable position to a number of UK regions, including: Derbyshire and Nottinghamshire; Leicestershire, Rutland and Northamptonshire; Greater Manchester; West Yorkshire; Devon; West Wales and The Valleys; and East Wales.²¹

A number of UK regions fall into the lowest category, namely: the Highlands and Islands; Cumbria; Cheshire; Lincolnshire; and Cornwall and Isles of Scilly. Of the UK regions with the most contracts signed Eastern Scotland and the Gloucestershire, Wiltshire and Bristol/Bath area fall into the 201-300 contracts signed category, whereas East Anglia and the Surrey, East and West Sussex region where in the 301-400 category.²²

In comparison with the Republic of Ireland, Northern Ireland entities signed a similar number of categories as those in the Border, Midland and Western NUTs II region. The Southern Eastern NUTs II region was home to 401-500 signed contracts, outperforming any area in the neighbouring regions (Northern Ireland, England, Scotland and Wales).

The regions with the greatest number of contracts signed as of 1 April 2011 were:

- Île de France – 2675 contracts signed;
- Oberbayern, Germany – 1200 contracts signed; and
- Comunidad de Madrid – 901-1000 contracts signed.²³

Figure 6 presents similar information as Figure 5 but by monetary value. Again Northern Ireland, receiving €10-25m through the FP7 Cooperation programme, performed at a similar level to a number of UK regions and The Border, Midland and Western region of the Republic of Ireland. Three of the regions with which Northern Ireland was broadly comparable in Figure 5, received a higher value of funding for contracts signed than Northern Ireland – West Yorkshire, Derbyshire and Nottinghamshire, and Leicestershire, Rutland and Northamptonshire.²⁴

The Southern Eastern Region of the Republic of Ireland received a similar value of funding as East Anglia and the Surrey, East and West Sussex regions (€100-200m) despite receiving a higher number of signed contracts.²⁵

The Île de France received the greatest financial contribution from the FP7 programme, €1045m, followed by Oberbayern which received €500-600m.²⁶

20 For a labelled map of NUTs 2 regions see <http://epp.eurostat.ec.europa.eu/cache/GISCO/yearbook2009/Ryb-Full-NUTS2-2009-EN.pdf> A decoding table is available here http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=ACT_OTH_CLS_DLD&StrNom=NUTS_33&StrFormat=HTML&StrLanguageCode=EN

21 European Commission, SME Participation in FP7 – Report Spring 2011 http://ec.europa.eu/research/sme-techweb/pdf/smes-in-fp7-spring-2011_full-rep_en.pdf#view=fit&pagemode=none

22 Ibid

23 Ibid

24 Ibid

25 Ibid

26 Ibid

Figure 5: Cooperation Programme FP7: Regional Distribution of Beneficiaries in signed contracts as of the 01 April 2011

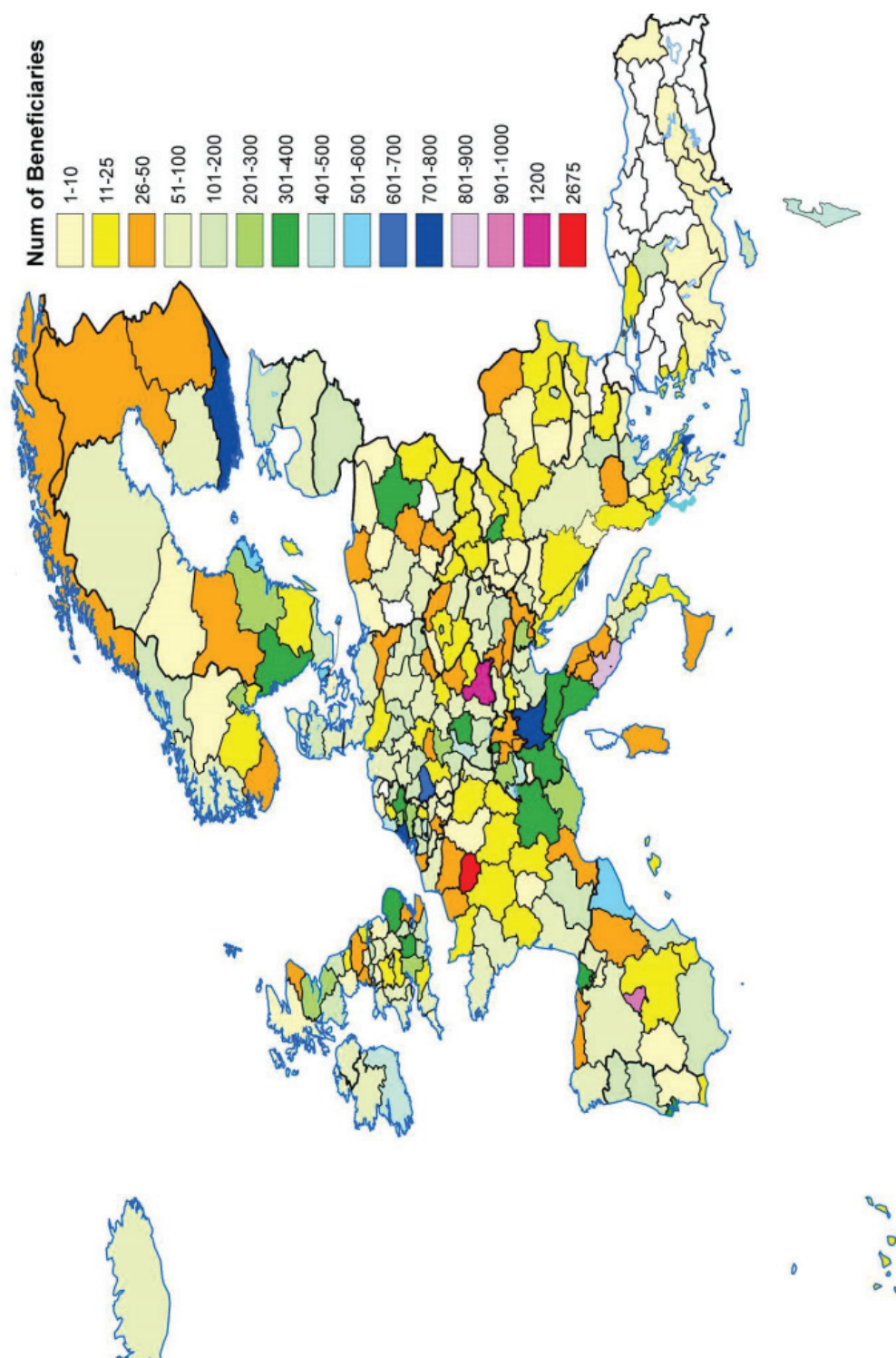
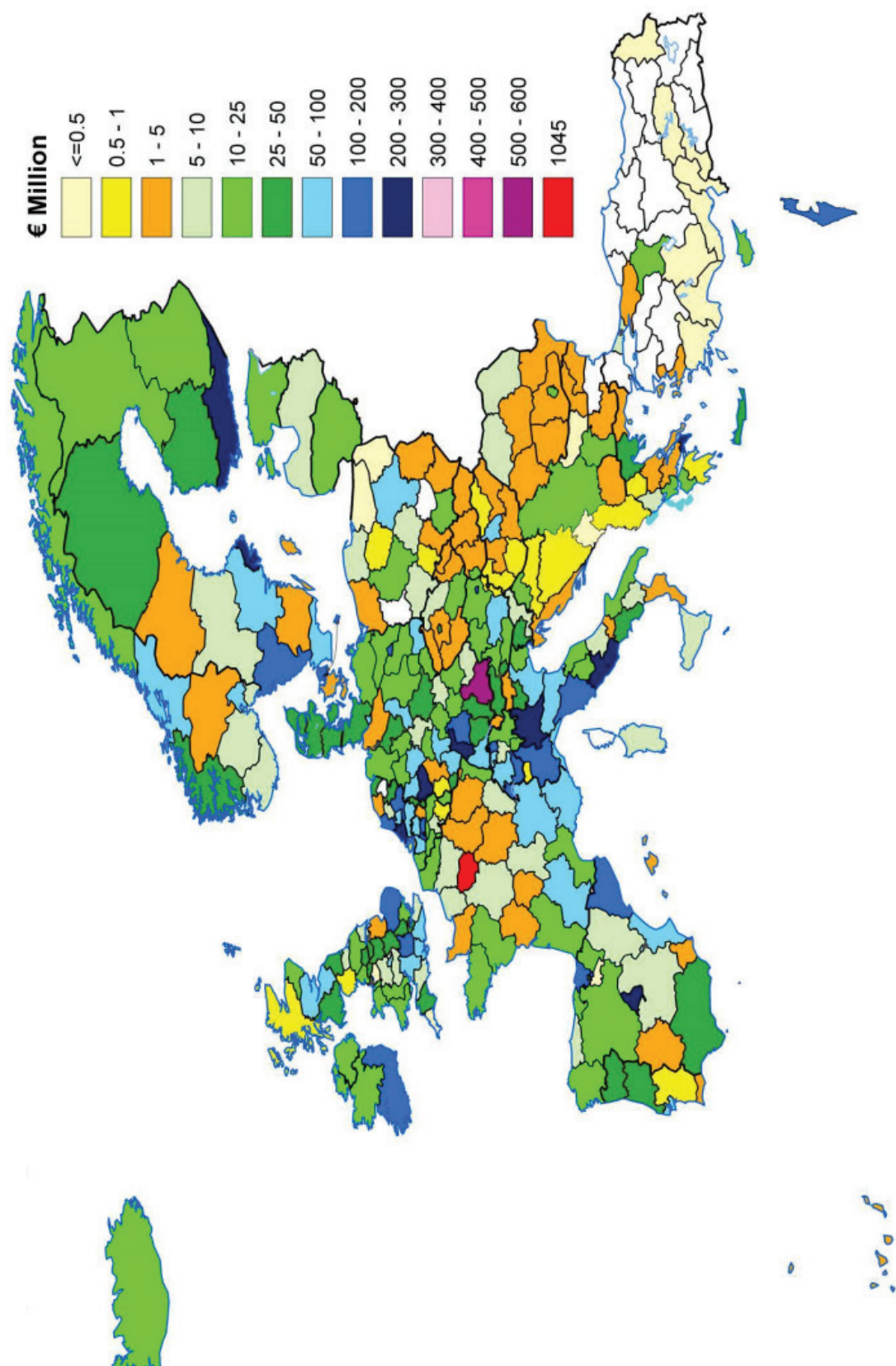


Figure 6: Cooperation Programme FP7: Regional Distribution of Beneficiaries in signed contracts as of the 01 April 2011

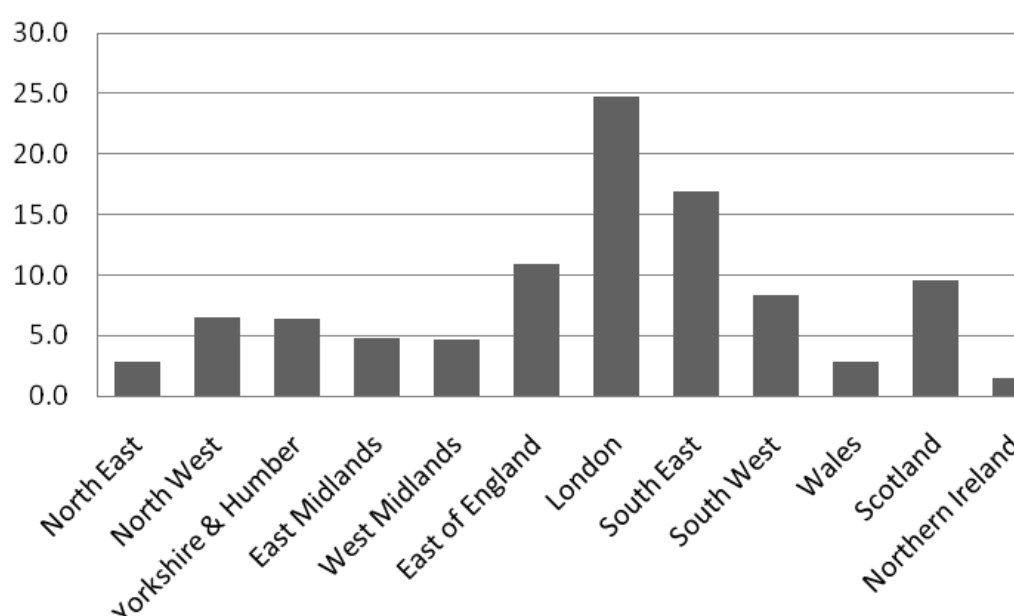


4 Northern Ireland's participation in FP7, further details

As of the 1 April 2011 7,290 UK organisations were participating in FP7. Figure 7 shows the regional distribution of participants as a proportion of the UK total. With 110 participants, 1.5% of the UK total, Northern Ireland has the smallest proportion of participants of all the UK regions. London is home to the greatest proportion of FP7 participants (1,803 participants or 24.7% of the UK total).²⁹

A similar picture emerges if regional requested financial contribution is compared to the UK total (Figure 8). As of April 2011 Northern Ireland's FP7 participants requested a financial contribution of just under £30m, which was 1.1% of the total amount requested by FP7 participants (approximately £2.7bn). The largest financial contribution was requested by participants in London, £700m, or 26% of the total.³⁰

Figure 7: UK regions total FP7 projects as a proportion of the UK total (up to 1 April 2011) (%)³¹

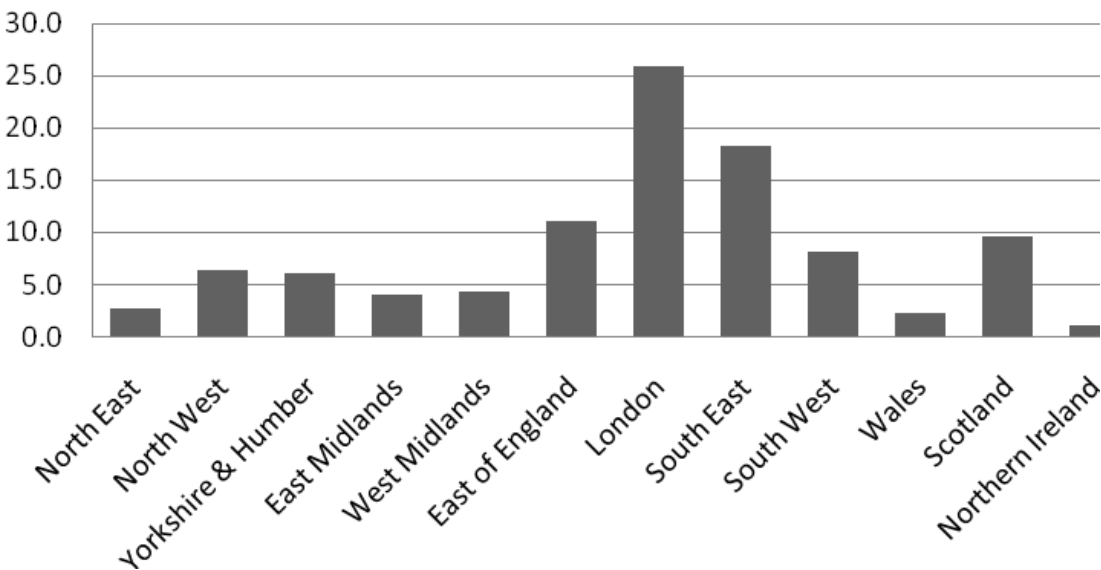


²⁹ From email correspondence with Department of Enterprise, Trade and Investment 06 September 2011.

³⁰ Ibid

³¹ Ibid

Figure 8: UK regions total requested financial contribution from FP7 as a proportion of UK total (up to 1 April 2011) (%)³²



Figures 9 and 10 provide further details of Northern Ireland's 110 participants, showing how these participants are spread across the various FP7 funding streams and the level of funding requested under each stream. The ICT (and SEC joint calls) and the People: Marie-Curie streams have seen the greatest Number of Northern Ireland participants (18 participants each, or 16.4% of total participation). This was, however, equivalent 1.6% and 1.2% of the UK total participation under these schemes respectively (UK total for ICT was 1,159 participants, for People: Marie-Curie it was 1,481). Northern Ireland has had 13 participants under the SMEs stream (11.8% of total participation); this was, however, 2% of the total UK participants under this stream (578 in total). Northern Ireland also had 13 participants under the Health stream, equivalent to 1.55% of the UK total (875). Northern Ireland has had no participants under the Regions of Knowledge (UK=24), Research Potential (UK=3), Coherent Development (UK=6) and INCO schemes (UK=14).³³

With regards to requested financial contribution (Figure 10) the largest proportion of money requested by Northern Ireland participants was in the Health stream – €5.9m equivalent to 20% of the total money requested by Northern Ireland participants (€30m) but just 1.4% of the total funding requested by participants in the UK under this scheme (€409m). A total of €5.6m (19% of the Northern Ireland total) was requested under the ICT stream (1.2% of the total requested in the UK under this stream), and €5.5m (18% of the Northern Ireland total) was requested under the People: Marie-Curie funding stream (1.5% of the total requested in UK under this stream). A total of €1.3m (4.4% of the total Northern Ireland request) was requested under the SME scheme (1.6% of the total requested in the UK under this stream).³⁴

32 Ibid
33 Ibid
34 Ibid

Figure 9: Northern Ireland Number of FP7 participants by funding stream (up to 1 April 2011)³⁵

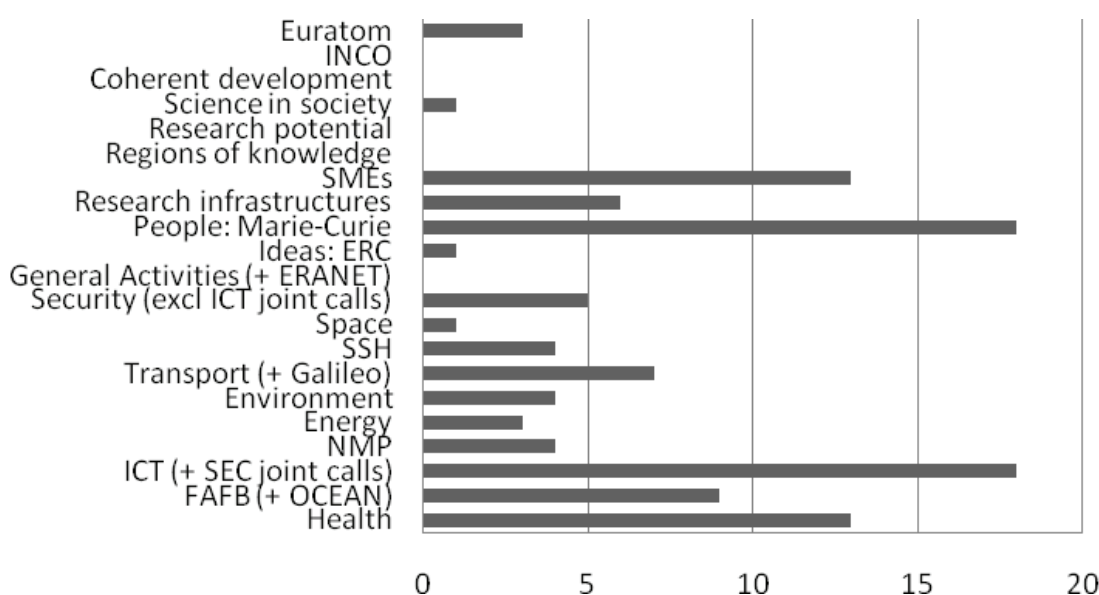
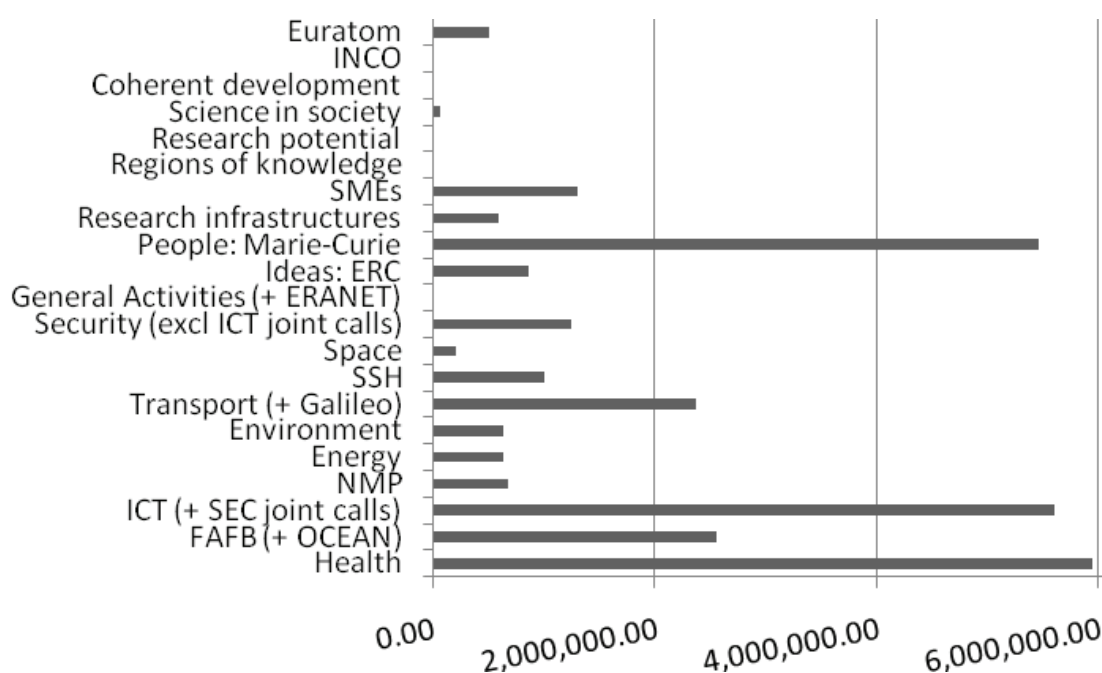


Figure 10: Requested Financial Contribution by funding stream (up to 1 April 2011) (€)³⁶



Figures 11 and 12 outline Northern Ireland's participation in FP7 by organisation type. Participation is greatest amongst the Higher Education sector in Northern Ireland, with 71 participants (65% of total participation in Northern Ireland) coming from that sector. This reflects the situation in the UK as a whole, where 4,391 (60% of total participation) participants came from the Higher Education sector. A total of 28 participants (25% of total Northern Ireland participation) came from the private commercial sector. This again reflects the situation in the UK as a whole, where 25% participants are from this sector (1,726 participants). The level of participation in Northern Ireland has been smaller in public and research organisations sectors (7% and 3.6% of total participation respectively).³⁷

³⁵ Ibid

³⁶ Ibid

³⁷ Ibid

Northern Ireland's requested financial contribution by sector as outlined in Figure 12 reflects sectoral participation. A total of €21m was requested by the Higher Education sector (72% of the total requested by Northern Ireland participants, and 1.7% of the total requested by this sector in the UK as a whole). A total of €6.7m was requested by the private commercial sector (23% of the total requested by all Northern Ireland participants, and 1.35% of the total requested by this sector in the UK as a whole). The public sector requested €1.09m in this period (7% of the Northern Ireland total, 0.16% of the total requested by this sector in the UK as a whole) and €453,339 was requested by research organisations (4% of the Northern Ireland total, 1.7% of the total requested by this sector in the UK as a whole).³⁸

Figure 11: Number of participants in FP7 by organisation type (up to April 2011)³⁹

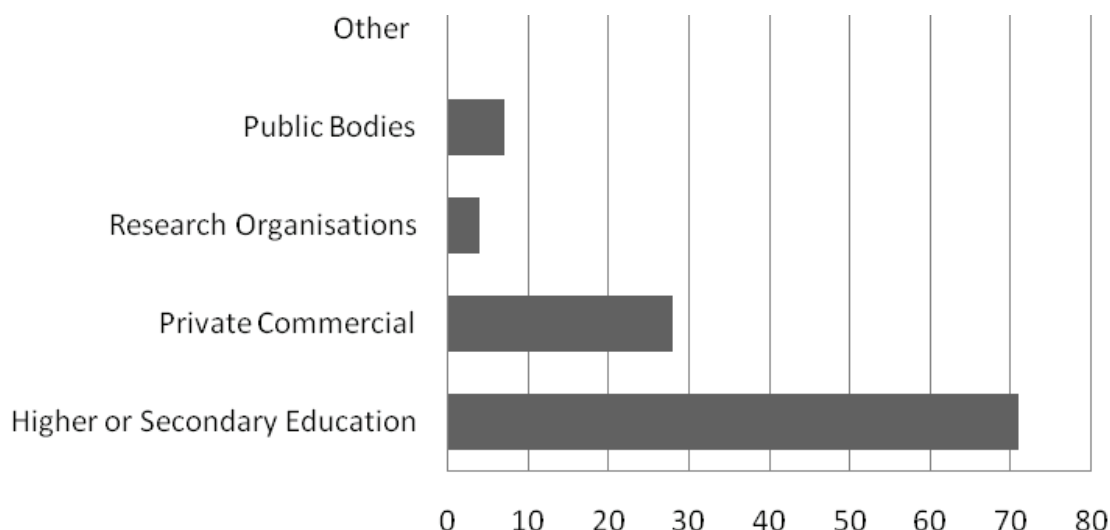
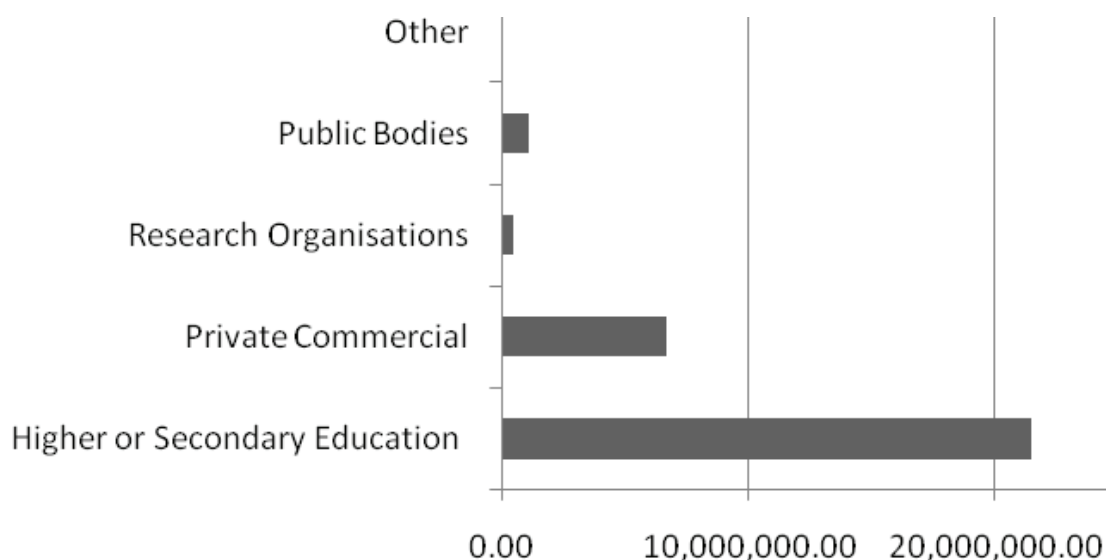


Figure 12: Requested funding contribution by organisation type (up to 1 April 2011) (€)⁴⁰



³⁸ Ibid

³⁹ Ibid

⁴⁰ Ibid

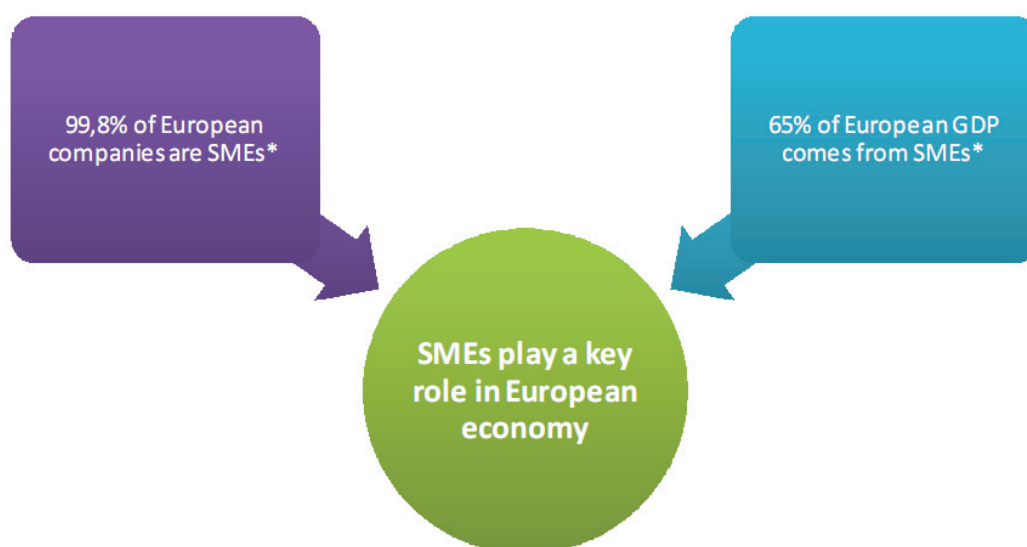
5 Small and Medium Enterprises in FP7

Small and Medium Enterprises are defined by the European Commission as:

*The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro.*⁴¹

Their contribution to the European economy is substantial as demonstrated in Figure 13. It demonstrates that 99.8% of all European companies are classed as SMEs, contributing to 65% of Europe's GDP.

Figure 13: SME contribution to European economy⁴²



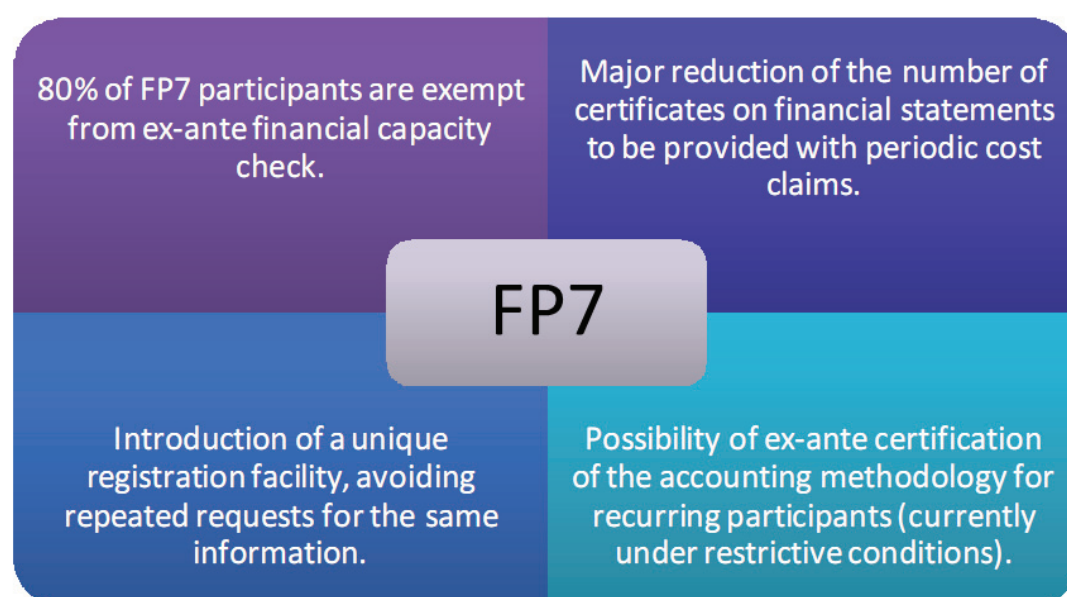
Source: MAPEER SME

Recognising this contribution FP7 included certain measures in its design to ensure it was more SME friendly than its predecessor (FP6). In a general sense, FP7 introduced a number of changes to the administrative process to make it easier for SME participation, as outlined in Figure 14.

⁴¹ European Commission The new SME definition User guide and model declaration (2005) http://ec.europa.eu/enterprise/policies/sme/files/sme_definition/sme_user_guide_en.pdf

⁴² MAPEER European Experts Panel on SMEs and Research Measures to foster SMEs' participation in R&D&I activities and synergies' promotion in support of innovation and SMEs (2010) http://ec.europa.eu/research/horizon2020/pdf/contributions/post/european_organisations/european_experts_panel_on_smes_and_research.pdf

Figure 14: SME friendly measures introduced to FP743



Source: MAPEER SME

Some FP7 programme streams have also been tailored to promote SME interest. The cooperation programme, for instance, contains provisos that state:

Particular attention should be paid to ensuring the adequate participation of SMEs, in particular knowledge-intensive SME in transnational cooperation. Concrete measures, including support actions to facilitate SME participation, will be taken throughout the 'Cooperation' part of the programme in the framework of a strategy to be developed under each theme. These strategies will be accompanied by quantitative and qualitative monitoring against the objectives set. The aim will be to enable at least 15 % of the funding available under the 'Cooperation' part of the programme to go to SMEs.⁴⁴ (Emphasis added)

Given that the budget for the Cooperation programme is €32,365m this means that a total of €4855m in funding will have gone to SMEs as part of the programme should the 15% target be met.

The Capacities programme has a specific thematic division that is dedicated to SMEs – Research for the benefit of SMEs. The theme has two central objectives:

- To strengthen the innovation capacity of European SMEs and their contribution to the development of new technology-based products and markets; and
- To bridge the gap between research and innovation by helping SMEs outsource research, increase their research efforts, extend their networks, better exploit research results and acquire technological know-how.

To achieve these aims two major activities are proposed:

- Supporting small groups of innovative SMEs to solve common or complementary technological problems; and

43 Ibid

44 Official Journal of the European Union REGULATION (EC) No 1906/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 laying down the rules for the participation of undertakings, research centres and universities in actions under the Seventh Framework Programme and for the dissemination of research results (2007-2013) (2006) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:391:0001:0018:EN:PDF> Article 5

- Supporting SME associations and SME groupings to develop technical solutions to problems common to large numbers of SMEs in specific industrial sectors or segments of the value chain.

Whilst the central focus of FP7 is the support of research projects, additional assistance is provided to 'national schemes providing financial means to support SME associations and SME groupings to develop technical solutions to problems common to large numbers of SMEs in specific industrial sectors or segments of the value chain'. 45

5.1 SME Participation in FP7

The European Commission's SME Participation in FP7 Report Spring 2011, offers the most recent assessment of SME engagement with the framework programme. The report's headline findings note:

- Focusing on the SME participation in the Thematic Priorities, €1,779.7m, or 14.4% of the Cooperation budget, is going to SMEs;
- For the 6,544 SME participations in Thematic Research Projects so far, the average EU contribution is €272,000;
- Over the full FP7 programme, including Research for the Benefit of SMEs and the Marie-Curie Actions, 10,127 of the participations are by SMEs, receiving an average EU contribution of €249,000;
- The Cooperation Programme still has €19,893m available to spend (61.7% of the total budget in the remaining years of the Framework Programme, until 2013). From this remaining budget, 15.4% (€2984m) should go to SMEs in order to reach the 15% target for the whole period.⁴⁶

Table 1 looks at the five programme streams in detail. Significantly, it shows SME participation in each programme as a proportion of total participation and EU funding to SMEs in each programme as a proportion of total funding within that programme. Overall, SMEs have made up 16.6% of all participants of all FP7 programmes, receiving 13.2% of total funding. The largest proportion of SME participation is found in the Capacities programme, where they have made up 30.1% of all participants. SMEs have received 31% of the total funding in this programme. In the Cooperation programme, SMEs have made up 16.6% of all participants, receiving 14.1% of all funding (just shy of the 15% target).⁴⁷

Table 2 examines the Cooperation programme in more detail, significantly it shows the proportion of SMEs participating in each Cooperation sub-stream and the proportion of funding SMEs have received in the that sub-stream.

The largest proportion of SMEs is found in the nanosciences, nanotechnologies, materials and production technologies stream (NMP), where they have made up 27.3% of all participants, receiving 22.7% of all funding. This is followed by the Security Research theme where SMEs have made up 20.4% of all participants, receiving 20.4% of all funding. SME participation has been lowest in the Socio-economic Sciences and Humanities Research theme, where they have made up 4.7% of all participants and received 4.4% of funding.⁴⁸

Figures 15, 16 and 17 provide a regional breakdown of SME participation in Cooperation programme of FP7 according to NUTs II regional classification. From the figures we can state the following about the participation of Northern Ireland SMEs:

45 Ibid

46 European Commission, SME Participation in FP7 – Report Spring 2011 http://ec.europa.eu/research/sme-techweb/pdf/smes-in-fp7-spring-2011_full-rep_en.pdf#view=fit&pagemode=none

47 Ibid

48 Ibid

- The number of SMEs to have signed contracts under the Cooperation Programme is in the second lowest category 1-5 (see Figure 15), on this measure the performance is equivalent to the North of Scotland and parts of the South West of England. It has been out performed by both of the Republic of Ireland NUTs II regions;
- With regard to financial contribution Northern Ireland has fared better, with SMEs receiving €1-2.5m from the Cooperation programme (Figure 16). As a point of comparison the Southern Eastern NUTs II of the Republic of Ireland has received amongst the largest EU contribution (€25-50m) of all European regions;
- With regard to the 15% target, Northern Ireland is in the 5-10% category, and somewhat short of reaching its target (Figure 17). The Highlands and Islands region has reached the target despite having a low number overall signed contracts and SME signed contracts, and receiving a relatively small financial contribution.⁴⁹

Table 1: SME Participation in FP7 by programme (until 1 April 2011)50

Programme	Signed Grant Agreements	SMEs Participations	All Participants	% of SMEs	EU Contribution to SMEs (€m)	EU Contribution to all (€m)	% Contribution to SMES
Cooperation	9,663	6,671	40,132	16.6	1,797.28	12,711.96	14.1
Ideas	1,595	8	1,767	0.5	8.92	2,507.76	0.4
People	4,732	470	8,173	5.8	110.26	1,752.74	6.3
Capacities	1,016	2,907	9,649	30.1	589.96	1,902.86	31.0
Euratom	83	71	1,136	6.3	10.92	204.26	5.3
All	11,089	10,127	60,857	16.6	2,517.34	19,079.31	13.2

Table 2: SME Participation in the Cooperation Programme (until 1 April 2011)51

Sub Programme	Signed Grant Agreements	SMEs Participations	All Participants	% of SMEs	EU Contribution to SMEs (€m)	EU Contribution to all (€m)	% Contribution to SMES	Average Contribution per SME (€)	Average contribution per participant (€)
Health	559	728	6,179	11.8	254.16	2,465.97	10.3	349,117	399,090
KBBE	233	376	3,101	12.1	62.71	749.90	8.4	166,783	241,825
ICT	1,185	1918	11,280	17.0	573.34	3,991.85	14.4	298,927	353,887
NMP	362	1229	4,498	27.3	322.44	1,420.34	22.7	262,358	315,772
Energy	197	401	2,206	18.2	142.88	768.32	18.6	356,312	348,285
Environment	272	438	3,801	11.5	73.72	810,368.00	9.1	168,299	213,282
TPT	535	926	4,605	20.1	214.27	1,211.52	17.7	231,393	263,079

50 Ibid

51 Ibid

Sub Programme	Signed Grant Agreements	SMEs Participations	All Participants	% of SMEs	EU Contribution to SMEs (€m)	EU Contribution to all (€m)	% Contribution to SMES	Average Contribution per SME (€)	Average contribution per participant (€)
SSH	142	62	1,307	4.7	10.32	233.11	4.4	166,456	178,356
SPA	110	206	1,217	16.9	39.54	297.79	13.3	191,939	244,987
SEC	110	260	1,275	20.4	86.28	422.11	20.4	331,839	331,070
All	3,522	6544	39,467	16.6	1,779.65	12,371.61	14.4	271,952	313,467

Figure 15: Regional Distribution of SMEs in signed contracts as of 01 April 2011 – Cooperation Programme52

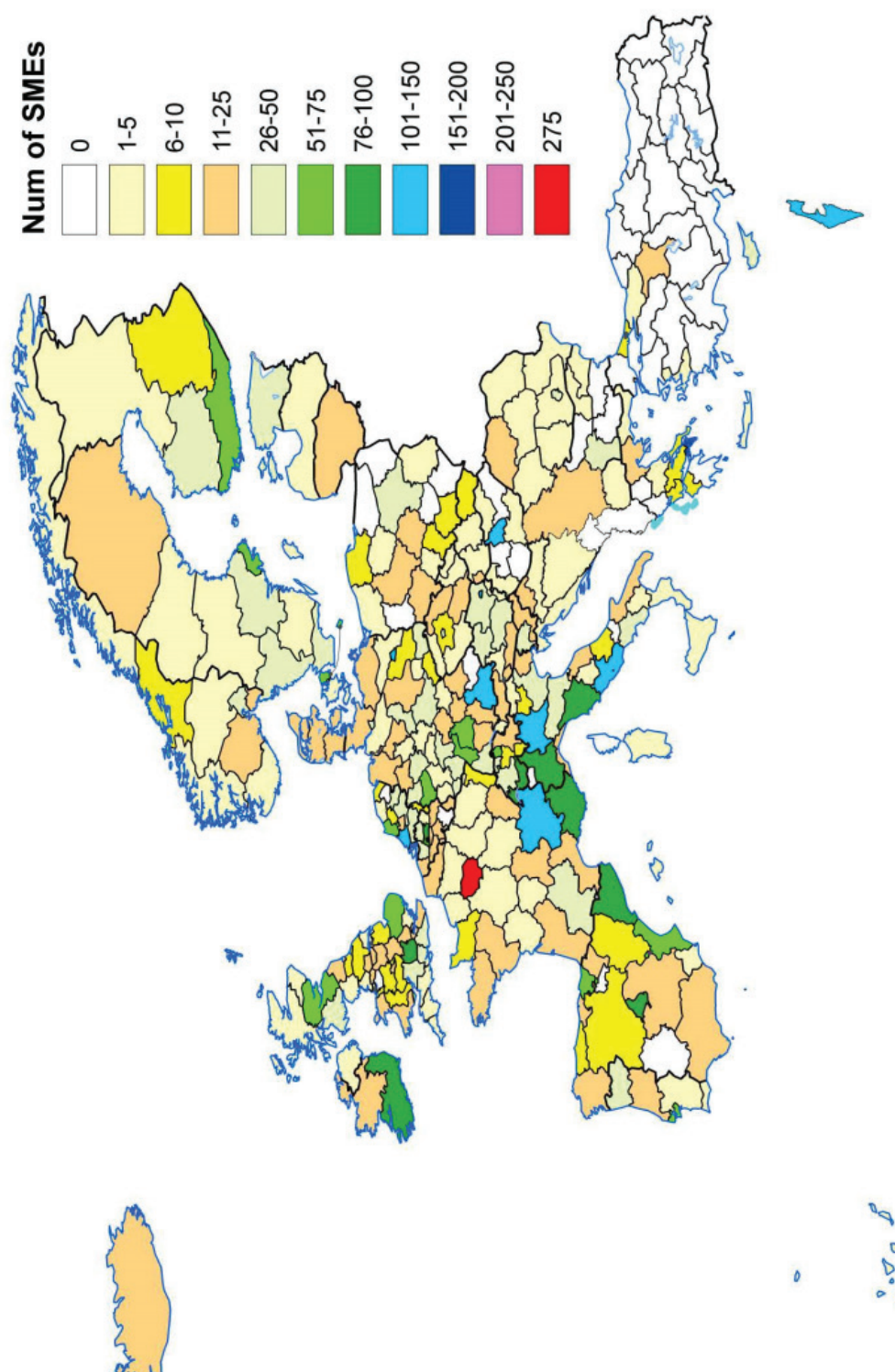


Figure 16 Regional Distribution of SMEs in EU €m contribution as of 01 April 2011 – Cooperation Programme⁵³

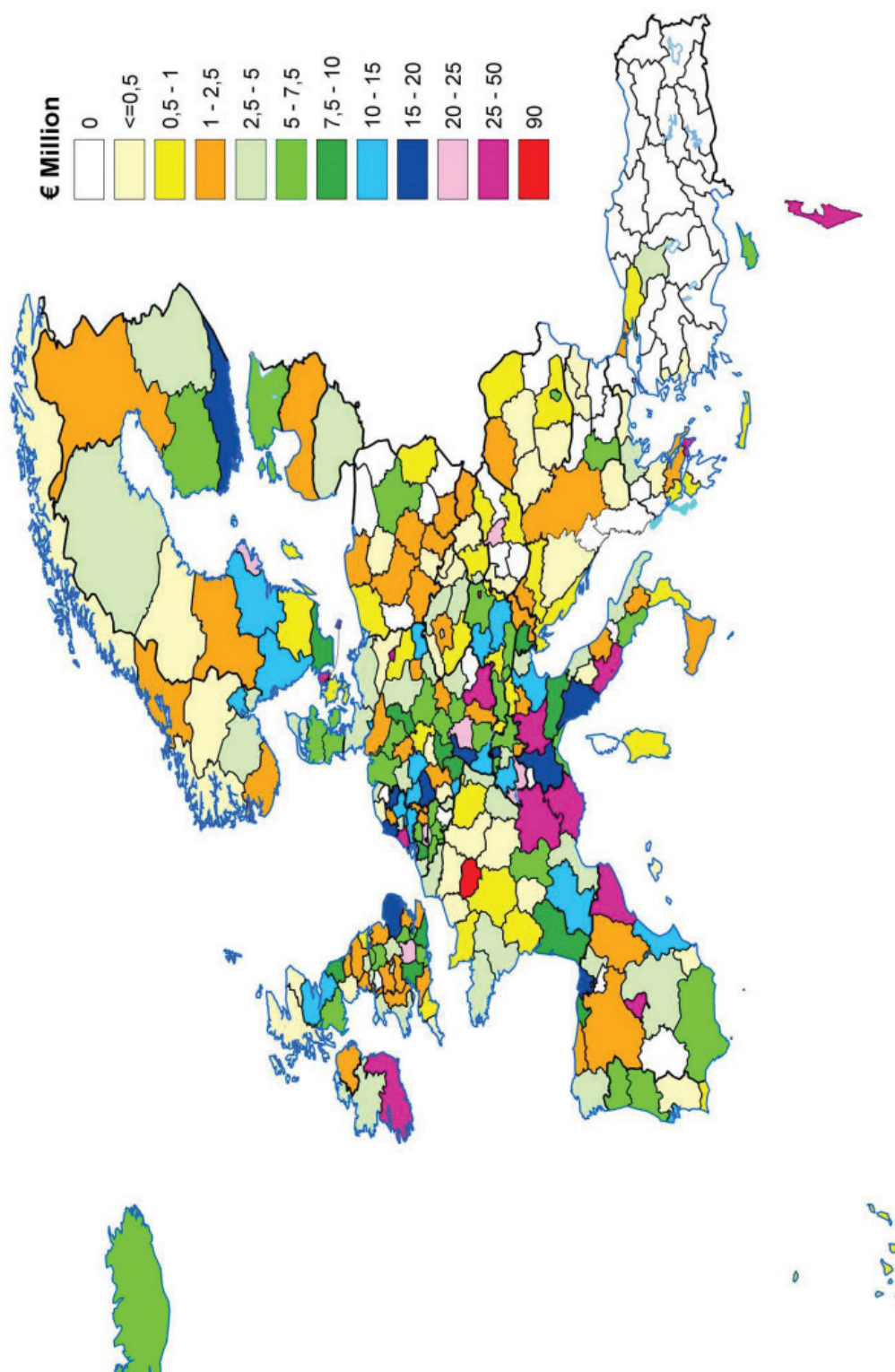
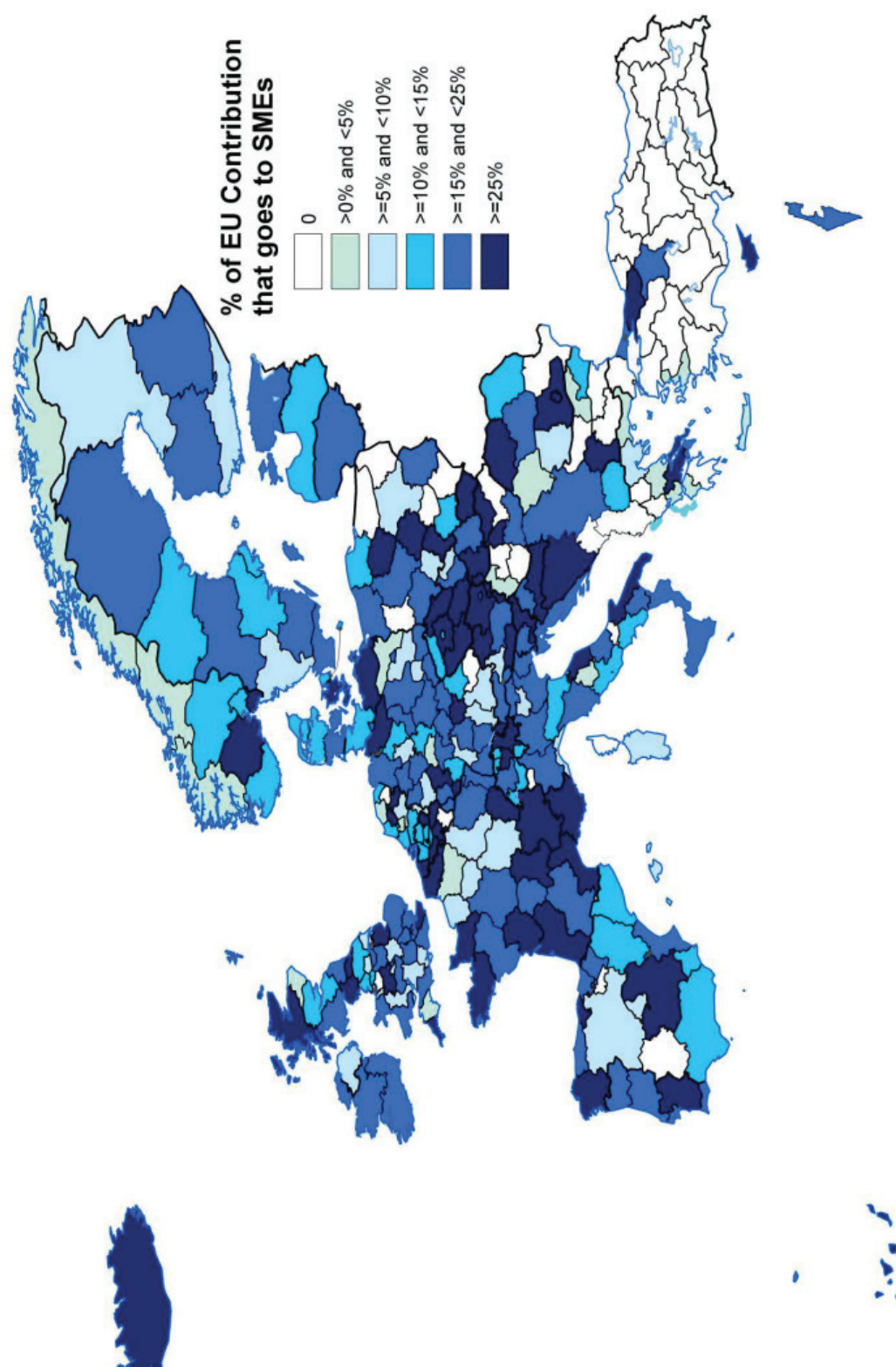


Figure 17 Regional Distribution of progress toward 15% as of 01 April 2011 – Cooperation Programme54



6 Barriers to SME participation in FP7

As outlined above, measures have been included in FP7 in an attempt to ensure SME participation is in its DNA. There are, however recognised barriers to SME involvement. Europa Bio, the European association for bioindustries have, for example, recognised the changes made to FP7 to facilitate SME inclusion, but have noted 'most' SMEs are not aware of these changes. The state:

*...many of the SMEs in Europe remain badly informed, or are even misinformed, about the financial assistance available, the rules to apply for it and the conditions of assessment. This is a reason often cited for their hesitation to participate in large projects.*⁵⁵

Continuing, they add:

*We found that there is an important need for further advice for SMEs on how to prepare a proposal to maximise the chances of success. This needs to take into account the fact that most SMEs have a severely limited capacity in terms of human resources to deal with the necessary paperwork. Most SMEs clearly need help to navigate the system, to identify suitable options and to prepare good proposals.*⁵⁶

In a more general sense, Figure 18 presents the results of a Networked Electronic Media (NEM) 57 initiative survey which addressed the barriers to SME participation in FP7. Based on the results of this survey, the three principal barriers to SME participation are:

- Finding the correct cooperation partner;
- Accessing funding; and
- The cost of participating.⁵⁸

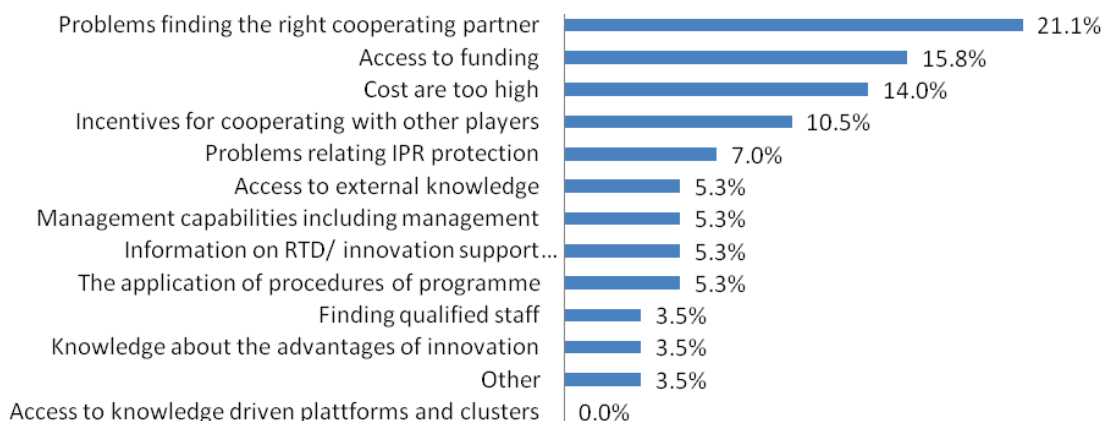
The 'application of procedures of the programme', which could be broadly interpreted to mean the administration of FP7 programmes, was ranked relatively low. That so few respondents listed 'knowledge about the advantages of innovation' and 'finding qualified staff' as barriers is a positive finding of the survey.

55 EURPOABIO Improving SME Participation in the EU Framework Programme http://www.europabio.org/sites/default/files/sme_participation_in_fps.pdf

56 Ibid

57 Note: NEM is a 'European Technology Platform under the Seventh Framework Programme. As an industry-led initiative, NEM aims at fostering the convergence between consumer electronics, broadcasting and telecoms in order to develop the emerging business sector of networked and electronic media.' For further details see <http://www.nem-initiative.org/facts-activities/what-is-nem.html>

58 MAPPEER SME, Organising dialogue and synergy-searching between policies http://mapeer-sme.eu/en/~media/MaPEer-SME/DocumentLibrary/Useful%20general%20documents/mapeer_d47_experts_panel_long_term_sustainability_v04

Figure 18: Response to NEM survey on barriers to SME participation⁵⁹

The European Commission, for its part, recognises the need to tackle the barriers to SME participation. In a 2010 communication, 'Simplifying the implementation of research framework programmes', the Commission identified a number of areas which continue to act as barriers to SME participation. Namely:

- access to programmes and the preparation of proposals is difficult, particularly for newcomers;
- the project administrative and accounting burdens are perceived to be too high;
- time-to-grant and time-to-pay times are too long.⁶⁰

Recognising these short-comings, the Commission has proposed a programme of reform designed to simplify research support for SMEs in the future. The strategy is in three parts – changes under the current legal framework, radical changes, and changes which could be implemented under future frameworks.

- Proposed changes under the current legal framework include reducing the time taken to award grants or payments, fixing the calls for proposals' deadline to take account holidays and ensure projects can become active once the grant is known;
- Proposed changes under the second strand – radical changes – are focussed upon accounting procedures. They include increasing the use of 'average cost methodologies', introducing lump sum payments to participants without requiring that they record time spent on activities in accounts, and introducing a flat rate for charging indirect costs for all types of organisations and funding schemes.
- Proposals under the third strand – those which could be implemented under future frameworks – include moving from a cost based funding scheme to a results based funding scheme which would shift the framework from a input based funding system to one that is based on 'prior definition and acceptance or output/results'. Three options for this are to be considered:
 - Project-specific lump sums as a contribution to project cost estimated during grant negotiation and paid against agreed outputs;
 - Publishing calls for proposals with pre-defined lump sums per project in a given a subject area and selecting proposals based upon the value of scientific output promised;

⁵⁹ Ibid

⁶⁰ European Commission Simplifying the implementation of research framework programmes (2010) http://ec.europa.eu/research/fp7/pdf/communication_on_simplification_2010_en.pdf

- A high-trust award approach which distributes pre-defined lump sums per project without further Commission control. Such an approach would be based on a highly competitive process for granting of awards, after which there would be no further financial or scientific checking by the Commission. This is summarised as a 'high-trust, high risk' strategy.⁶¹

On establishing a way forward, the Commission's communication states:

The Commission calls on the other EU institutions to contribute to the debate and vie feedback on the options outlined in this Communication, in view of the future shaping of EU research funding.

The results of this debate will be introduced in the Commission proposals for the 'Innovation Union' flagship initiative under the Europe 2020 strategy and into the shaping of the next framework programme.

*Depending on consensus obtained in response to this Communication regarding specific measures the Commission may present amendments still for FP7, following its interim evaluation.*⁶²

The interim report of FP7 (published November 2010) notes:

*...the funding going to SMEs is now close to the target level of 15 for the Cooperation specific programme. There is, however, still a wide range of evidence that small businesses are more easily deterred by 'complexity' in procedures and delays in contracts.*⁶³

Within its ten recommendations the report states that the simplification process requires a 'quantum leap'. To this end it recommends that:

...all Directorates-General and agencies rapidly to implement the short-term simplification measures recently put forward in a Communication by the Commission and to ensure that they are applied rigorously from 2011-2013. Coherence of procedures and approaches between Commission Directorates General and the Executive Agencies responsible for administering FP7 is of crucial importance. The Expert Group proposes that the Commission consider the upcoming revision of the Financial Regulations as an opportunity to create more flexible conditions for research in subsequent FPs. In addition the Group pleads for the Commission to switch from its present low-risk/low-trust attitude to a more trust-based and risk-tolerant approach.

In January 2011 the Commission introduced three changes to FP7, with a view to simplifying the process for SMEs. All three measures came into force with immediate effect. The measures were:

- Allowing more flexibility in how personnel costs are calculated so that EU research grant-holders can apply their usual accounting methods when requesting reimbursement for average personnel costs. They will no longer need to set up entire parallel accounting systems just for this purpose;
- SME owners whose salaries are not formally registered in their accounts can now be reimbursed, through flat-rate payments, for their contribution to work on research projects.
- A new steering group of senior officials from all the Commission departments and agencies involved will remove inconsistencies in the application of the rules on research funding.⁶⁴

61 Ibid

62 Ibid

63 European Commission, Interim evaluation of the Seventh Framework Programme (2010) http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/fp7_interim_evaluation_expert_group_report.pdf

64 Europa press release EU research and innovation funding – immediate changes to cut red tape for researchers and SMEs (24 January 2011) <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/57&format=HTML&aged=0&language=EN&guiLanguage=en>

7 Horizon 2020

Between February and May 2011 the Commission consulted on the development of Post 2013 arrangements for the funding of research and innovation.⁶⁵ The consultation – From Challenges to Opportunities: Towards a Common Strategic Framework for EU research and innovation funding – was viewed as a key step in developing the Commission's formal proposals for FP7's successor, which is to be known as Horizon 2020.

In June 2011, the Commissioner for Research, Innovation and Science pointed toward 'an emerging consensus' commenting:

*There is a clear desire for a much simpler funding landscape, with fewer instruments, improved coordination and elimination of unnecessary overlap. The rules and procedures should be simpler and applied more uniformly, however we have to square this with a demand for greater flexibility*⁶⁶.

She noted too that the new strategy would not simply mark a move from the '7th to the 8th Framework Programme', but, rather, a 'clear departure from business as usual'.⁶⁷

The European Commission Green Paper on a Common Strategic Framework for EU Research and Innovation Funding Analysis of public consultation provides some indication of the direction and tone Horizon 2020 will take. The headline findings of this analysis suggest that the upcoming strategy will include:

- Simplification was considered as a key priority;
- An approach that links research and innovation to EU policy on tackling societal change, which includes climate change, energy security and efficiency, demographic aging, and resource efficiency;
- Continuity of existing programmes that are considered successful;
- Calls for funding opportunities are less perspective and more open;
- EU support across the innovation chain;
- Support for both 'curiosity-driven' and 'agenda-driven' research; and
- Support for 'bottom-up' innovation.⁶⁸

The next steps in the development of Horizon 2020 are as follows:

- 30 November 2011 – proposed date for adoption by the European Commission of the draft legislative proposal for Horizon 2020 - the future Framework Programme for Research and Innovation;
- 5 December – 1st Innovation Convention;
- 6 December – Presentation of Horizon 2020 to the Competitiveness Council; and
- Discussions with the co-legislators: the Council of the European Union and the European Parliament (no date given).⁶⁹

65 European Commission From Challenges to Opportunities: Towards a Common Strategic Framework for EU research and innovation funding (February 2011) http://ec.europa.eu/research/consultations/csfr/consultation_en.htm

66 Europa Press Release Máire Geoghegan-Quinn Commissioner for Research, Innovation and Science The future of EU-funded research and innovation programmes: an emerging consensus....and a new name Conference closing the consultation on the future Common Strategic Framework for EU Research and Innovation Bruxelles, (10 June 2011) <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/11/432&format=HTML&aged=0&language=EN&guiLanguage=en> (accessed 22/08/11)

67 Ibid

68 European Commission Green Paper on a Common Strategic Framework for EU Research and innovation Funding Analysis of public consultation (10 June 2011) http://ec.europa.eu/research/csfr/pdf/consultation-conference/summary_analysis.pdf

69 European Commission Horizon 2020 http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=home (accessed 22/08/11)



Northern Ireland
Assembly

Research and Library Service Research Paper

Paper 281-11

30 September 2011

NIAR 281-11

Aidan Stennett

R&D Policy, Performance and Barriers

The following paper looks at R&D strategy, expenditure
and constraints in Northern Ireland and beyond.

Research and Information Service briefings are compiled for the benefit of MLAs and their support staff. Authors are available to discuss the contents of these papers with Members and their staff but cannot advise members of the general public. We do, however, welcome written evidence that relate to our papers and these should be sent to the Research and Information Service, Northern Ireland Assembly, Room 139, Parliament Buildings, Belfast BT4 3XX or e-mailed to RLS@niassembly.gov.uk

Key Points

The Department of Enterprise, Trade and Investment's key policy aim with regard to R&D is to increase annual growth in SME expenditure by 8% and larger company expenditure by 5% between 2008 and 2011. Invest NI has operated under the same targets, although applicable to client companies only.

Between 2005 and 2008 Northern Ireland Northern Ireland had:

- Lowest average total business expenditure on R&D (BERD) of all the UK and ROI NUTs regions;
- Average BERD per capita in this period was the third lowest of all the UK and ROI regions; and
- Average business expenditure, as a percentage of GDP was the fifth lowest of all the regions, but higher than Scotland and Wales.

The year on year percentage change in BERD in Northern Ireland has followed an erratic pattern between 2001 and 2009, as evidenced in the table below:

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
SME	53.92%	-15.57%	10.46%	20.22%	8.95%	43.50%	-9.39%	36.00%
250+	-19.44%	-27.81%	2.93%	18.86%	7.56%	-20.49%	14.58%	130.59%
All	1.10%	-22.59%	6.43%	19.52%	8.23%	10.78%	-0.59%	76.02%

The top-four high-level constraints on innovation identified by Northern Ireland businesses (of all sizes) were:

- 1. The availability of finance;
- 2. The cost of finance;
- 3. The perceived economic risk; and
- 4. The cost of innovation.

Executive Summary

EU Strategy

EU strategy is outlined in the Green Paper on the EU Research Area which seeks to create a European research landscape that comprises of:

...European internal market for research, where researchers, technology and knowledge freely circulate; effective European-level coordination of national and regional research activities, programmes and policies; and initiatives implemented and funded at European level.

In setting out how this vision is to be achieved five high-level objectives have been outlined the include ensuring; a flow of competent multi-disciplinary and global researchers; an integrated, networked and accessible research infrastructure; interdisciplinary research institutions engaging in 'effective' public-private cooperation and partnerships; knowledge sharing; jointly-programmed public research investment; and an globally open research area.

The main delivery mechanism for EU strategy is Framework Programme 7, which is the subject of a complimentary research paper prepared for the Committee for Enterprise, Trade and Investment (NIAR636).

UK Strategy

Current UK Government thinking on innovation and R&D focuses on technology and is outlined in the Blueprint for Technology policy document. The policy's vision is to ensure the UK Government is the 'most technology friendly in the world'. It seeks to drive economic productivity through 'high-growth, high-tech innovative businesses'.¹

It has three objectives which aim to remove barriers to and incentivise innovative activity:

- Creating 'the right framework for enterprise and investment';
- Maintaining competitive advantage, by 'getting behind' industries which already possess and have the potential to maintain competitive advantage; and
- Bridging the 'gap between innovation and commercial success'.²

Northern Ireland Strategy

The Department for Enterprise, Trade and Investment and Invest Northern Ireland (Invest NI) have, for the last number of years (2008-11), operated towards achieving similar R&D targets as outlined in the Programme for Government.

DETI:

- Increase SME annual growth in BERD by 8%; and
- Increase larger company growth in BERD by 5%.

Invest NI:

- Increase by 8% the average annual growth in BERD expenditure in Invest NI client companies with fewer than 250 employees;
- Increase by 5% the average annual growth in BERD expenditure in Invest NI client companies with 250 employees or above.

1 BIS Blueprint for Technology (2011) <http://www.bis.gov.uk/assets/biscore/innovation/docs/b/10-1234-blueprint-for-technology>

2 Ibid

Sources of funding and support

A variety of funding and support services are available to business in Northern Ireland. These include: Invest NI Grants, The Small Business Research Initiative, R&D Tax Credits, and InterTrade Ireland Innova and All-Island Innovation programmes.

R&D performance comparisons and employment

Data on Northern Ireland's R&D expenditure between 2005 and 2008 shows the following (note, figures in €s due to source material – regions refer to NUTs 1 regions, 15 in total):

- Average total (all sectors) expenditure during this period was €461m was the lowest of all UK regions, with only the Border, Midlands and Western region of ROI recording a lower spend.
- Average total spend per capita, €264, was the third lowest in the UK and lower than the two ROI regions.
- Average total expenditure as a percentage of GDP was 1.05%, the third lowest in the UK and lower than both ROI regions.
- Average business expenditure during this period was €234m was the lowest of all UK and ROI regions.
- Average business spend per capita, €134, was the third lowest in the all UK and ROI regions.
- Average total expenditure as a percentage of GDP was 0.54%, the fifth lowest of all regions but was higher than both Scotland and Wales.
- In Northern Ireland SME Business Expenditure on R&D (BERD) increased by 232% between 2001 and 2009
- The year on year percentage change in BERD in Northern Ireland has followed an erratic pattern between 2001 and 2009, as evidenced in the table below:

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
SME	53.92%	-15.57%	10.46%	20.22%	8.95%	43.50%	-9.39%	36.00%
250+	-19.44%	-27.81%	2.93%	18.86%	7.56%	-20.49%	14.58%	130.59%
All	1.10%	-22.59%	6.43%	19.52%	8.23%	10.78%	-0.59%	76.02%

- Overall expenditure by larger companies increased 61% between 2001 and 2009.
- Between 2008 and 2009 larger company BERD increased by 131%.
- Average total expenditure (2005-2008) in the Higher Education (HE) sector was €187m the lowest in the UK but greater than the Border, Midlands and Western region of ROI.
- In the same period average per capita HE expenditure was €108, the fifth lowest of all regions.
- Average HE expenditure as a percentage of GDP was 0.43%, the sixth lowest of all regions and comparable to the figure recorded for the North East of the UK.
- Average total government expenditure in Northern Ireland over the period was €28m the second lowest of all regions.
- Average per capita expenditure in Northern Ireland during this period was €16, the fourth lowest of all regions.
- As a percentage of GDP Northern Ireland's expenditure averaged at 0.065% the fourth lowest of all regions.

- Between 2005 and 2008 the average number of R&D personal annually employed in Northern Ireland was 5,541 the lowest of any UK region.
- In Northern Ireland, on average, 0.93% of the total employed population worked in R&D annually, which is the second lowest proportion of all UK regions.

Barriers to R&D and Innovation

In the UK Innovation Survey (2009) the following were identified as the four major barriers to innovation by 'all businesses' in Northern Ireland (ranked in order with one being the most identified constraint):

- The availability of finance;
- The cost of finance;
- The perceived economic risk; and
- The cost of innovation.

A greater proportion of Northern Ireland respondents found Government and EU regulations constraining than in the rest of the UK (10% NI and 8.3% UK).

For Small UK companies (below 50 employees, Northern Ireland data unavailable in survey) the four major barriers identified were (ranked in order with one being the most identified constraint):

- The cost of finance;
- The cost of innovation;
- The availability of finance; and
- The perceived economic risk

A total of 8.3% of respondents falling into the small enterprise category identified 'government regulations' as a high level barrier, with 7% identifying EU regulations'.

For medium sized UK businesses (between 50 and 250 employees, Northern Ireland data unavailable in survey) the four major barriers identified were (ranked in order with one being the most identified constraint):

A smaller proportion of medium-sized enterprises found 'government regulations' and 'EU regulations' (6.1% and 4.6%) a high-level constraint than those categorised as small enterprises.

- The cost of innovation;
- The cost of finance;
- The perceived economic risk; and
- The availability of finance.

Barriers to university spin-outs

The University of Ulster identified the following barriers to the setting-up of spin-out companies:

- A lack of incubation across the north;
- Bureaucracy when dealing with EU programmes and funds;
- A limited understanding across Government of the steps involved in the commercialisation of research; and
- Limited availability of private equity and Venture Capital.

Contents

- 1 Introduction
- 2 R&D Strategy
 - 2.1 EU Strategy and Funding
 - 2.1 UK Strategy
 - 2.3 NI Strategy
 - 2.3.1 MATRIX
- 3 Sources of funding & support
- 5 R&D Expenditure
 - 5.1 All Sectors
 - 5.2 Business Sector
 - 5.2.1 Northern Ireland BERD – further details
 - 5.3 Higher Education Sector
 - 5.4 Government Sector
 - 5.5 R&D Employment
- 6 Barriers to business R&D
 - 6.1 All Businesses UK and Northern Ireland
 - 6.2 SME Sector
- 7 Northern Ireland Universities & Spin Out Companies
 - 7.1 University of Ulster
 - 7.1.1 Innovation Services
 - 7.1.2 Incentives:
 - 7.2 Queen's University, Belfast

1 Introduction

This paper provides information on:

- R&D Strategy at European, United Kingdom (UK) and Northern Ireland (NI) level;
- Sources of funding and support for business in Northern Ireland;
- Comparative information on Research and Development (R&D) expenditure across the regions of the UK and Republic of Ireland (ROI);
- Barriers to innovation identified by businesses; and
- Information on University spin-out companies and barriers to their development.

2 R&D Strategy

2.1 EU Strategy and Funding

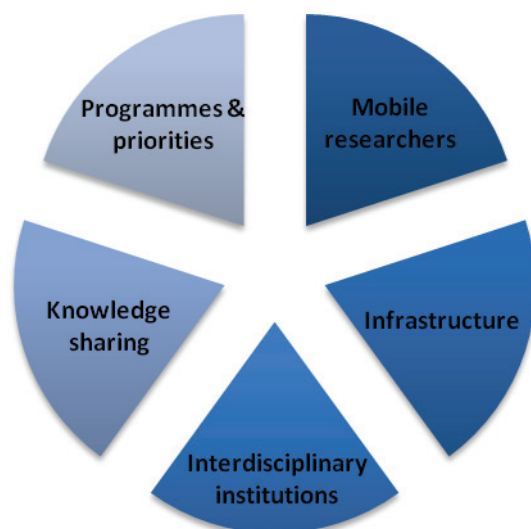
The European Research Area (ERA) is an umbrella concept 'composed of all research and development activities, programmes and policies in Europe which involve a transnational perspective'. It consists of programmes and policies which operate at regional, national and European level.

The 2007 Green Paper on the ERA defines a European R&D landscape comprising of a:

...European internal market for research, where researchers, technology and knowledge freely circulate; effective European-level coordination of national and regional research activities, programmes and policies; and initiatives implemented and funded at European level.³

Specifically, it seeks to create an internal market for research that meets the needs of business, the scientific community and citizens, and which is characterised by a flow of competent researchers, highly mobile between institutions, disciplines, sectors and countries; a research infrastructure that is integrated, networked and accessible to research teams from Europe; interdisciplinary research institutions engaging in 'effective' public-private cooperation and partnerships, which form the nucleus of research clusters and networks; knowledge sharing, particularly between public research and industry; research programmes and priorities, that emphasise jointly-programmed public research investment; and a research area that is open to the world, with a particular focus on neighbouring countries.

Figure 1: Components of EU R&D Strategy



The main mechanism for delivery of EU R&D strategy is Framework Programme 7; please see NIAR636 for further details.

2.1 UK Strategy

Current UK government thinking on issues such as R&D and Innovation was outlined in the Blueprint for Technology, published November 2010. The strategy aims at making the UK Government the 'most technology friendly in the world' and seeks to drive economic productivity through 'high-growth, high-tech innovative businesses'. The strategy has three objectives which seek to remove barriers to and incentivise technological innovation:

3 The European Commission *The European Research Area: New Perspectives* Green Paper 04 April 2007 <http://ec.europa.eu/research/era/docs/en/understanding-era-european-commission-eur22840-161-2007-en.pdf> p7

- Creating 'the right framework for enterprise and investment';
- Maintaining competitive advantage, by 'getting behind' industries which already possess and have the potential to maintain competitive advantage; and
- Bridging the 'gap between innovation and commercial success'.

The strategy outlines a range of measures – those with a specific focus on R&D include:

- A consultation on the taxation of intellectual property, R&D Tax Credits, the potential for creating a Patent Box and the Dyson Review recommendations;
- Maintaining the science budget in cash terms of the Spending Review period with resource spending of £4.6 billion a year;
- A series of regulation simplifications;
 - a 'one-in-one-out' rule whereby no regulation is brought in without another regulation being cut by at least the same amount;
 - ending the culture of 'tick-box' regulation;
 - 'sunset clauses' for regulations and regulators to ensure that the need for each is regularly reviewed;
 - Afford the public 'the opportunity to challenge the worst regulations'; and
 - bringing 'new discipline to the implementation of EU rules, so that British businesses are not disadvantaged relative to their European competitors and ensure gold-plating is stopped'.
- The provision, over four years, of £200m to fund the establishment of 'an elite network of Technology and Innovation Centres';
- Creating 'the most competitive environment in the developed world for venture capital and early-stage investment';
- The establishment of the UK Innovation Fund, which comprises of £150m government and £175m of private investment; and
- Introduce a Small Business Research Initiative (SBRI) to provide R&D procurement contracts to businesses to develop new and innovative products and services.

2.3 NI Strategy

Northern Ireland's key R&D strategy document is the Regional Innovation Action Plan 2008-2011. The plan seeks to meet Public Service Agreement 1 – 'promote higher-value added activity through innovation and the commercial exploitation of R&D'.⁴ Delivery on this agreement is measured through average annual growth in business expenditure on R&D (BERD). There are two central targets related to this:

- Increase SME annual growth in BERD by 8%; and
- Increase larger company growth in BERD by 5%.⁵

Table 2 outlines the Action Plan's strategic objectives under four broad policy areas. The range of objectives presented combines a multi-sectorial approach covering the private, public, and education sectors, with a multi-level outlook that is regional, national and international.

4 DETI *Regional Innovation Action Plan 2008-2011* <http://www.detini.gov.uk/eco-dev-pubs-4>

5 *Ibid*

With regard to financial contribution, the Action Plan committed £360m over its three year lifespan, including £170m from Invest Northern Ireland (see below for Invest NI strategy) and £90m from the innovation fund.⁶

In addition to the Action Plan, Invest NI's current corporate plan (2008-2011) 'sets ambitious targets to increase business expenditure on R&D'.⁷ These targets are derived from the Programme for Government Public Service Agreements. The key targets are similar to those of the Department:

- Increase by 8% the average annual growth in BERD expenditure in Invest NI client companies with fewer than 250 employees; and
- Increase by 5% the average annual growth in BERD expenditure in Invest NI client companies with 250 employees or above.⁸

The plan makes a commitment to:

- Secure Research & Development investment commitments of £120m;
- Assist 300 companies to engage in Research & Development for the first time;
- Increase the commercialisation of intellectual property from Northern Ireland's university and company research base; and
- Support MATRIX (the NI Science and Industry Panel), which will advise DETI on policies to better target resources to technology areas of greatest future potential and exploit core niche strengths in the R&D and science base.⁹

Table 1: Northern Ireland Regional Innovation Action Plan 2008-2011 – Imperatives and Objectives¹⁰

Imperative	Strategic Objective
To Establish Northern Ireland as an outward-focused and competitive region in the global knowledge economy - with an international reputation for innovation excellence	<p>Ensure the Northern Ireland is playing its full role in the UK, all-island, European and global innovation arenas</p> <p>Enhance and promote the development of an innovation culture in Northern Ireland (across all sectors of business, government and academia/education)</p> <p>Encourage Northern Ireland business and universities to be more outward focused and raise their profiles internationally</p> <p>Ensure that Northern Ireland business (and the business representatives organisations) become more proactive in leading and informing the innovation agenda</p>
To encourage Northern Ireland's businesses to become more innovative and creative in order to compete in the global market	<p>Promote an increased level of innovation and R&D activity within Northern Ireland businesses (including encouraging businesses to invest more in innovation and R&D)</p> <p>Encourage and support Northern Ireland businesses in building the capacity to take forward innovation ideas into new products, services and processes</p> <p>Create the context in which Northern Ireland businesses become more independent of public sector support</p>

6 *Ibid*

7 Invest NI Corporate Plan 2008-11 http://www.investni.com/eqia_corporate_plan_2008-2011_results__ci_august-2008.pdf

8 *Ibid*

9 *Ibid*

10 DETI *Regional Innovation Action Plan 2008-2011* <http://www.detini.gov.uk/eco-dev-pubs-4>

To encourage Northern Ireland government and the wider Northern Ireland Public Sector to lead by example in championing and exploiting innovation and R&D	Ensure that the public sector realises the (commercial) value of its R&D for the wealth of the region
	Encourage the public sector to lead the adoption of best practice in innovation and R&D and to champion the use of innovation and creativity as business critical in service delivery and process development
	Use Northern Ireland Sustainable Development Strategy as a mechanism by which the public sector can drive the innovation creativity and design agenda
	Ensure Northern Ireland Government addresses risk management issues and adopts an appropriate out-come based approach to procurement
To ensure that the Northern Ireland education system adopts an enhanced role in developing a culture of innovation and creativity and enables people to recognise opportunities in the knowledge economy	Ensure that Government interventions to promote and support innovation and R&D exploitation become more streamlined and targeted in order to assist innovation and R&D practitioners
	Encourage the tertiary education sector to take appropriate steps to realise the commercial opportunities of its research to enhance the wealth of the region
	Create the circumstance in which industry can take more responsibility for informing and supporting the education sector in preparing people for work in the knowledge economy
	Ensure that more people are encourage to recognise career opportunities through science, technology, engineering and mathematics

2.3.1 MATRIX

MATRIX is a Northern Ireland business led expert panel who advise Government on the commercialisation of R&D and science and technology.

The panel provides advice across three areas:

- Key R&D and science and technology affecting business innovation;
- Emerging strategic technology issues affecting the Northern Ireland economy; and
- Promoting a culture of innovation and raising the profile of R&D and science and technology, with particular regard to commercial activities.

The panel's key objectives are:

- To increase the economic return from science and technology in Northern Ireland;
- To commission research, analysis and studies to assist DETI in building an evidence base for policy intervention;
- To act as a forum for advising on the development of R&D and science and technology in the public and private sectors;
- To promote the importance of R&D and science and technology to Northern Ireland; and
- To build working relationships with parent bodies across Northern Ireland, the United Kingdom, the Republic of Ireland and internationally.

The MATRIX panel is supported by five Horizon panels which focus upon:

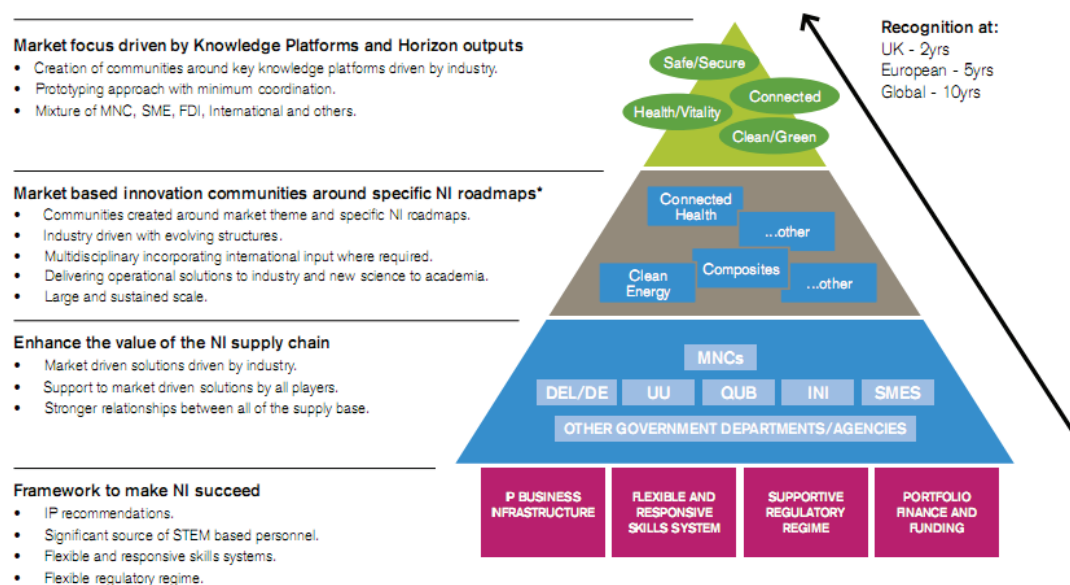
- Advanced engineering in transport;
- Advanced materials;
- Agri-food;
- ICT; and
- Life and Health sciences.

In 2008 the panel released a series of thematic reports on the above sectors. The following recommendations were put forward as part of the First Report (2008):

- The formation of industry led 'communities' which engage with academia, business and government to address global market opportunities presented by science and technology;
- That these communities create Northern Ireland 'road maps';
- A world class intellectual property and business infrastructure be created in Northern Ireland;
- A flexible and responsive skills system should be developed; and
- The regulatory regime in Northern Ireland should be reformed to allow Northern Ireland to 'take and manage a higher level of risk within a broad innovation portfolio'.

The panel's vision of Northern Ireland's future innovation landscape is set out in Figure 2 below.

Figure 2: Future focussed innovation system for Northern Ireland



*Those illustrated here are examples that have been proposed, but not exhaustive.

3 Sources of funding & support

NI Business Info outlines a range of funding resources available to Northern Ireland businesses wishing to innovate or engage in R&D¹¹:

Invest NI Grants – Invest NI offer financial support to companies engaging in the following activities: scoping, defining and planning an R&D project; research or critical investigation aimed at producing new scientific or technical knowledge; product or process development or improvements; exceptional development of leading edge technology; contracted research; and linking to a college or university to carry out specific projects. Applications for support are assessed on a case by case basis.¹²

The Small Business Research Initiative – led by the Technology Strategy Board the initiative enables small businesses to bid for technology based public sector development contracts. Projects cover a range of topics including health, defence, low carbon buildings, crime prevention and transport.¹³

R&D Tax Credits – primarily tax relief for R&D are separate schemes for companies with less than 500 full-time staff (the 'SME scheme') and for large companies. The 2011 Budget announced that rate of relief for SMEs would increase from 175% to 200% of qualifying R&D expenditure when calculating profit for corporation tax purposes from April 2011. There will also be a further increase to 225% from April 2012. Businesses not in profit could qualify for a cash payment of about 24.5% for every pound of expenditure on qualifying R&D. Larger companies can claim relief of up to 130% of qualifying expenditure.¹⁴

InterTrade Ireland - InterTrade Ireland works on a cross border basis to support SMEs. The body has a particular focus on innovation and R&D through its Innova programme, which offers businesses an opportunity to participate in cross-border R&D partnerships. Funding of up to £250,000 is available for the programme. The body also offers advice on R&D and innovation in general and on Framework Programme in particular.¹⁵ It has also been central in organising a series of innovation lectures and workshops through its All-Island Innovation Programme.¹⁶

Other funding sources and assistance – a range of other funding sources is also available including: Carbon Trust grants for R&D in low carbon innovation; National Endowment for Science, Technology and the Arts grants for innovative products, services or techniques; Knowledge Transfer Partnerships with UK universities; Knowledge Transfer Networks, facilitated by the Technology Strategy Board; and Equity Finance.¹⁷

-
- 11 NI Business Info *Innovation, research and development grants* <http://www.nibusinessinfo.co.uk/bdotg/action/layer?site=191&topicId=1074463677> (accessed 21/09/11)
 - 12 Invest NI *Research and Development* http://www.investni.com/index/already/product/research_and_development.htm (accessed 21/09/11)
 - 13 NI Business Info *Small Business Research Initiative* <http://www.nibusinessinfo.co.uk/bdotg/action/detail?itemId=1086265928&site=191&type=RESOURCES> (accessed 21/09/11)
 - 14 NI Business Info *R&D Tax Credit* <http://www.nibusinessinfo.co.uk/bdotg/action/detail?itemId=1086266055&site=191&type=RESOURCES> (accessed 21/09/11)
 - 15 InterTrade Ireland *Funding and Programme Information* <http://www.intertradeireland.com/businessfundingservices/fundingandprogrammeinformation/>
 - 16 InterTrade Ireland *All-Island Innovation Programme* <http://www.intertradeireland.com/all-island-innovation-programme/>
 - 17 NI Business Info *Other Sources of Funding* <http://www.nibusinessinfo.co.uk/bdotg/action/detail?itemId=1074471695&site=191&type=RESOURCES>
-

5 R&D Expenditure

The figures below provide a range of comparative information on R&D expenditure across the UK and the Republic of Ireland. The figures compare All sectors, Business, Higher Education and Government R&D expenditure. Figures are presented by NUTs regions which enables a sub-national comparison. Data has been sourced from the latest Eurostat databases; regrettably comparable data is only available until the end of 2008.

5.1 All Sectors

Figure 3 shows total R&D expenditure (in €m¹⁸) across the UK and Republic of Ireland regions between 2005 and 2008. Northern Ireland had amongst the lowest total expenditure of all the regions in this period, averaging at €461m over the four years. It had the lowest spend of all the UK regions, with only the Border, Midland and Western region of the Republic of Ireland during this period having a lower average spend in this period (€438m, data for the two regions of RoI is only available for three years). The East and South East of England were the regions with the highest spend during this time. The total spend for the UK (€33,619m average) is significantly larger than that of Ireland (€2,324m).¹⁹

Figure 4 provides similar information, although spend is presented on a per capita basis. Over the period measured Northern Ireland's average per capita spend on R&D was €264. Again, this was amongst the lowest in the UK with only Wales (with an average of €257) and Yorkshire and the Humber (with an average €243) lower. Northern Ireland's per capita spend was lower than both regions of the Republic of Ireland in this period.²⁰

Figure 5 presents R&D spend for all sectors as a proportion of GDP. On average, R&D expenditure in Northern Ireland over this period was equivalent to 1.05% of GDP. Again, this was one of the lowest in the UK, with only Yorkshire and the Humber (0.92%) and London (1.01%) recording lower figures. Compared to the two regions of the Republic of Ireland, Northern Ireland's R&D as a percentage of GDP was significantly less (the Border, Midlands and Western Region figure was 1.33%, the figure for the Southern and Eastern region was 1.24%).²¹

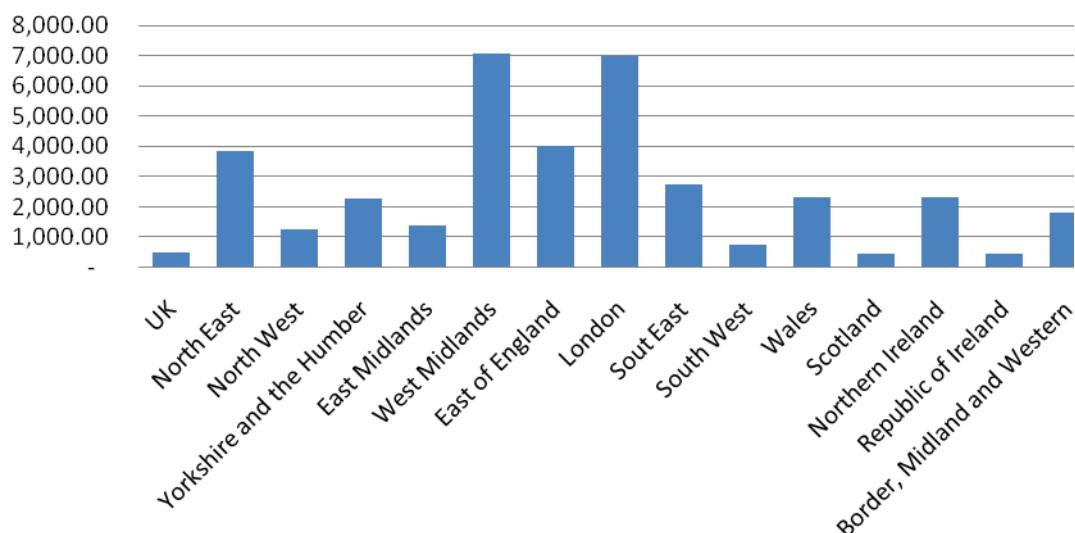
¹⁸ Note figures are in Euros due to the source of information.

¹⁹ Eurostat Total intramural R&D expenditure (GERD) by sectors of performance and region http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdreg&lang=en

²⁰ *Ibid*

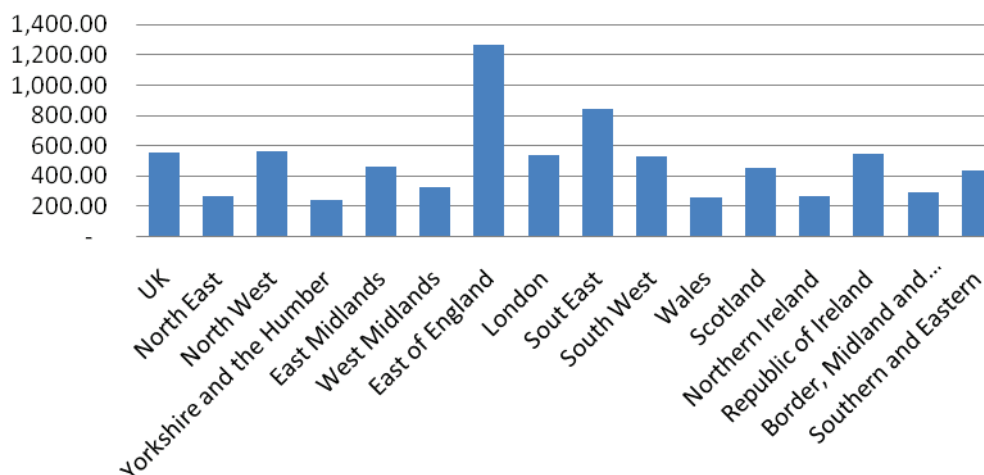
²¹ *Ibid*

Figure 3: Average total R&D Expenditure (€m) – All Sectors (2005-08)22



Source: Eurostat

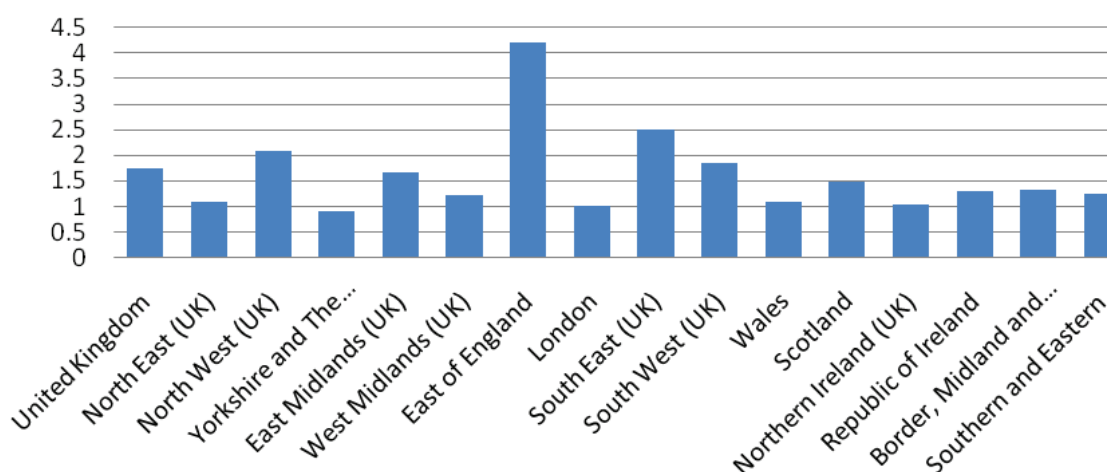
Figure 4: Average per capita R&D expenditure (€) – All Sectors (2005-08)23



Source: Eurostat

22 *Ibid*

23 *Ibid*

Figure 5: R&D expenditure as a percentage of GDP (average) – All Sectors 2005-08)²⁴

Source: Eurostat

5.2 Business Sector

Figure 6 presents total business expenditure on R&D across the UK and RoI regions in €m. Average expenditure in Northern Ireland during this period was €234m, the lowest of all the regions. The two regions with the next lowest average spends are the Border, Midlands and Western region of RoI (€319m) and Wales (€334m).²⁵

Figure 7 presents similar information on a per capita basis. Northern Ireland's average per capita spend during the period measured was €134. This was the third lowest of all the regions examined. Yorkshire and the Humber (average per capita spend €112) and Wales (per capita spend €113) has lower per capita spends.²⁶

Figure 8 compares business R&D expenditure as a percentage of GDP across all regions. The average for Northern Ireland during this period was 0.54%, considerably less than the figure for the UK as a whole 1.09%. This figure was lower than that of the two regions of RoI, but higher than: London (0.34%); Yorkshire and the Humber (0.42%); Wales (0.48%); and Scotland (0.50%).²⁷

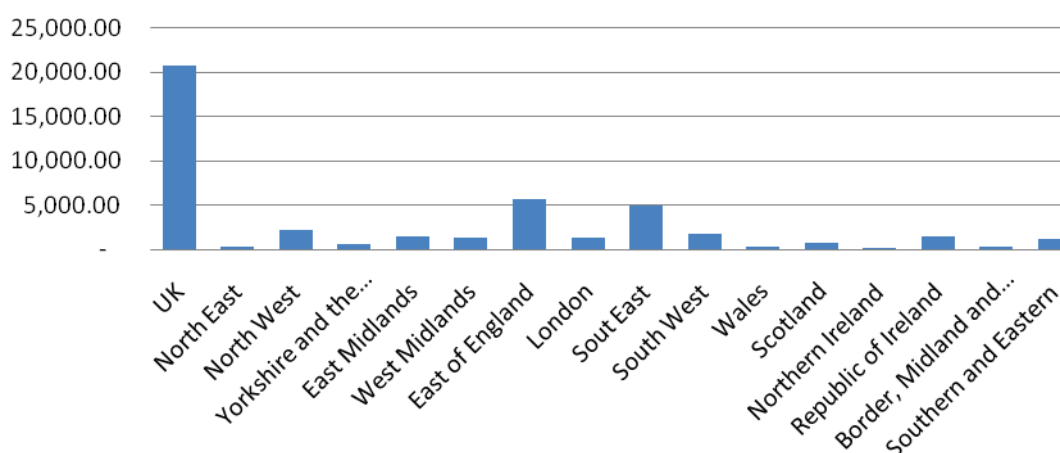
²⁴ *Ibid*

²⁵ *Ibid*

²⁶ *Ibid*

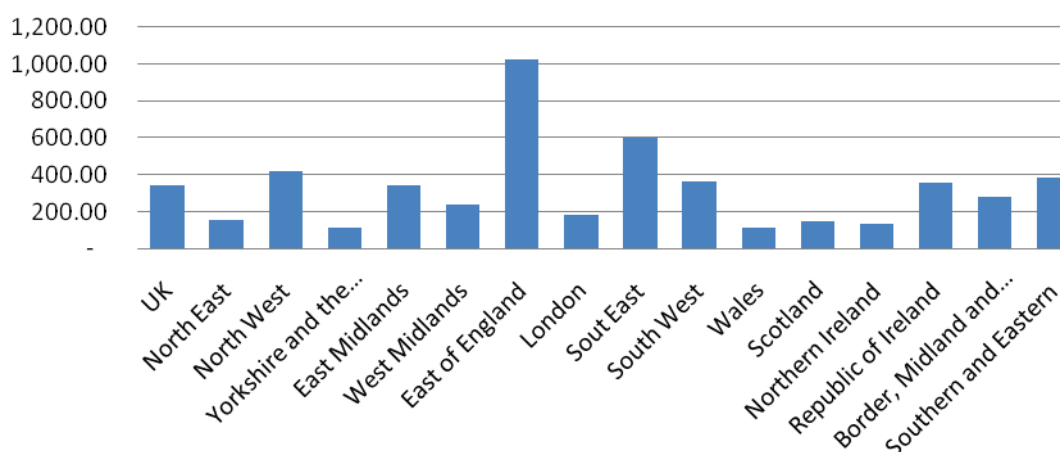
²⁷ *Ibid*

Figure 6: Average total R&D expenditure (€m) – Business Sector (2005-2008)²⁸



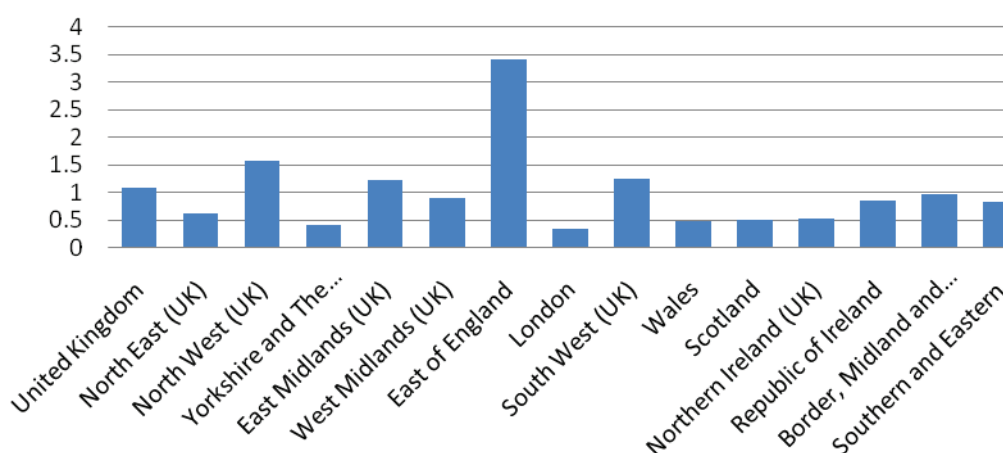
Source: Eurostat

Figure 7: Average per capita R&D expenditure (€) – Business Sector (2005-2008)²⁹



Source: Eurostat

Figure 8: Business Sector R&D expenditure as a % of GDP (average) (2005-2008)³⁰



Source: Eurostat

28 Ibid

29 Ibid

30 Ibid

5.2.1 Northern Ireland BERD – further details

Figure 8 provides further details on BERD in Northern Ireland between 2001 and 2009. It outlines BERD by company size – SME and larger companies – as well showing trends in overall BERD.

With regard to SME BERD, the figure shows a general rising trend since 2003, excepting a considerable dip in 2008. Overall SME BERD increased by 232%.³¹

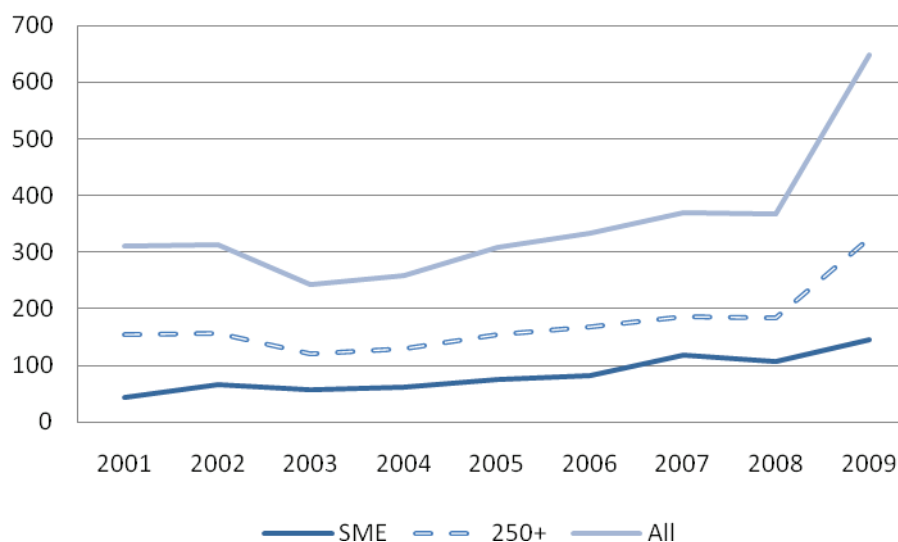
Expenditure by larger companies followed a similar trend over the period – a general upward trajectory since 2003, excepting a decline in 2006/07. The growth between 2008 and 2009 was more pronounced in this case. Overall expenditure by larger companies increased 61% between 2001 and 2009.³²

The year on year percentage change in BERD in Northern Ireland has followed an erratic pattern between 2001 and 2009, as evidenced in the table below:

Table 2: Year-on-year percentage change in BERD Northern Ireland

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
SME	53.92%	-15.57%	10.46%	20.22%	8.95%	43.50%	-9.39%	36.00%
250+	-19.44%	-27.81%	2.93%	18.86%	7.56%	-20.49%	14.58%	130.59%
All	1.10%	-22.59%	6.43%	19.52%	8.23%	10.78%	-0.59%	76.02%

Figure 9 – Northern Ireland BERD by company size



Source: Department of Enterprise, Trade and Investment

5.3 Higher Education Sector

Figure 10 compares total R&D expenditure in the Higher Education sector across all regions (HERD). Average expenditure in Northern Ireland over the four year period was €187m. The lowest in the UK by a considerable margin (the closest comparable average spend by a UK

31 Department of Enterprise, Trade and Investment *Northern Ireland Research and Development Statistics Bulletin 2009* (December 2010) http://www.detini.gov.uk/research_and_development_statistics_2009-3.pdf

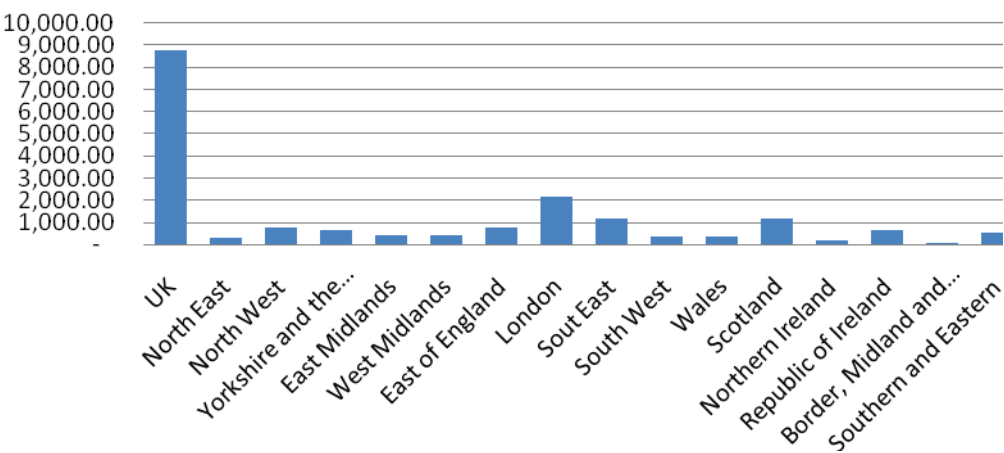
32 Eurostat Total intramural R&D expenditure (GERD) by sectors of performance and region http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdreg&lang=en

region was in the North East, €286m). Only the Border, Midland and Western region of RoI had a lower average total spend in this time (€90m).³³

Figure 11 compares per capita Higher Education expenditure on R&D. Northern Ireland's average per capita expenditure was €108 over the four year period. This figure is greater than the average per capita spend of the following UK regions: the South West (€75); the West Midlands (€78); and the East Midlands (€94). It was also higher than the Border, Midland and Western region of RoI (€80).³⁴

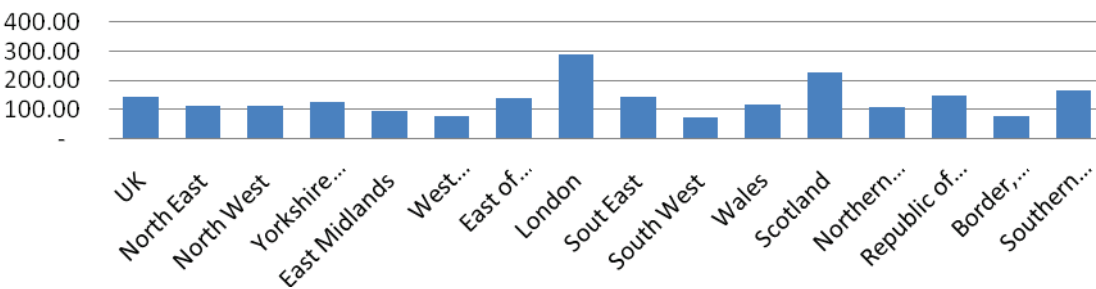
Figure 12 presents total Higher Education expenditure on R&D as a percentage of GDP. The average figure for Northern Ireland for this period was 0.43%, which was higher than the South West region of the UK (0.26%), the West Midlands region (0.29%) and the East Midlands Region (0.34%). The Northern Ireland average was comparable to the North West of the UK (0.43%). The Northern Ireland figure was higher the average for RoI (0.36%), and its two regions (Border, Midlands and Western – 0.27%, and Southern and Eastern – 0.37%).³⁵

Figure 10: Average total R&D expenditure (€m) – Higher Education Sector³⁶



Source: Eurostat

Figure 11: Average per capita R&D expenditure (€) – Higher Education Sector³⁷



Source: Eurostat

33 *Ibid*
34 *Ibid*
35 *Ibid*
36 *Ibid*
37 *Ibid*

Figure 12: Higher Education Sector R&D expenditure as a % of GDP³⁸

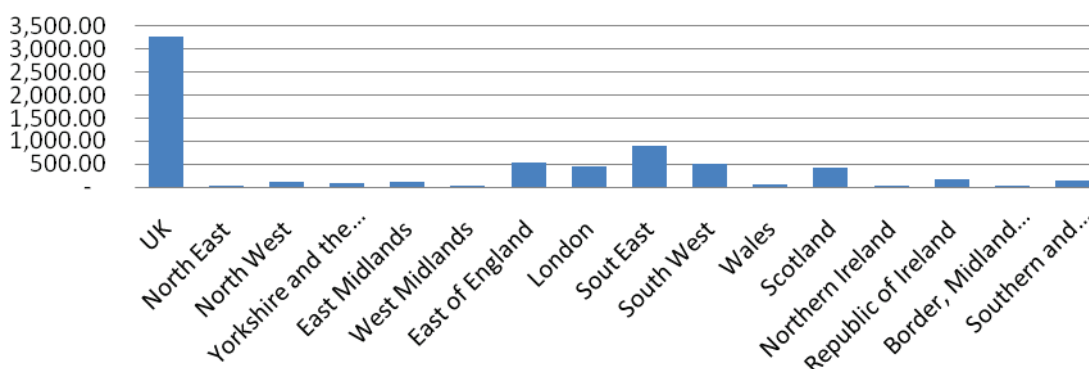
Source: Eurostat

5.4 Government Sector

Average total government expenditure in Northern Ireland over the period was €28m (Figure 13). This was the second lowest of all the UK regions, with only the North East recording a lower total expenditure (€2.56m). The Northern Ireland average was lower than the Border, Midland and Western region of RoI (€36m) and considerably lower than the Southern and Eastern region (€131.5m).³⁹

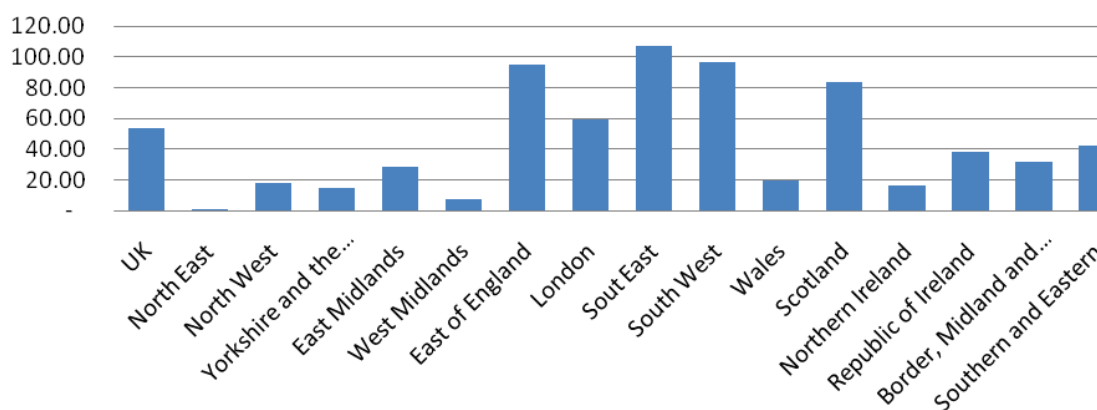
Average per capita expenditure in Northern Ireland during this period was €16 (Figure 14), the fourth lowest of all regions, above the North East (€1), the West Midlands (€7) and Yorkshire and the Humber (€15).⁴⁰

As a percentage of GDP Northern Ireland's expenditure averaged at 0.065% (Figure 15). The fourth lowest of the UK regions, above: the North East (0.0003%); the West Midlands (0.025%); and Yorkshire and the Humber (0.055%). Northern Ireland's average was lower than the two RoI regions in this period.⁴¹

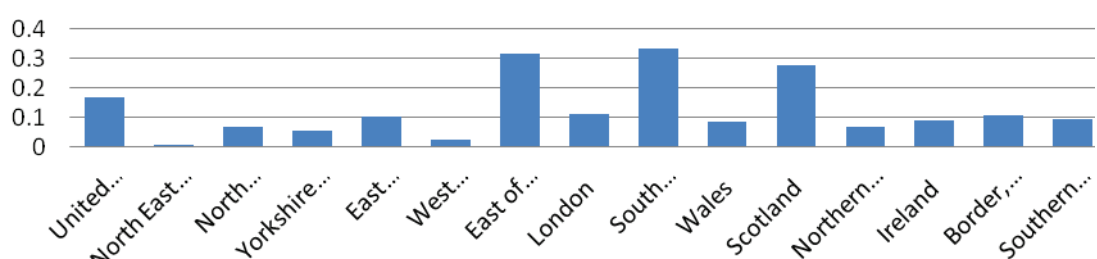
Figure 13: Average total R&D expenditure (€m) – Government Sector⁴²

Source: Eurostat

38 *Ibid*39 *Ibid*40 *Ibid*41 *Ibid*42 *Ibid*

Figure 14: Average per capita R&D expenditure (€) – Government Sector⁴³

Source: Eurostat

Figure 15: Government sector R&D expenditure as a % of GDP⁴⁴

Source: Eurostat

5.5 R&D Employment

Figure 16 and 17 examine personnel employed in R&D over the period 2005-2008. Figure 16 compares average annual total R&D personnel for each region during this period. The figure shows that in the UK, R&D personnel are concentrated in London (35,220 R&D personnel on average, 14% of UK average) and the South East (47,051 R&D personnel on average, 19% of UK average), accounting for 33% of the UK total (UK total equals 251,798). During this period Northern Ireland was home to 5,541 R&D personnel, the lowest number of any UK region, and equivalent to just 2.2% of the UK total average.⁴⁵

Figure 17 compare R&D as a percentage of total regional employment averaged out over the four year period 2005-2008. By this measure, the East of England had, on average, the largest proportion of total employment employed in the R&D sector – 1.6%. The South East of England had a similar proportion of the all employees working in the sector with 1.58% on average of the all employees working in R&D over the period. Both these figures are in excess of the UK and EU-27 figures, 1.16% and 1.07% of total employment working in R&D over the period on average respectively. In Northern Ireland, on average, 0.93% of the total employed population worked in R&D annually, which is the second lowest proportion of all UK regions. The lowest proportion was in the North East – 0.91%.⁴⁶

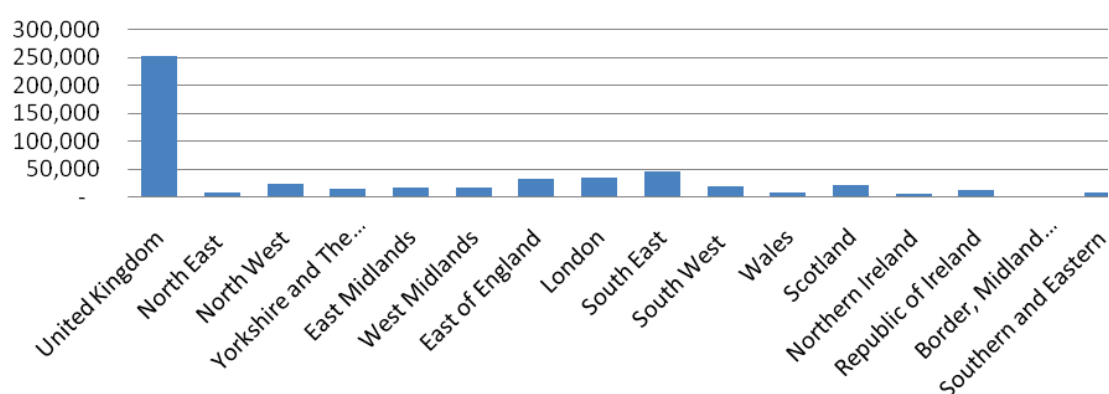
43 *Ibid*

44 *Ibid*

45 *Ibid*

46 *Ibid*

Figure 16: Average total R&D Personnel and Research (Full-time equivalent) All Sectors (2005-2008)⁴⁷



Source: Eurostat

Figure 17: Percentage of total employment - full time equivalent (four year average 2005-2008)⁴⁸



Source: Eurostat

⁴⁷ *Ibid*

⁴⁸ *Ibid*

6 Barriers to business R&D

6.1 All Businesses UK and Northern Ireland

Figures 18 and 19 are extracts from the UK Innovation Survey 2009, the latest release of the Department for Business, Innovation and Skill's statistical release (the publication is produced every two years). The figures show perceived innovation constraints for all business sizes and types. The constraints have been ranked by respondents according to their observed significance – high, medium and low. Figure 15 presents survey results for the UK, while Figure 16 collates results from Northern Ireland respondents.⁴⁹

For all respondents the prevalent perceived constraint within the high significance category was the 'cost of finance', which 17.2% of respondents viewed as a constraint of high significance. This was followed by the 'cost of innovation' which 16.4% considered a high level constraint, and the 'perceived economic risk' which 15.5% considered a high level constraint. Across the UK 7.9% considered 'government regulations' a high level constraint, with 6.6% ranking 'EU regulations' similarly.⁵⁰

In Northern Ireland the 'availability of finance' and the 'cost of finance' were ranked as high level constraints by the greatest number of respondents – 16.3% for both. These were followed by the 'perceived economic risk' (15.4%) and the 'cost of innovation' (15.1%). A greater proportion of Northern Ireland respondents found Government and EU regulations constraining than in the rest of the UK (10% and 8.3% respectively).⁵¹

49 BIS The UK Innovation Survey 2009 Statistical Annex <http://www.bis.gov.uk/assets/biscore/science/docs/u/10-p106-uk-innovation-survey-2009-statistical-annex.xls>

50 *Ibid*

51 *Ibid*

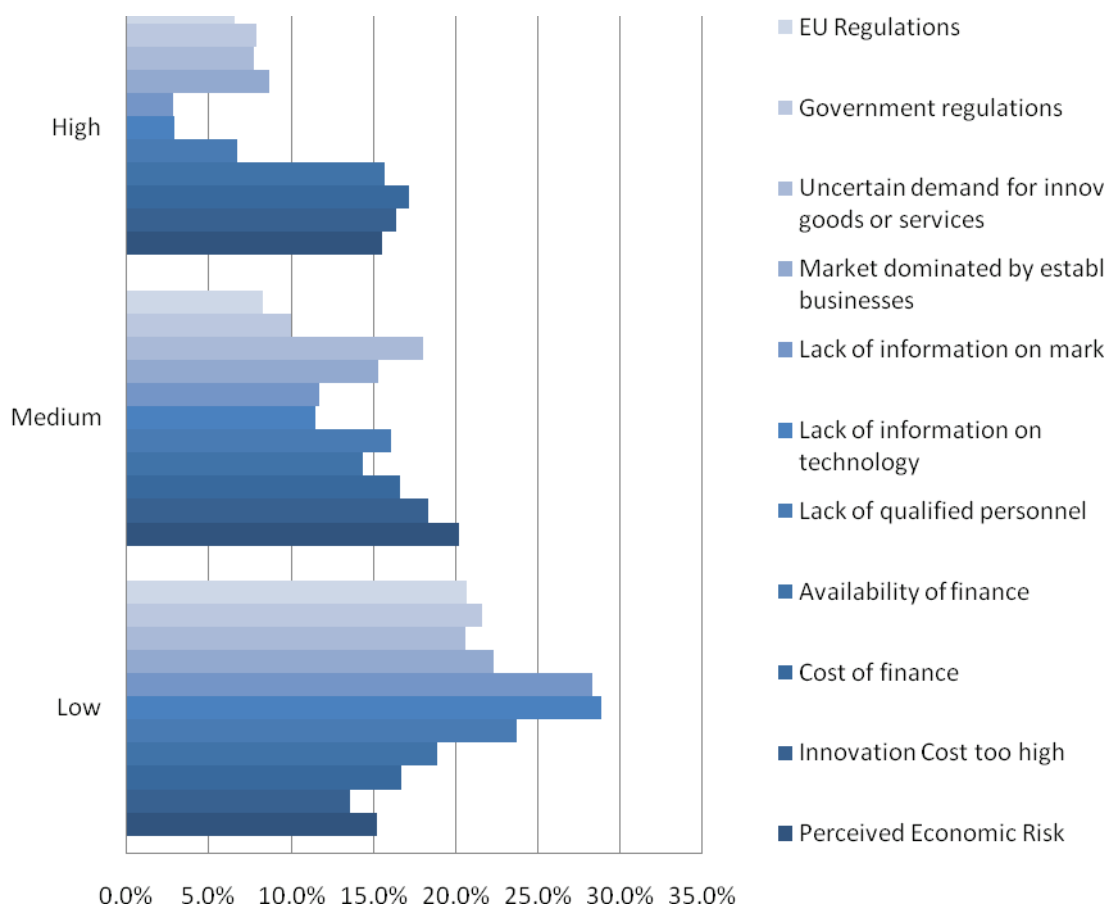
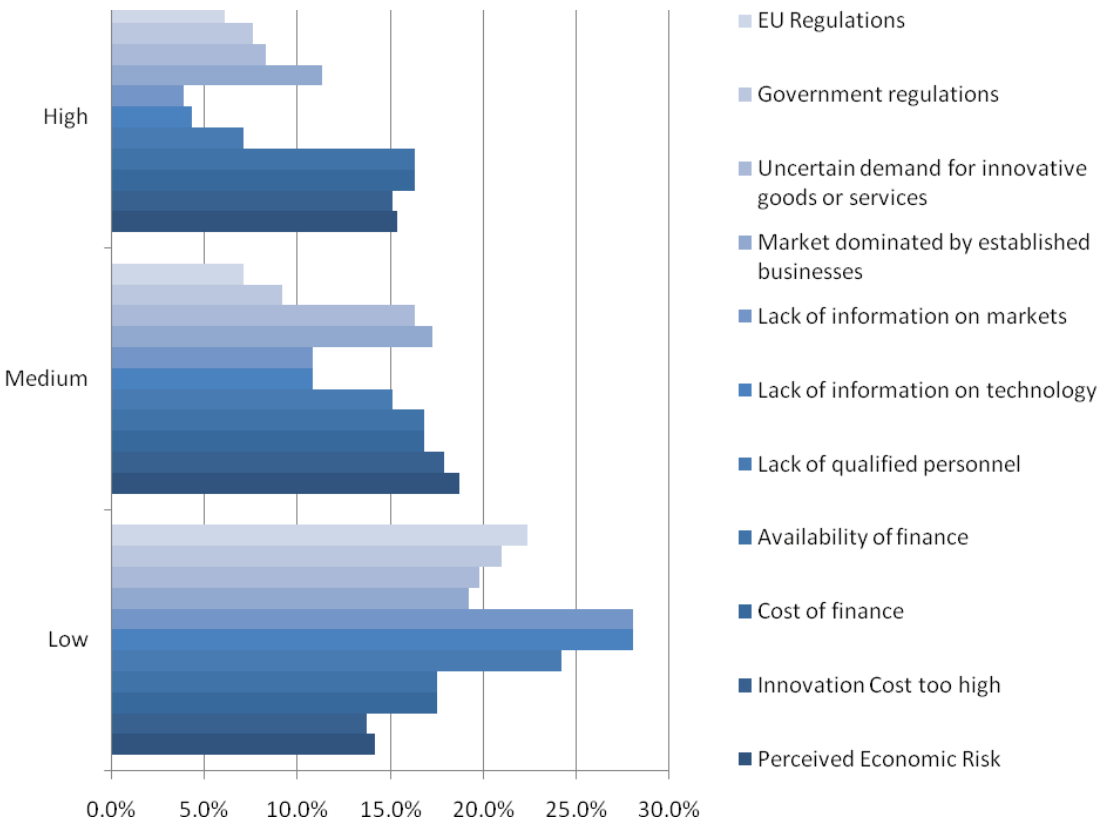
Figure 18: Innovation constraints – UK52

Figure 19: Innovation constraints – Northern Ireland⁵³



6.2 SME Sector

Figure 20 and 21 outline responses to the UK Innovation Survey on the question of innovation constraints, focussing specifically on the opinions of those in the small enterprises (10 to 49 employees, Figure 16) and medium sized enterprises (50-249 employees, Figure 17) across the UK (Northern Ireland specific information is not available at this level).⁵⁴

With regards Figure 20, the high level constraint identified by the greatest proportion of small enterprises was the 'cost of finance' (18%). This was followed by 'innovation cost to high' (16.8%), the 'availability of finance' (16.5%), and the 'perceived economic risk' (16%). A total of 8.3% of respondents falling into the small enterprise category identified 'government regulations' as a high level barrier, with 7% identifying 'EU regulations' similarly.⁵⁵

Figure 21 shows that the high level constraint identified by the greatest proportion of medium-sized enterprises was 'innovation cost too high'. This was followed by 'cost of finance' (13.5%), 'perceived economic risk' (13.1%) and the 'availability of finance' 12.4%). A smaller proportion of medium-sized enterprises found 'government regulations' and 'EU regulations' (6.1% and 4.6%) a high-level constraint than those categorised as small enterprises.⁵⁶

53 *Ibid*
54 *Ibid*
55 *Ibid*
56 *Ibid*

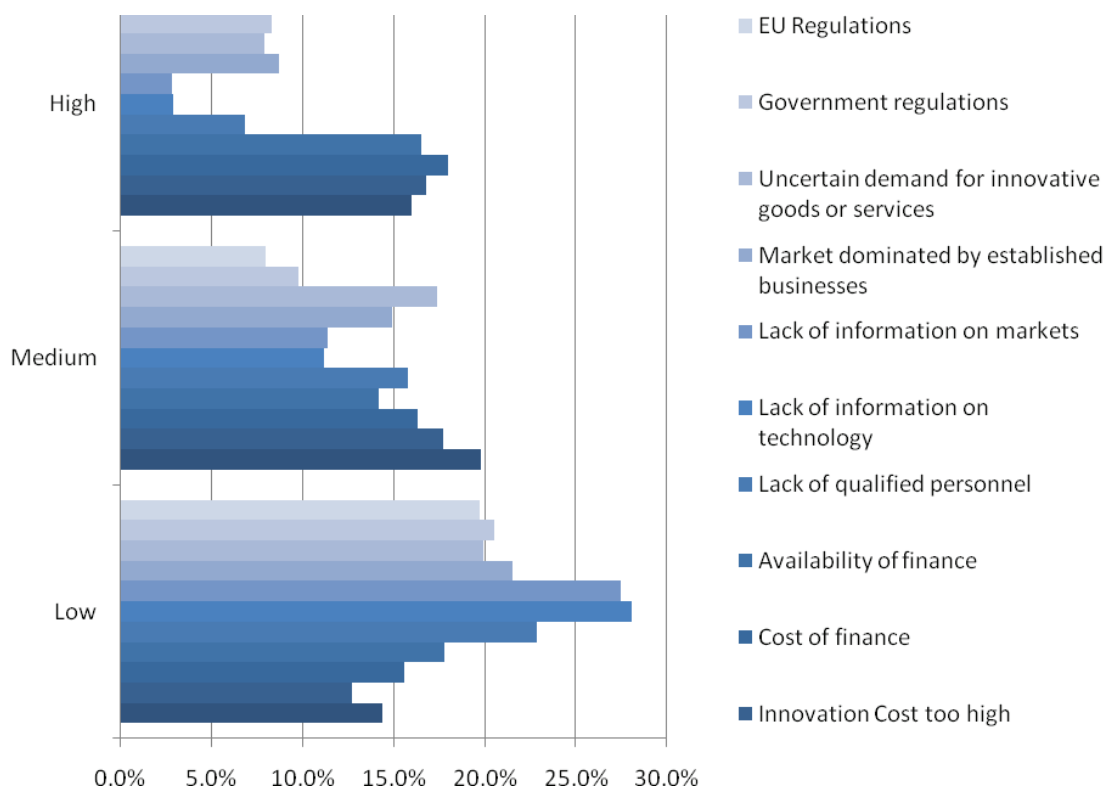
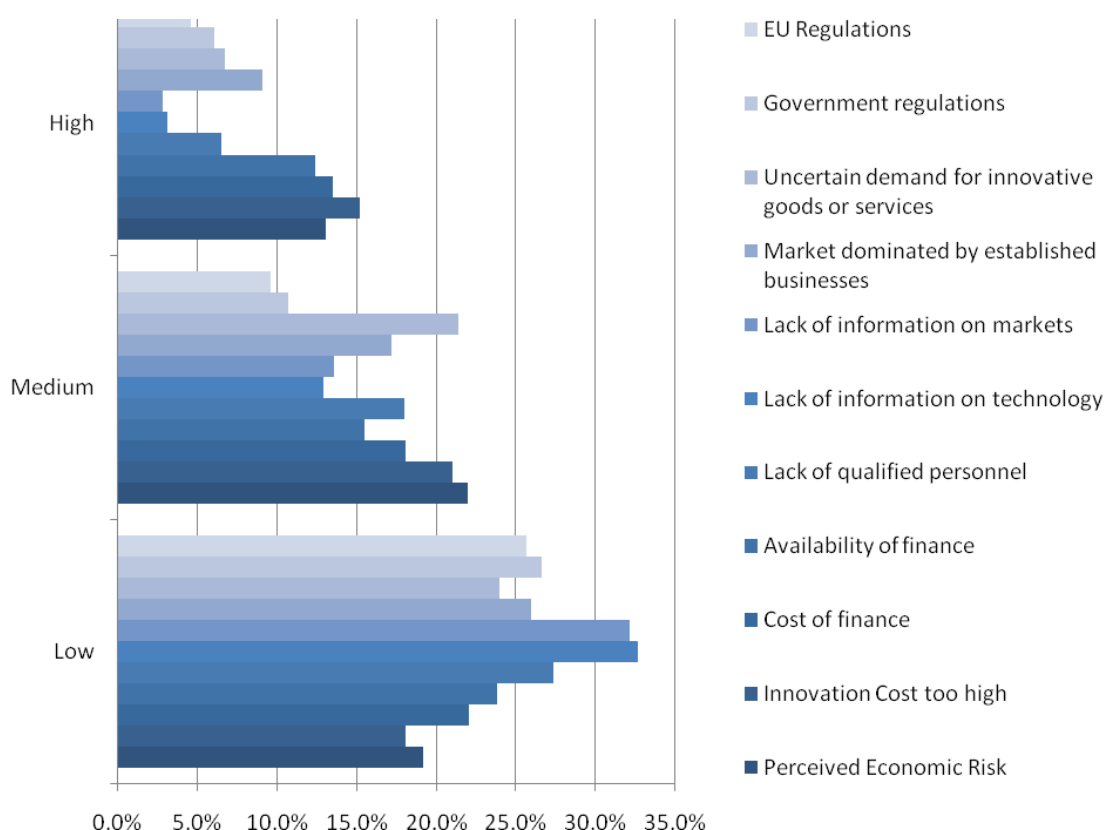
Figure 20: Small enterprises innovation constraints⁵⁷

Figure 21: Medium-sized enterprises innovation constraints⁵⁸

The National Endowment for Science, Technology and the Arts (NESTA)⁵⁹ report 'Beyond the Banks' examines the issue of SME access to finance in more detail. The report notes that the funding of small business is a 'perennial issue' and quotes comments made by the Business Secretary Vince Cable in July 2011 in which he stated that lending to SMEs had been contracting since recovery began in late 2009, noting that 'lending to the smaller companies with turnover of less than £1million has been particularly affected'.⁶⁰

The report's key findings with regard to the financing of SMEs are that:

- The use of external financing is in decline as SMEs attempt to pay off debt;
- The use of loan financing for smaller businesses is becoming more costly and there is a shift towards alternatives; and
- Although many companies are keen to expand, many others are more concerned with investing to maintain a 'steady state'.⁶¹

It also notes the following which includes a range of potential alternatives to traditional funding sources:

- There may be potential for something akin to a bond market for SMEs to develop from the peer-to-peer lending model;
- Auction-based invoice discounting has potential attractions for small business borrowers, this is referred to as an Asset-based lending exchanges;

58 *Ibid*

59 The independent body responsible for promoting innovation in the UK

60 NESTA *Beyond the Banks* (2011) <http://www.nesta.org.uk/library/documents/BeyondtheBanksv6.pdf>

61 *Ibid*

- Asset-based lending, such as factoring and invoice discounting, could be used to provide more finance to early-stage businesses;
- Many of the report's sources highlighted an 'advice gap'. That is, most small business managers were thought to take little or no external advice, tending to rely on their accountant. The report adds that the Business Finance Taskforce is addressing this;
- On the issue of regulation, the report notes: it is not clear how online marketplaces fit into the regulatory framework and asset-based lending is unregulated. While some providers are keen to gain the implicit assurance of being regulated, there is a risk of regulation being too onerous for SMEs; and

On the issues of incentives the report questioned whether the UK has the right tax incentives in place to encourage a flow of finance to SMEs.⁶²

7 Northern Ireland Universities & Spin Out Companies

7.1 University of Ulster

The University of Ulster has focused its Research and Innovation into a number of research institutes, with each of the six University faculties having research graduate schools, in order to:

...improve and professionalize the training of research students within the faculty by improving the quality of research induction and training, providing greater co-ordination and structuring of the monitoring and management of progress, providing improved resources for research students and their general welfare, increasing the numbers of research students and developing the faculty as a centre of excellence in graduate research. 63

Innovation Ulster Ltd is the legally constituted vehicle through which the University engages commercially with the business community and investors. Profits and surpluses from commercial activity are brought back into the University for distribution to the academic community and associated faculties and schools. Innovation Ulster Ltd is a 100% wholly owned subsidiary of the University of Ulster.

Innovation Ulster Limited is constituted to:

- Licence Intellectual Property to industry for royalties
- Licence Intellectual Property to spinout companies for equity
- Invest and hold equity in Ulster's spinout companies
- Invest and hold equity in Ulster's associated startup companies
- Manage Ulster's consultancy activity

In addition, in order to make full and effective use of the knowledge and products developed at the University, an "Office of Innovation" was established.

The Office of Innovation has a base at all four campuses of the University and provides a focus for enterprise innovation, networking, research, training and development projects, consultancy and funded programmes.

The team facilitates business and industry access to a wide range of University services. Business Liaison Executives work in partnership with clients to identify the right contacts within the University to help deliver innovative solutions to meet business needs.

The University is a leader in the delivery of knowledge transfer to industry including:

- Consultancy
- Knowledge Transfer Partnerships (KTPs)
- FUSION
- Innovation Vouchers
- Social Enterprises
- Collaborative Research
- Knowledge Club events
- U2B - a publication for the business community

7.1.1 Innovation Services

The primary role of the Innovation Services Team within the Office of Innovation is to translate Ulster's knowledge and technology (Intellectual Property) into marketable products and services in the most effective and timely manner possible.

This is achieved primarily through the following mechanisms:

- Spinouts / New Business Ventures;
- Technology Licenses;
- Consultancy; and
- Collaborative Development Projects.⁶⁴

There are 16 research institutes within the University of Ulster. UUTech Ltd (now 'Innovation Ulster Ltd') has invested over £4m to form almost 30 spin out companies, 24 of which are 'flourishing' today.⁶⁵

The main activities within Ulster's Innovation Strategy are:

- Business Outreach: The focus of the Business Outreach team is to capture business requirements, diagnose solutions and broker academic links:
 - The Business Outreach team also support Northern Ireland's third sector through financial assistance to the Science Shop, which matches Ulster's students with community and voluntary organisations to undertake scoped research projects, and through delivery of a range of knowledge transfer programmes to Social Enterprises;
 - It ensures involvement in student entrepreneurship;
 - It plays a key role in increasing engagement of academics in knowledge transfer activity; and
 - It provides a sectoral focus to augment the business outreach activities in the following areas – Life & Health Sciences, Enterprise, Sustainable Development and Creative Enterprise.
- Knowledge Transfer: The Knowledge Transfer Team develops and applies products to ensure the University's knowledge satisfies the requirements of clients. The team is responsible for:
 - Increasing the University's consultancy income;
 - Increasing the University's participation in the UK wide Knowledge Transfer Partnership (KTP) programme; and
 - Further developing Ulster's involvement in InterTradeIreland's FUSION programme and other publicly funded knowledge transfer programmes.
- Research Collaboration: A Research Collaboration team focuses on the creation of market-orientated Intellectual Capital. This team provides an advisory role to academics wishing to undertake applied research on behalf of companies and manages the delivery of Ulster's Research Impact Awards and other Research Collaboration incentive programmes.
- Technology Commercialisation: The Technology Commercialisation team focuses on increasing the rate of commercialisation of the University's Intellectual Capital. The team is responsible for increasing the numbers of spin out companies from Ulster and increasing the number of IP license agreements.⁶⁶

64 Ulster University Innovation Office <http://oi.ulster.ac.uk/about>

65 *Ibid*

66 *Ibid*

7.1.2 Incentives⁶⁷

The UU has a number of Incentives for developing research and innovation, including:

- **Academic Incentives – Consultancy:** consultancy activity as an important outlet for the dissemination of its staff expertise in the area of knowledge transfer to the benefit of business and the wider community and encourages its staff to be leaders in the promotion of creativity and innovation through consultancy. During any one financial year academic staff can undertake consultancy activity up to a maximum of 30 days, and non-academic staff can undertake consultancy up to a maximum of 10 days. Of the revenue received for this work, 16% is deducted and returned to the academic's School or Department, 16% is deducted and returned to Innovation Ulster Ltd which manages the consultancy business and the remainder may be taken by the academic through payroll or used within the University for academic pursuits.
- **Intellectual Property:** The University of Ulster owns 100% of the intellectual property (IP) created during the performance of the contracted duties of all employees, or assigned to the University by students or other individuals, except where otherwise defined within this policy. Net proceeds from commercialisation will be distributed between the inventor/creator(s) and the University on a fair and equitable basis.

Revenue generated through licenses will be distributed as outlined in Table 3.

Table 3: Distribution of revenue – University of Ulster⁶⁸

Net Revenue	Inventor/Creator(s)	Research Institute/ Research Centre/ School*	Innovation Ulster Ltd
≤£25,000	50%	30%	20%
>£25,000	33%	34%	33%

UU's Performance and Targets are outlined in Table 4.

Table 4: University of Ulster performance and targets⁶⁹

Theme	Metric	Actual AY 10/11	Target AY 11/12	Target AY 12/13
Business Outreach	Business Engagements	> 300	300	300
	Brokered Company Contracts	140	150	175
	Community Engagements	> 100	100	100
Knowledge Transfer	Number of new KTPs	12	25	30
	Consultancy Income	£1.45m	£1.8m	£2m
	% Repeat Business	20%	20%	20%
Research Collaboration	Invention Disclosures	52	60	70
	UK Provisional Applications	16	17	20
	New Strategic Research Collaborations	2	3	5

⁶⁷ Correspondence with University of Ulster Innovation Office (5 September 2011)

⁶⁸ From correspondence with University of Ulster (5 September 2011)

⁶⁹ *Ibid*

Theme	Metric	Actual AY 10/11	Target AY 11/12	Target AY 12/13
Technology Commercialisation	New Income from IP	£105k	£150k	£250k
	New IP Licenses	7	3	3
	New Spin Out Companies	4	3	4

7.1.3 Barriers to spin-out

The University of Ulster identified the following barriers to creating spin-off companies.

- A lack of incubation across the north;
- Bureaucracy when dealing with EU programmes and funds;
- A limited understanding across Government of the steps involved in the commercialisation of research;
- Limited availability of private equity and Venture Capital.

7.2 Queen's University, Belfast

In order to support QUBs research activities it has developed two offices with a number of responsibilities:

- The Research Policy Office:
 - Research Excellence Framework;
 - Research Assessment Exercise;
 - Central Research Support Fund;
 - Research Governance;
 - Research Clusters and Forums.⁷⁰
- Business and Knowledge Exploitation:
 - Commercial opportunities;
 - Consultancy services;
 - Services for academics;
 - Technical services;
 - Knowledge Transfer Centre.⁷¹

The Business and Knowledge Exploitation Office manages a range of business activities on behalf of QUB including technological licensing, consulting, technical services, knowledge transfer and early stage company support.

In recent years the universities and industry have begun to interact in a more structured and commercially focused way, with an increased number of university “spin out” companies.

The work of QUBIS Ltd and UUTECH Ltd, formed in 1984 and 1988 respectively, to commercialise the Research and Development work of the two Universities and facilitate technological transfer, is also significant.

QUBIS has four main objectives:

⁷⁰ Queen's University of Belfast Research Office <http://www.qub.ac.uk/directorates/ResearchEnterprise/ResearchPolicyOffice/>

⁷¹ Queen's University of Belfast Business and Knowledge Exploitation <http://www.qub.ac.uk/directorates/ResearchEnterprise/>

- To establish one or two new business ventures per annum, using joint ventures with outside partners where possible and to encourage academic staff to take a stake in each new enterprise;
- To maintain and grow the existing business within the portfolio both in terms of profitability and employment levels;
- Service type ventures are expected to become profitable at an early date, year two being the target. In the case of more capital investment or R & D led ventures, these are expected to be profitable within R & D; and
- To reinvest.⁷²

Review of QUBIS data shows that there are 27 companies on its portfolio⁷³.

In a paper to the Committee for Employment and Learning, QUB stated that:

*Queen's spin-off companies have created over 1,000 high value jobs and have a collective turnover in excess of £100m annually, with over 90% of output being exported.*⁷⁴

Queen's has a long established strategy of fostering an entrepreneurial culture and promoting the successful transformation of good research into good business through innovation and commercial development.

In December 2009, the University's venture spin-out company, QUBIS Ltd celebrated its 25th anniversary. QUBIS companies currently have an annual turnover in excess of £100m and sustain 1,000 high value jobs in Northern Ireland. Some 90% of QUBIS companies' products and services are exported. Despite the economic downturn, QUBIS has created five new high-tech companies in the last three years.⁷⁵

Small and medium sized enterprises (SMEs) in Northern Ireland have benefited considerably from technology transfer, whereby the research and knowledge within the universities is transferred to business with a view to developing commercially viable products or services.

In addition to QUBIS, QUB developed the Knowledge Transfer Centre in 1993 to provide a focal point for the promotion and support of knowledge transfer activities, in particular to increase the involvement of SMEs with the University, by developing collaborative projects through Knowledge Transfer Partnerships (KTPs). KTPs allow young graduates to be employed by business, but continue to be supervised by academics from the relevant university department, providing a very useful bridge between academic departments and businesses, and facilitating the transfer of expertise from the universities and colleges to the private sector.⁷⁶

There are currently 70 KTP programmes in NI: 40 are led by Queen's, 17 by UU and 13 by the Further Education Colleges.

Queen's also works in partnership with the larger companies in Northern Ireland, such as Bombardier, Wrightbus, FG Wilson, Radox and Almac, all of whom value the University's research strength and mention them as a key factor in their continued commitment to investment in the province. The current development of the Northern Ireland Advanced Composites Engineering Centre, a collaboration between Queen's, UU and Bombardier is just one example.

⁷² Queen's University Belfast QUBIS <http://www.qub.ac.uk/sites/QUBIS/>

⁷³ *Ibid*

⁷⁴ *Ibid*

⁷⁵ *Ibid*

⁷⁶ Queen's University Belfast Knowledge Transfer Centre <http://www.qub.ac.uk/directorates/KnowledgeTransferCentre/>

Queen's and University of Ulster are co-founders of the Northern Ireland Science Park (NISP) which promotes R&D in NI. For example, the NISP 'Connect' Programme encourages innovation and enables fledgling companies from the universities and beyond to avail of the much needed support in services and finance to underpin company growth.

Table 5 below provides a breakdown of research income secured by the two universities in 2008-09. Queen's, with core government funding for research of almost £33m in 2008, secured a further £59m, equating to £181 for every £100 of government funding, while the University of Ulster, with £17.5 m of core research funding, secured a further £20m, equating to £119 for every £10077.

Table 5: Queen's and UU Research Grants and Contracts by source of funding 2008-09

Source of Funding	Queen's £m	UU £m
Total BIS Research Councils, Royal Society & British Academy	14.7	6.1
UK-based charities	7.2	1.6
UK central government bodies/local authorities, health & hospital authorities	19.6	7.9
UK industry, commerce & public corporations	2.9	0.4
EU	7.2	3.2
Other sources	7.7	1.4
TOTAL RESEARCH GRANTS & CONTRACTS	59.3	20.6

Source: HESA 2008-09

Source: HESA 2008-09



Northern Ireland
Assembly

Research and Library Service Research Paper

Paper 697/11

24 October 2011

NIAR 697-11

Aidan Stennett

EU Innovation Policy – Best Practice

This paper provides case studies on best practice EU innovation policy. It examines the research and innovation systems of the three top performing EU Member States: Sweden, Germany and Finland.

Research and Information Service briefings are compiled for the benefit of MLAs and their support staff. Authors are available to discuss the contents of these papers with Members and their staff but cannot advise members of the general public. We do, however, welcome written evidence that relate to our papers and these should be sent to the Research and Information Service, Northern Ireland Assembly, Room 139, Parliament Buildings, Belfast BT4 3XX or e-mailed to RLS@niassembly.gov.uk

Key Points

The research and innovation systems of the three top performing EU Member States share the following characteristics:

- A higher level of business R&D expenditure;
- Good linkages between the science base and business; and
- They 'excel' in the commercialisation of their technological knowledge.

In addition:

...the overall good performance of the innovation leaders reflects a balanced national research and innovation system. While each country has its own specificities, policy responses should attempt not only to address relative weaknesses in national research and innovation systems, but also to have more balanced performances across all categories of indicators

A successful research and innovation can take a significant time to develop and must continually evolve in order to respond to challenges and prevent stagnation.

Executive Summary

This paper examines the research and innovation systems of the three top performing EU Member States: Sweden, Germany and Finland.

While it is evident that there is no single way to improve research and innovation performance, the three states do share characteristics, namely:

- A higher level of business R&D expenditure;
- Good linkages between the science base and business; and
- They 'excel' in the commercialisation of their technological knowledge.

Sweden

Swedish government policy on innovation and research is the responsibility of two ministries, the Ministry of Enterprise, Energy and Communications and innovation policy, and the Ministry of Education. There are also two significant government agencies: the Swedish Research Council; and the Agency for Innovation Systems (VINNOVA).

In Sweden 3.9% of GDP is invested in R&D. The sectoral distribution of R&D expenditure is weighted heavily towards the business sector; with enterprises accounting for approximately 80% of total research and innovation spend.

The country's research and innovation system has a number of strengths:

- High-levels of investment in R&D – in 2009 total Swedish R&D investment amounted to 112bn Swedish Krone (SEK);
- A concentration of large global corporations with a culture of R&D investment;
- An internationally linked economy (although with some distance to market);
- An export orientated market that is fuelled by innovation; and
- A long tradition of cooperation within a 'triple helix' – Academia, Government and Industry.

From a policy perspective the region's focus is on the health, biotechnology and transport sectors. Current policy prioritises promoting excellence in Universities; and linking academia to business. The Research and Innovation Bill' (2008), commits to €500m investment in research and innovation – equivalent to 1% of all public funding.

Vinnova, the region's principal agency for the delivery of innovation policy has five tools at its disposal:

- Investing in research and innovation;
- Improving the innovation capacity of SMEs – which includes coaching and facilitating their promotion in international partnerships;
- Promoting global links – through bilateral linkages and through participating in EU R&D programmes;
- Policy development; and
- Utilising the Country's innovation infrastructure – which includes a strong research and innovation environment, testing and demonstration sites, incubation facilities, and the relationship that exist amongst the 'triple helix'.

Despite its strong position, Sweden faces a number of challenges relating to research and innovation:

- A strong dependence on a small number of large companies for investment

- The economic crisis' impact on Swedish industry; and
- A difficulty in ensuring that academia listens to and responds to the needs of business.

Germany

Germany's system of research and innovation governance is influenced by its federal government structure. The federal government and the 16 L nder (state government) each play a role in the system and share a number of responsibilities.

The ministries with principal responsibility for research and innovation at federal level are the Federal Ministry of Education and Research and the Federal Ministry of Economics and Technology.

Across Germany's governance system there are more than 20 programme executing organisations (which can be public, semi-public or private institutions) responsible for the implementation and administration of policy formulated at federal or state level.

Gross domestic expenditure on R&D (GERD) in Germany in 2007 was 2.53% (estimated at 2.64% for 2008). Industry was the largest funding sector by a considerable margin providing €41,761m of funding to the implementation sectors, the majority of which was fed back into industry

Germany is strong when it comes to producing innovative outputs and new technology. It has a high share of innovators, technological patents and its medium to high-tech manufacturing sector has high employment and is a strong exporter.

Current policy is a response to specific research and innovation challenges:

- Funding innovation - German policy is to offer a range of financial support mechanism to SMEs including venture capital (the High-tech start-up fund), loan programmes and grants. In 2008 the Central Innovation Programme for SMEs (ZIM) was launched. In 2009 and 2010 ZIM had an annual budget of €300m, rising to €500m from 2011.
- Keeping pace with global technology trends – federal government launched a series of 17 'Thematic R&D Programmes', which target policy and funding at specific technological areas.
- Adapting Germany's education system to meet the needs of rapidly evolving requirements of technology and innovation – the Federal Government has have reformed vocational training courses, introducing new, 'modern' courses and improving the supply of further education, including additional financial incentives for employees.
- Continuing the strong tradition of industry-science link ups – A number of policies have been adopted to ensure this tradition continues. The region has also introduced the Research Bonus to strengthen the ability of universities and public research institutions to co-operate with SMEs.

Finland

The Finnish research and innovation system is often viewed as a bench mark in many countries.

It is recognised by policy makers in Finland that its success was the result of many years of intervention.

There have been a number of facets to this development:

- Education, science and R&D have had high political status since the 1950s;
- Policy makers of the 1950s and 1960s were able to establish a long-term national restoration and growth programme based on strong public-private partnerships and strong public investments;

- Finland established a negotiation-based contract system in the labour market in the 1960s and 70s;
- Policy makers promoted infrastructure development designed to enhance economic and societal conditions that was later adaptable to a successful research and innovation system;
- The Technology Committee, which comprises of stakeholders from the public and private sectors, introduced a consensus-based long-term programme for raising technological capabilities of the country and increasing R&D in the early 1980s.

At departmental level the key players in the innovation system are the Ministry of Employment and the Economy and Ministry of Education and Science.

In 2009, R&D expenditure was equivalent to 4% of GDP. The largest proportion of expenditure has historically come from the business sector, with the public sector contributing a relatively small proportion.

Finland performs well across a number of indicators:

- The region's human resource performance is strong;
- The region is marked by high business investments; and
- Finnish SME cooperation in innovation has been growing at a faster rate than the EU average.

Current research and innovation policy is outlined in the National Innovation Strategy (2008). It is based on ten principles:

- reinforcing the competence base;
- broad-based innovation activity;
- internationalisation of the innovation environment and operating in a world without borders;
- strong and networked innovation centres;
- internationally competitive system of training and higher education;
- developing the Finnish environment to support growth businesses;
- strengthening demand and user orientation;
- central government's corporate steering and a systemic approach;
- resources for innovation activity; and
- international review of the innovation system

VEKKES is the main Finnish funding agency. The agency provides grants totaling €600m annually.

Contents

- 1 Introduction
- 2 EU Member State's Innovation Performance
- 3 Sweden
- 4 Germany
- 5 Finland

1 Introduction

The following paper provides background details on the research and innovation systems adopted by the three best performing EU member states – Sweden, Germany and Finland.

The paper makes use of policy assessments from Pro Inno Europe, an initiative of the European Commission's Directorate General of Enterprise and Industry which aims to be:

...the focal point for innovation policy analysis and policy cooperation in Europe, with a view to learn from the best and contribute to the development of new and better innovation policies in Europe.

2 EU Member State's Innovation Performance

Figure 1, which is sourced from the Innovation Union Scoreboard 2010, ranks European Union Member States by their innovation performance. The scoreboard is calculated based upon data across 24 indicators. Member States have been divided into four categories – Innovation Leaders, Innovation Followers, Moderate Innovators, and Modest Innovators.

The scoreboard identifies Sweden, Germany, Finland and Denmark as the four innovation leaders in the EU.

- The report notes that, although 'there is not one single way to reach top innovation performance', these regions do share some common characteristics, namely:
- Each has higher levels of business R&D expenditure;
- They all have 'higher than average scores in the Public-private co-publications per million population indicator', suggesting good linkages between the science base and business; and
- They all 'excel' in the commercialisation of their technological knowledge.¹

Significantly:

...the overall good performance of the innovation leaders reflects a balanced national research and innovation system. While each country has its own specificities, policy responses should attempt not only to address relative weaknesses in national research and innovation systems, but also to have more balanced performances across all categories of indicators.²

This paper looks in detail at the research and innovation systems in operation in the top three countries – Sweden, Germany and Finland.

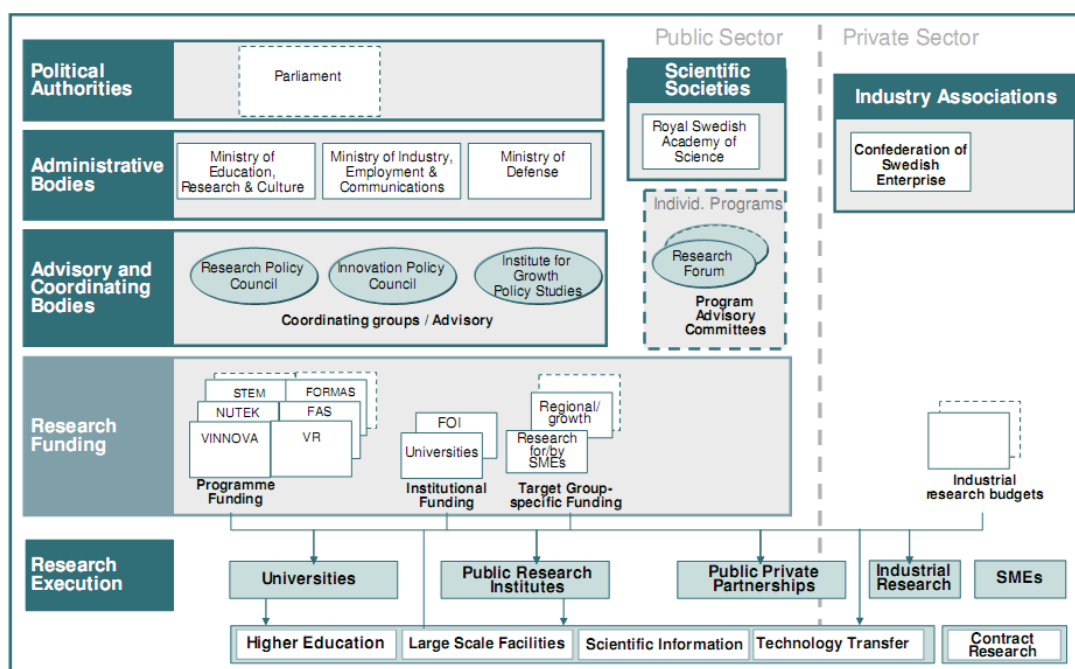
1 Pro Inno Europe Innovation Union Scoreboard 2010 – The Innovation Union's performance and scoreboard for Research and Innovation (1 February 2011) http://ec.europa.eu/research/innovation-union/pdf/iu-scoreboard-2010_en.pdf

2 Ibid

3 Sweden

Swedish government policy on innovation and research is the responsibility of two ministries, with the Ministry of Enterprise, Energy and Communications, responsible for industrial and innovation policy, and the Ministry of Education, responsible for research policy. A high level of defence based research ensures that the Ministry of Defence has a role in the Swedish research and innovation system. There are also two significant government agencies: the Swedish Research Council, which facilitates ‘fundamental research’; and the Agency for Innovation Systems (VINNOVA) which focuses on ‘applied, needs drive research and innovation’.³ Figure 1 illustrates the Swedish research and innovation system in more detail.

Figure 1: Diagram of the Swedish research and innovation system⁴



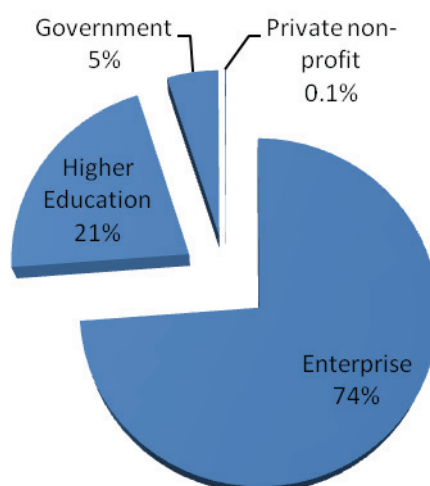
In Sweden 3.9% of GDP is invested in R&D⁵. The sectoral distribution of R&D expenditure is weighted heavily towards the business sector. Figure 2 outlines the proportion of R&D performed by each sector in Sweden, Enterprise makes up 73.8% of all R&D activity, followed by higher education (21.3%).⁶

3 The Ministry of Enterprise, Energy and Communication Swedish Research and Innovation Policy – perspectives on policy interaction http://www.spri.es/wNS/docs/publicaciones/ponencias/MARIE_IVARSSON.pdf

4 Europa Private Sector Interaction in the Decision Making Processes of Public Research Policies: Country Profile: Sweden http://ec.europa.eu/invest-in-research/pdf/download_en/psi_countryprofile_sweden.pdf

5 Vinnova A Key actor in innovation <http://www.vinnova.se/upload/EPiStorePDF/vi-11-06.pdf>

6 The Ministry of Enterprise, Energy and Communication Swedish Research and Innovation Policy – perspectives on policy interaction http://www.spri.es/wNS/docs/publicaciones/ponencias/MARIE_IVARSSON.pdf

Figure 2: % of total R&D performed by different sectors⁷

The Swedish research and innovation system has a number of strengths:

- High-levels of investment in R&D – in 2009 total Swedish R&D investment amounted to 112bn Swedish Krone (SEK);⁸
- A concentration of large global corporations with a culture of R&D investment;
- An internationally linked economy (although with some distance to market);
- An export orientated market that is fuelled by innovation; and
- A long tradition of cooperation within a 'triple helix' – Academia, Government and Industry.⁹

With regard to industry sectors, Swedish policy emphasises the health and biotechnology sectors. The transport sector has had considerable attention in recent years, largely on account of the impact of the financial crisis on the national automotive industry. Current policy is less focussed on the ICT reflecting the fact that this is a mature field. The regions policy priorities are:

- Promoting excellence in Universities; and
- Linking academia to business through cluster building and public-private partnerships.¹⁰

Less emphasis is placed on knowledge transfer, direct support to business, support to risk capital, and the mobility of its researchers. The region's current policy, the Research and Innovation Bill' (2008), commits to €500m investment in research and innovation – equivalent to 1% of all public funding. This investment is targeted at universities. Investment will be focussed on areas in which Sweden is already world class and where it is deemed that industry and wider society require new knowledge. A total of 150m SEK has been earmarked for the commercialisation of research results, the initiative places an obligation on higher education teachers to identify and inform their employers of patentable results in a bid to 'step up the commercialisation and utilisation of research results'.

Current policy is unique in the history of Swedish R&D policy in the sense that it is the 'first decisive policy step in addressing innovation alongside research' and that it promotes

7 Ibid

8 Vinnova A Key actor in innovation <http://www.vinnova.se/upload/EPiStorePDF/vi-11-06.pdf>

9 The Ministry of Enterprise, Energy and Communication Swedish Research and Innovation Policy – perspectives on policy interaction http://www.spri.es/wNS/docs/publicaciones/ponencias/MARIE_IVARSSON.pdf

10 INNO-Policy TrendChart – Innovation Policy Progress Report Sweden (2009) <http://www.proinno-europe.eu/page/innovation-and-innovation-policy-sweden>

‘research and innovation policy interplay’. The policy also strives to improve multi-level governance by introducing regional-national dialogue.

Vinnova, the Country’s principal business orientated research and innovation agency, has a central aim of increasing the ‘competitiveness of Swedish researchers and companies’. This is achieved by the funding of ‘needs-driven research and the development of effective innovation systems’. The agency has an investment budget of €220m per year. Projects funding by Vinnova required co-financing bringing annual investment to €440m per year.¹¹

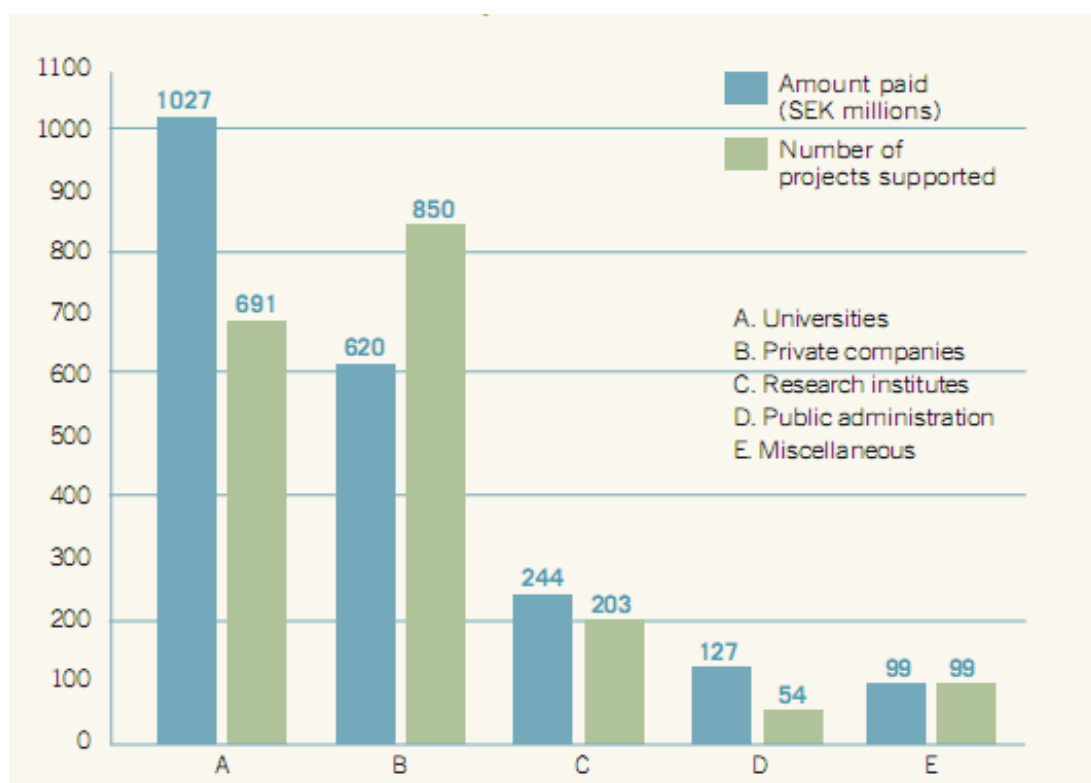
The agency has five ‘tools’ to promote research and innovation:

- Investing in research and innovation;
- Improving the innovation capacity of SMEs – which includes coaching and facilitating their promotion in international partnerships;
- Promoting global links – through bilateral linkages and through participating in EU R&D programmes;
- Policy development; and
- Utilising the Country’s innovation infrastructure – which includes a strong research and innovation environment, testing and demonstration sites, incubation facilities, and the relationship that exist amongst the ‘triple helix’.

Figure 3 outlines the sectoral distribution of Vinnova’s project financing in 2010. Again, there is a significant emphasis on the promotion of University projects.

11

Vinnova About Vinnova <http://www.vinnova.se/en/About-VINNOVA/> (accessed 19/10/11)

Figure 3: Vinnova's project financing in 2010

Source: Vinnova

Despite Sweden's position at the top of the EU innovation scoreboard its strong position hides a number of weaknesses in its national research and innovation system, as well as a number of difficulties in the wider economic system. The Swedish economy's dependence on export market specialised in capital goods¹², led to it being particularly affected by the economic crisis. The resulting restricting of the major export industries has limited their ability to invest in research and innovation. In 2008, Sweden was overtaken by Switzerland in the EU Innovation scoreboard, a situation since redressed.¹³

A number of structural challenges have been identified in the region's research and innovation system:

- A strong dependence on a small number of large companies for investment – over the last decade the 20 largest companies in Sweden have consistently accounted for approximately 62% of industry R&D. As noted above these companies have been affected by the economic crisis. This has not only limited their ability to invest it has been passed along the supply chain with knowledge intensive SMEs, research institutes and universities facing a downturn in demand for their services. A further problem is that R&D performers are becoming increasingly globalised, more than 40% of Swedish business R&D is performed by companies with headquarters outside Sweden. This is problematic in the context of continuing global economic difficulty as Sweden can no longer be considered a guaranteed a natural choice for locating should these companies reevaluate their survival strategies and the location of their business activities.
- The economic crisis' impact on Swedish industry, as mentioned above, has been significant. The impact has been felt acutely by the motor industry which employs 5% of all private sector workers. The economic crisis, which has impacted demand, is coupled

¹² Capital goods are defined as: buildings, machines, and equipment that are used to produce products or provide services <http://dictionary.cambridge.org/dictionary/business-english/capital-goods>

¹³ Vinnova About Vinnova <http://www.vinnova.se/en/About-VINNOVA/> (accessed 19/10/11)

with the longer term problem of over-capacity in global car manufacture. The failing of one major motor company would have serious implications on the ability of component suppliers to reach the critical mass necessary to develop and manufacture components in Sweden.

- Sweden is also marked by a lack of policies that support non-technical forms of innovation (innovation in services for example). The countries strong focus on university innovation and the linking up of academia with business driven by a desire to 'get research results out' rather than a desire to communicate the needs to business to academia.¹⁴

14 INNO-Policy TrendChart – Innovation Policy Progress Report Sweden (2009) <http://www.proinno-europe.eu/page/innovation-and-innovation-policy-sweden>

4 Germany

Germany's system of research and innovation governance is influenced by its federal structure. The federal government and the 16 L nder (state government) each play a role in the system and share a number of responsibilities – financing, education, and research and innovation initiatives.¹⁵

The federal government is, however, the principal actor in system. It has responsibility for:

- Ensuring an innovation-friendly framework through legislation, macro-economic conditions, and competition;
- Implementing a strategic R&D vision, directing both public and private R&D activities;
- Providing the majority of institutional funding; and
- Operating programmes to assist SMEs in research innovation activities.¹⁶

The main responsibility of the Lander is to fund universities, including some industry linkages and innovation programmes in universities. A range of programmes are offered at both government levels, including R&D grants, financing technology start-ups, venture capital programmes and providing loans for innovation projects.

At federal level the two main actors are:

- The Federal Ministry of Education and Research (BMBF) – responsible for the financing of top-level R&D projects in enterprises and public sciences, coordinating and funding basic and applied research at public research authorities and tertiary education; and
- The Federal Ministry of Economics and Technology (BMWi) – responsible for designing appropriate framework conditions for innovation including competition policy, the legal setting and conditions aimed encouraging entrepreneurship, providing direct financial support to SMEs through grants, loans and venture capital, providing infrastructure support to the business sector; providing grant funding to the public and private sector for application-oriented thematic and sectoral research programmes.¹⁷

Across Germany's governance system there are more than 20 programme executing organisations (which can be public, semi-public or private institutions) responsible for the implementation and administration of policy formulated at federal or state level. The most important of these organisations are:

- PT Jülich (Biotechnology, energy, new materials/nanotechnology, environmental technologies and climate, maritime technologies, basic research in science, technology transfer and start-ups);
- DLR (ICT, space, health, services, workplace design, research in education, environment/culture/ sustainability);
- PT Karlsruhe (manufacturing technologies, sustainability research); and
- VDI/VDE Innovation and Technology (microsystems, cooperative R&D programmes for SMEs).¹⁸

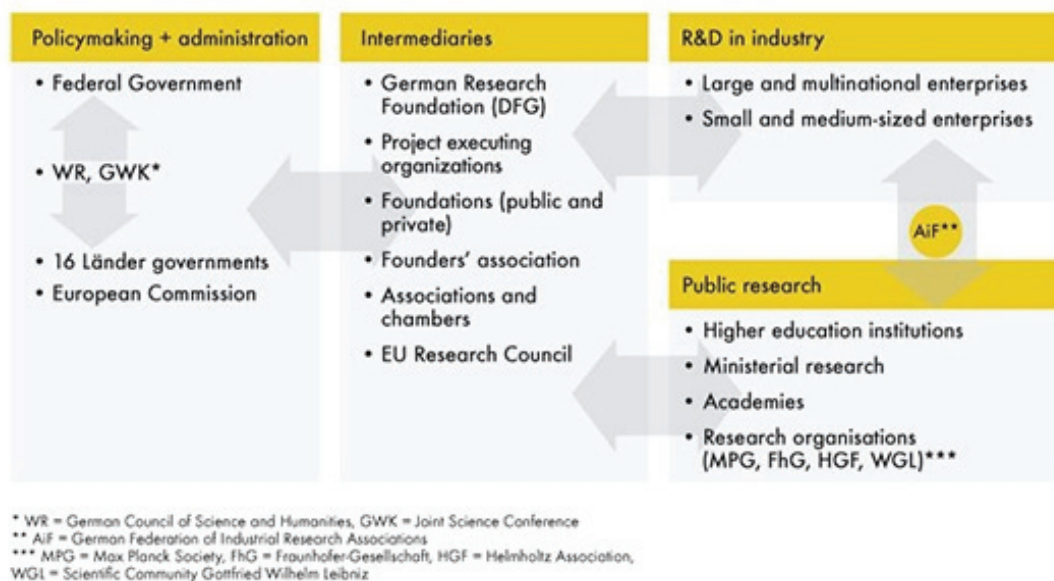
Figure 4 provides more detail on the intricacies of the Germany research and innovation system.

15 INNO-Policy TrendChart – Innovation Policy Progress Report Germany (2009) <http://www.proinno-europe.eu/page/innovation-and-innovation-policy-germany>

16 Ibid

17 Ibid

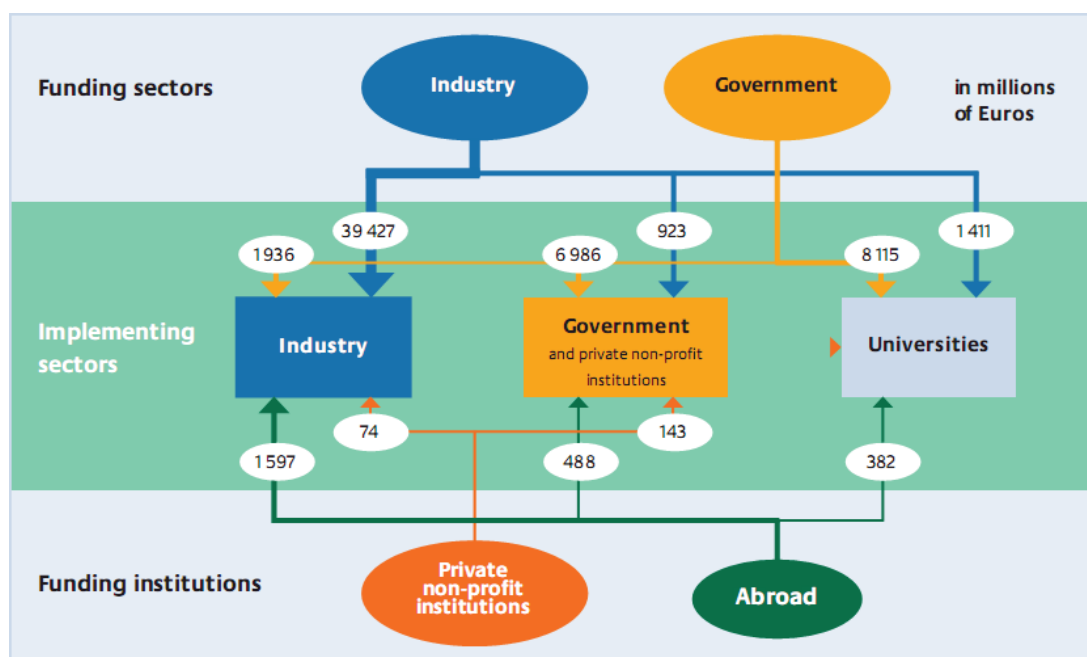
18 Ibid

Figure 4: Germany's research and innovation system¹⁹

Gross domestic expenditure on R&D (GERD) in Germany in 2007 was 2.53% (estimated at 2.64% for 2008). Figure 5 provides a breakdown of GERD in 2007 showing the flow of financial support to the three major implementing sectors – Government, Industry and Universities. Industry was the largest funding sector by a considerable margin providing €41,761m of funding to the implementation sectors.²⁰

¹⁹ Research in Germany Participants in the German research and innovation system <http://www.research-in-germany.de/dachportal/en/research-funding/research-funding-system/bilder-grafiken/59946/participants-in-the-german-research-and-innovation-system,templateId=popup.html>

²⁰ Federal Ministry of Education and Research Federal Report on Research and Innovation (2010) <http://www.research-in-germany.de/dachportal/en/downloads/download-files/60110/bmbf-bufi-2010-abstract.pdf>

Figure 5: GERD by implementing and funding sectors 2007

Germany is strong when it comes to producing innovative outputs and new technology. The country has a high share of innovators, technological patents and its medium to high-tech manufacturing sector has high employment and is a strong exporter. The region has long-established links between business and academia, facilitating technology transfer. This is evidence by the proportion of funding universities receive from industry (see Figure 5).

The country's strong innovation performance masks a number of weaknesses. This is particularly true in those areas which are viewed as a 'long-term determinants of an economy's innovative potential', such as human capital and financial investment in new technologies. Pro inno Europe's 2009 assessment of the German research and innovation system also noted that:

Areas of concern include the low share of science and engineering (S&E) and social science and humanities (SSH) graduates among the younger population, a low share of youths that have attained at least upper secondary education, low lifelong learning activities of enterprises and a low level of VC [venture capital] investment.²¹ [Recent policy changes suggest that a number of these are being addressed, see below]

Despite its short comings Germany's research and innovation system is one of the strongest in Europe and it is one of two Innovation Leaders identified as having the strongest growth of those within their grouping in the 2010 Innovation Union Scoreboard (the other being Finland).²²

Current policy is a response to specific research and innovation challenges:

- Funding innovation – German policy recognises a number of problems face businesses and other institutions seeking to finance R&D or other innovation related activities:
 - That financial markets tend to be cautious when financing investments which have uncertain outcomes;

21 INNO-Policy TrendChart – Innovation Policy Progress Report Germany (2009) <http://www.proinno-europe.eu/page/innovation-and-innovation-policy-germany>

22 Pro Inno Europe Innovation Union Scoreboard 2010 – The Innovation Union's performance and scoreboard for Research and Innovation (1 February 2011) http://ec.europa.eu/research/innovation-union/pdf/iu-scoreboard-2010_en.pdf

- That the economic crisis has placed restrictions on lending that has reinforced the above; and
- That SMEs are particularly limited by the above due to having fewer internal funds and higher exposure to risk should an innovation product fail.

In response to these constraints German policy has been to offer a range of financial support mechanism to SMEs including venture capital (the High-tech start-up fund), loan programmes and grants. In 2008 the Central Innovation Programme for SMEs (ZIM) was launched. In 2009 and 2010 ZIM had an annual budget of €300m, rising to €500m from 2011.²³

- Keeping pace with global technology trends – Germany's innovation success has been, to an extent, predicated on mature technologies that retain little scope for future growth (automotive, machinery, and chemical and electrical engineering). In contrast, Germany's performance in high-tech sectors with expected growth potential (biotechnology, nanotechnology and health and medical technologies) is weaker. In response, federal government launched a series of 17 'Thematic R&D Programmes', which target policy and funding at specific technological areas.
- A third challenge is adapting Germany's education system to meet the needs of rapidly evolving requirements of technology and innovation. A future shortfall in qualified skilled labour is recognised as potential barrier to maintaining a successful innovation system in the future. However, the split in education responsibilities between federal and state government has complicated the policy response to this challenge. The federal government's influence extends to vocational education and training. In this area they have reformed vocational training courses, introducing new, 'modern' courses and improving the supply of further education, including additional financial incentives for employees.
- Despite already having established strong linkages between academia and business, the German government retains a strong focus on industry-science linkups. Innovation programmes often focus on funding collaborative R&D and innovation projects, such as the Thematic R&D Programmes and the Central Innovation Programme for SMEs (ZIM). The Research Bonus is intended to strengthen the ability of universities and public research institutions to co-operate with SMEs. Additional policy activities aim at establishing better management of intellectual property at universities and to foster spin-offs from public research. Furthermore, the Top Cluster Programme funds regional thematic clusters that bring together public research and enterprises to further develop high technologies in various areas. In each of the three funding rounds up to five clusters will be selected for funding (€200m is earmarked for each round).²⁴

23 Pro Inno Europe ZIM, the Central Innovation Programme for SMEs Peer review report (2011)

24 Pro Inno Europe Innovation and Innovation Policy in Germany <http://www.proinno-europe.eu/page/innovation-and-innovation-policy-germany>

5 Finland

The Finnish research and innovation system is often viewed as a benchmark in many countries. Of the four Innovation Leaders identified in the Innovation Union Scoreboard, Finland, like Germany, has been also identified as a growth region. It is recognised by policy makers in Finland that its success was the result of many years of intervention. In answering the question:

*How was it possible for Finland – while being limited in its human and capital resources – to become a high tech intensive knowledge-based economy (with world-class STI policies) so quickly during the second half of the 1990s?*²⁵

A spokesperson for the Innovation Department of the Ministry of Employment and the Economy noted:

*The Finnish STI success story of the Finnish STI system did not get realised that quickly. Actually, the case is the opposite: it took a long time to build up the system.*²⁶

There have been a number of facets to this development:

- Education, science and R&D have had high political status since the 1950s;
- Policy makers of the 1950s and 1960s were able to establish a long-term national restoration and growth programme based on strong public-private partnerships and strong public investments;
- Finland established a negotiation-based contract system in the labour market in the 1960s and 70s;
- Policy makers promoted infrastructure development designed to enhance economic and societal conditions that was later adaptable to a successful research and innovation system;
- The Technology Committee, which comprises of stakeholders from the public and private sectors, introduced a consensus-based long-term programme for raising technological capabilities of the country and increasing R&D in the early 1980s.²⁷

Innovation governance in Finland is enshrined throughout the government hierarchy. At parliamentary level, the Committee of the Future assess societal policy trends in general but also has a focus on innovation policy. The main research and innovation focussed government body is the Research and Innovation Council which is responsible for the strategic development and coordination of Finnish science and technology policy as well as of the national innovation system as a whole. A number of key ministries have responsibility for elements of the research and innovation system, the most significant of which are:

- The Ministry of Employment and the Economy – which is responsible for research and innovation at industrial level, it oversees TEKES, the Finnish Funding Agency for Technology and Innovation and a number of public innovation organisations and research institutes; and
- The Ministry of Education and Science – oversees education and training, science policy, institutions of higher education, and the Academy of Finland.²⁸

25 Innovation Department Ministry of Employment and the Economy, Finland The role of the knowledge economy in driving economic growth and transformation – the Finnish case (May 2011) presentation to the Rebalancing the Northern Ireland Economy conference Belfast 2011

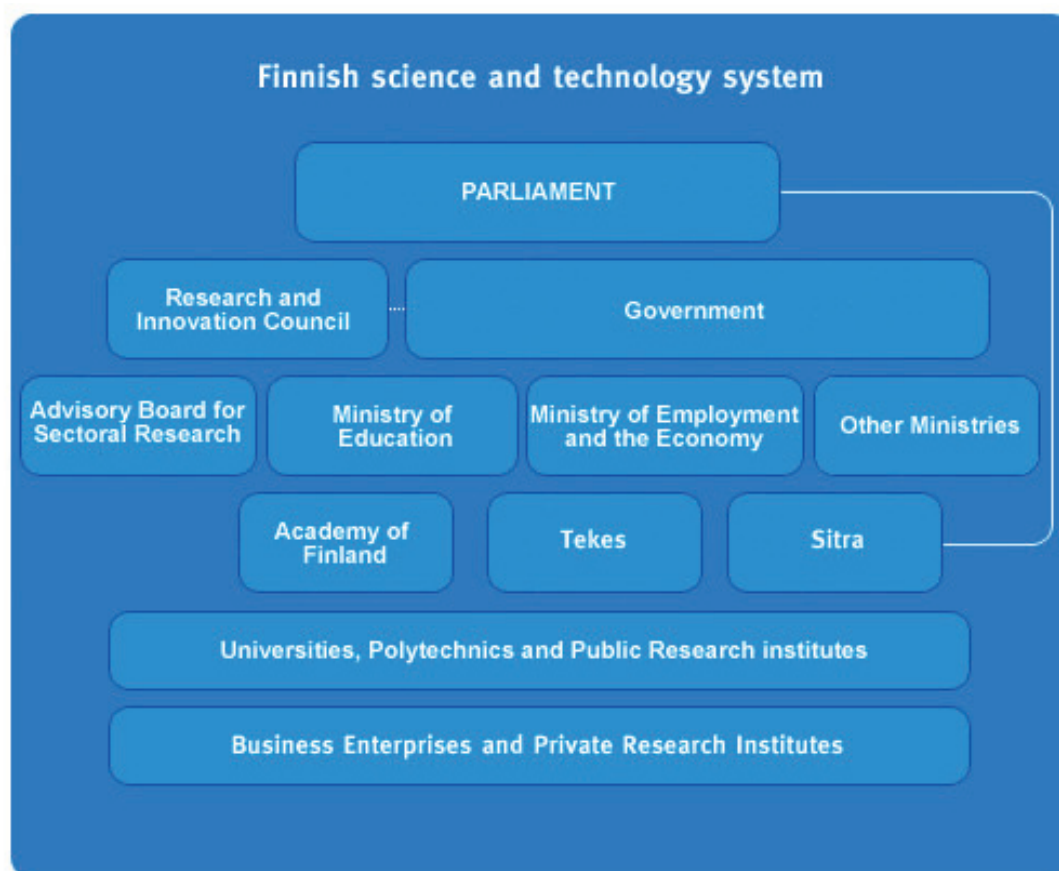
26 Ibid

27 Ibid

28 Pro Inno Europa Innovation and Innovation Policy in Finland <http://www.proinno-europe.eu/page/innovation-and-innovation-policy-finland>

These two ministries distribute 80% of Government funding for research and innovation. Figure 6 illustrates the Finnish research and innovation system in great detail.²⁹

Figure 6: The Finnish research and innovation system

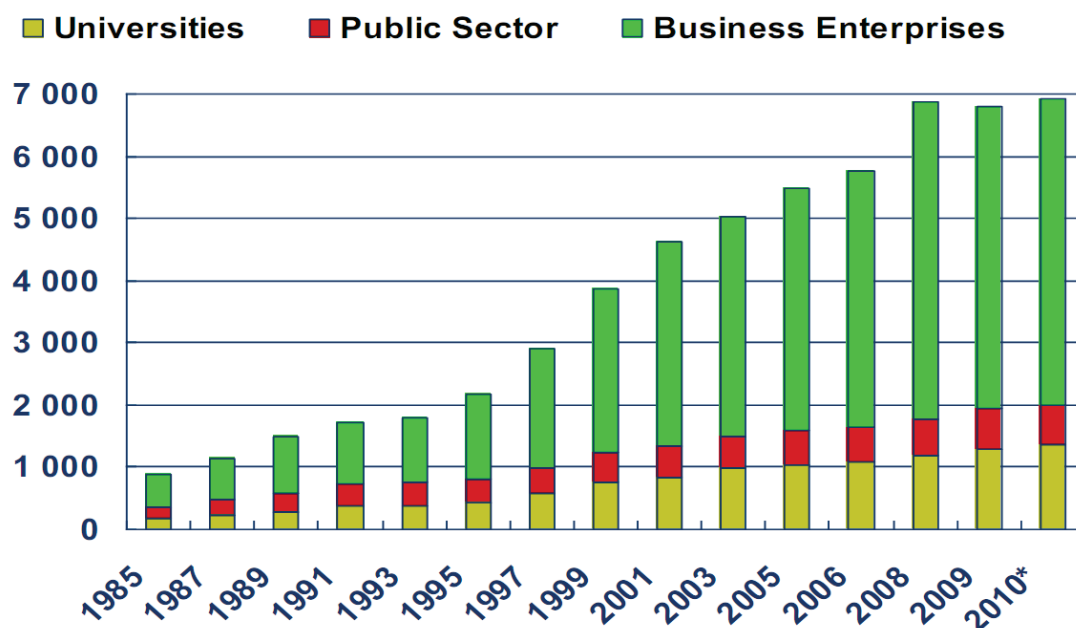


In 2009, R&D expenditure was equivalent to 4% of GDP³⁰ As evidenced in Figure 7, the largest proportion of expenditure has historically come from the business sector, with the public sector contributing a relatively small proportion.³¹

29 Ibid

30 Finnish Science and Technology Information Service GDP share of R&D expenditure in certain countries http://www.research.fi/en/resources/R_D_expenditure/GDP_share_of_RD_expenditure_in_certain_countries

31 Innovation Department Ministry of Employment and the Economy, Finland The role of the knowledge economy in driving economic growth and transformation – the Finnish case (May 2011) presentation to the Rebalancing the Northern Ireland Economy conference Belfast 2011

Figure 7: Finnish R&D Expenditure 1985-2010 (€m)

Finland performs well across a number of indicators:

- The region's human resource performance is strong and is particularly focussed on education. Growth in this area is below the EU average, although, this is due to the region being in a strong starting position;
- The region is marked by high business investments, in 2009 it was among the EU member states which had the highest proportion of enterprises indicating that they had increased innovation spending and projected they would continue to do so; and
- Finnish SME cooperation in innovation has been growing at a faster rate than the EU average; there have also been improvements in the number of SMEs taking part in in-house innovation.³²

Current research and innovation policy is outlined in the National Innovation Strategy (2008). The strategy covers three broad areas of focus – know-how, demand and users. The policy has ten guiding principles by which it will seek to shape the future of Finland's research and innovation system:

- reinforcing the competence base;
- broad-based innovation activity;
- internationalisation of the innovation environment and operating in a world without borders;
- strong and networked innovation centres;
- internationally competitive system of training and higher education;
- developing the Finnish environment to support growth businesses;
- strengthening demand and user orientation;
- central government's corporate steering and a systemic approach;
- resources for innovation activity; and

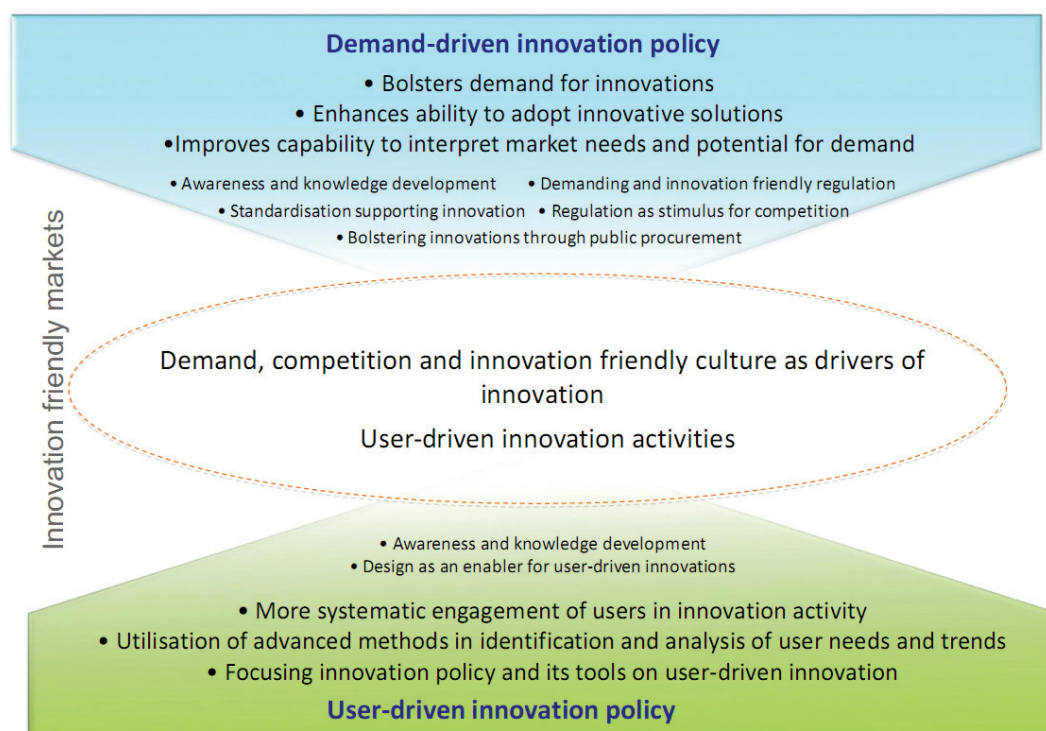
32

Pro Inno Europa Innovation and Innovation Policy in Finland <http://www.proinno-europe.eu/page/innovation-and-innovation-policy-finland>

- international review of the innovation system.³³

Pro Inno Europe's review of Finland's research and innovation system argues that the most significant and unique element of this new strategy is the focus on developing a demand and user orientated system. Figure 8 illustrates how this will work in operation. The policy intervention seeks to exploit market incentives to encourage innovation amongst enterprises and other community organisations, and to develop lead markets.³⁴

Figure 8: Finland's demand and user orientation model³⁵



VEKKES, the main funding agency within the Finnish research and innovation system developed its current strategy in line with the broader national strategy. The agency provides grants totalling €600m annually aimed at: developing know-how and innovative products, process, services and business concepts; facilitating collaboration between SMEs and larger business, industry and academia, public and private sectors, and global, national and regional organisations; and encouraging foreign companies to operating in the Finnish market place to engage in R&D and other innovative activities.³⁶

33 Ibid

34 Ibid

35 Innovation Department Ministry of Employment and the Economy, Finland The role of the knowledge economy in driving economic growth and transformation – the Finnish case (May 2011) presentation to the Rebalancing the Northern Ireland Economy conference Belfast 2011

36 TEKES Funding and Services http://www.tekes.fi/en/community/Funding_and_services/346/Funding_and_services/1238



Northern Ireland
Assembly

Research and Library Service Briefing Paper

24 October 2011

NIAR 661-11

Fergal Campbell

Role of a Rapporteur for Committee Inquires

Please Note: the options presented in this paper are intended as a catalyst for discussion. No legal advice on how or indeed if they could be achieved has been sought at this stage.

1 Introduction

The following paper provides a brief overview of the role of the rapporteur model for committee inquiries and a discussion of its possible implementation to the Northern Ireland Assembly.

2 What is a rapporteur?

In general a rapporteur is a member of a legislative assembly committee with specialised knowledge on particular subject area relating to a committee and drafts a report in that area on behalf of the committee. In other words:

*'A rapporteur is a person appointed by a deliberative body to investigate a particular issue or situation and report back'*¹

The model is traditionally a continental parliamentary practice, but could be transferable to the enquiry model currently employed by Assembly committees. There is a certain amount of pressure associated with the role to ensure that the rapporteur reaches as broad a consensus as possible.² As in the EU Parliament, the model could work well in the Assembly where a consensual approach is required.³

-
- 1 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)
 - 2 Corbett, R., Jacobs, F. and Shackleton, M (2003). The European Parliament (5th edn). London: John Harper Publishing
 - 3 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)
-

3 Role of a rapporteur

The role of a rapporteur is to draft reports, either legislative or non-legislative, on behalf of their respective committees.⁴ The reports usually comprise of an explanatory statement, motion for resolution and amendments.

In theory a rapporteur would have three primary duties in the Assembly; they would assist their committees in forming a position on a legislative proposal and would be responsible for particular committee reports and for drafting recommendations.

The rapporteur drafts an initial report on a legislative proposal from the Executive or a committee enquiry. Following discussions with the committee as a whole, the rapporteur redrafts a report with a list of agreed amendments.⁵

3.1 Why is a rapporteur used?

The role is valuable, where an issue is of cross committee interest and the creation of a joint committee is impractical.

The rapporteur model is used to designate a Member who may have an interest or expert knowledge in a topic. The reports are known by the name of the individual who prepare them and they become the focal point of contact for media attention and stakeholder involvement.⁶

3.2 How are rapporteurs appointed?

There are two possible ways in which a rapporteur may be appointed;

- The first is the nomination of a Member of the committee by his/her fellow Members.⁷ This method may be suitable when the issue is less contentious and the report required is less substantial. The election by fellow Members offers the flexibility to designate a Member who has expert knowledge on the subject; and
- The allocation of reports amongst various political parties can follow the lines of the D'Hondt system, combined with an auction system reflecting the different values of reports.⁸ The value of the report depends on the political weight assigned to it. If a particular issue is of interest to a party then they may have the opportunity to bid for it, thus reducing their chances of securing future reports. There are concerns that this appointment system may lack flexibility, overlooking experts in the area.⁹

4 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)

5 Costello, R. & Thomson, R. (2010). The policy impact of leadership in committees: Rapporteurs' influence on the European Parliament's opinions. *European Union Politics*, vol. 11 no. 2 219-240

6 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)

7 Costello, R. & Thomson, R. (2010). The policy impact of leadership in committees: Rapporteurs' influence on the European Parliament's opinions. *European Union Politics*, vol. 11 no. 2 219-240

8 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)

9 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)

4 Implementing the rapporteur model for committee inquiries in the Assembly.

The use of the rapporteur model within the Assembly requires an examination into the different elements of its implementation. What follows is adapted from the processes employed by the European Parliament and is not exhaustive, but simply an outline to its possible implementation.

4.2 Possible process¹⁰

Several committee scenarios could warrant the appointment of a rapporteur: when a legislative proposal from the Executive requires a response at committee level; when a non-legislative report is produced in response to an Executive consultation; and when a committee produces own-initiative reports on a particular problem otherwise known as committee inquiries.

Once the nature of the report is identified, the committee, using the desired selection methods, appoints a rapporteur. The designated Member conducts an enquiry into the topic.

When the report is drafted, the committee hold a discussion to scrutinise the report. Suggested amendments are attached or alternatively the report may be accepted without any amendments.

Finally, if issues reported on by a committee rapporteur are addressed in the chamber, the Member can offer their opinion on any amendments suggested on the floor.¹¹

4.3 Standing Orders

Like any of the committee procedures, it is likely that the role and responsibilities of the rapporteur would need to be set out in Standing Orders, for example:

- The scenarios that warrant the appointment of a rapporteur or not, in the case of a legislative proposal that has been approved without amendment;
- The timetable for completion of the report; and
- The selection method used to appoint the rapporteur.

4.4 Assistance from the Secretariat

At EU¹² and the Committee of Oireachtas¹³ level (see below) rapporteurs generally receive little assistance from the Secretariat, often relying on their own staff, or, in the case of the Oireachtas, they may seek external assistance from academia.¹⁴

Should the adoption of the rapporteur system in the Northern Ireland Assembly the role of the secretariat should be discussed in relation to the following:

- Should the rapporteur avail of assistance and guidance from the Secretariat staff during the drafting stage of the report. It may be difficult for the designated Member to find the time to produce a report on an individual basis?

10 Adapted from the EU process detailed in *Rapporteurs in the European Parliament*, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)

11 Corbett, R., Jacobs, F. and Shackleton, M (2003). *The European Parliament* (5th edn). London: John Harper Publishing

12 Northern Ireland Assembly Committee for Enterprise, Trade and Investment – Committee Office study visit to the EU Parliament.

13 Correspondence with Oireachtas 24 October 2011

14 Ibid

- Should the rapporteur receive assistance help from the committee staff and utilise any resources provided by the committee. The Research and Information Service (RaISe) can also provide professional assistance in the research stages of the report?

In other jurisdictions:

- Rapporteurs often seek information from a wide range of sources outside of the secretariat. They can request information from national governments, employers, trade associations and sometimes lobbyists.¹⁵

However:

- In terms of assistance from Hansard, it is worth noting that in the Oireachtas the official report's function is to report only public meetings of committees. Therefore if a special rapporteur has any meetings with stakeholders outside of a committee it is not recorded on the official report.¹⁶

4.5 Possible problems and issues of discussion

4.5.1 Problems identified in literature

The use of the rapporteur model can present its own set of problems. The following have been identified in the relevant literature:

- The allocation of rapporteurs would have to reflect a fair party balance. An appropriate selection method would ensure democratic fairness, as parties get reports proportionately to their size. As indicated above though a degree of flexibility should be applied to ensure specific expertise and interest is factored into the selection process;¹⁷
- Another potential problem associated with the role of a rapporteur is the lack of assurances that the Member will act independently of their party preferences.¹⁸ Those who show extreme preferences will find it hard to gain committee support. A rapporteur should aim to achieve a broad consensus; and
- The additional duty of rapporteur may encounter resistance from the Members themselves.¹⁹ Research on the use of the role in the European Parliament found that there was a lack of interest in the rapporteur's work from other Members.

4.5.2 Evidence sessions

From a European perspective, rapporteurs often collect evidence via 'public hearings'. These are used to inform the final report but are not always included in the final documents. From the perspective of the Northern Ireland Assembly Committee for Enterprise, Trade and Investment it may necessary to discuss the manner in which evidence is collected and how this presented in the final report.²⁰

15 Corbett, R., Jacobs, F. and Shackleton, M (2007). The European Parliament (7th edn). London: John Harper Publishing

16 Correspondence with Oireachtas Official Report 19 October 2011

17 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)

18 Costello, R. & Thomson, R. (2010). The policy impact of leadership in committees: Rapporteurs' influence on the European Parliament's opinions. European Union Politics, vol. 11 no. 2 219-240

19 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)

20 Northern Ireland Assembly Committee for Enterprise, Trade and Investment – Committee Office study visit to the EU Parliament

5 Where is the rapporteur model used currently?

5.1 European Parliament²¹

The rapporteur model is common practice in the European Parliament. The committees in the European Parliament use a modified D'Hondt system alongside an auction system that reflects the different values of reports.

In the European Parliament, rapporteurs enjoy an influential role with increased powers and more privileged speaking rights. They have the ability to lead the debate, write the first draft of the report, receive a significant amount of media attention, influence timetable and agenda and can organise conferences.

The process for reports depends on their nature. For example, the Parliament respond to legislative proposals sent from The Commission by appointing a committee responsible for the report. The committee appoint a rapporteur who conducts the research into the issue. Once a draft report has been produced, the committee hold a discussion led by the rapporteur. Any amendments suggested are attached to the report and once it is accepted by the committee, it is voted on in the plenary. During its debate, the rapporteur can offer an opinion on any suggested amendments.

Political groups often appoint a shadow rapporteur to follow the progress of the report. This ensures that a consensus is reached at committee level and that rapporteurs are acting independently of their party's interests. Additionally, draftsmen may be appointed to oversee elements of the report that are of interest to committees other than the one responsible for the report. The draftsmen act as rapporteurs for the committees who have expressed an opinion on the issue.

5.2 The Oireachtas

In 2006, the Irish Government appointed two rapporteurs to draft a report on the legal developments for the protection of children in Ireland. Unlike the European Parliament, the rapporteurs appointed were independent from, but accountable to the Oireachtas.²²

This independent appointment was the result of the specialist legal knowledge needed to approach the report. The functions of the special rapporteurs were as follows;

- Audit legal developments for the protection of children;
- Assess the impact of litigation in national and international courts on child protection; and
- Prepare a report detailing the results of the previous years' work for consideration, debate and subsequent publication.²³

Rapporteurs can also consult Departments of Government and the Ombudsman for children about child protection legislation and ways to enhance that protection.

This approach from the Irish Government shows the need to ensure flexibility in the selection process. This flexibility ensures that experts on the issue are identified as the most appropriate candidates for the position of rapporteur as opposed to choosing a Member on a party basis.

From a Committee perspective, the previous Dáil operated a system of rapporteurs which has, for a number of reasons, faded from prominence in the current session of the Dáil. Committees had previously been allowed to appoint a rapporteur for the performance of

21 Rapporteurs in the European Parliament, Centre of public scrutiny (2006) accessed online at <http://www.aalep.eu/sites/default/files/documents/Rapporteurs%20in%20the%20European%20Parliament.pdf> (First accessed on 13 October 2011)

22 Ibid

23 Ibid

specific duties – the completion of report relating to the work of the committee.²⁴ Each committee had an annual allocation of approximately €15,000 for this purpose; a proportion of this money was paid to a rapporteur in the form of an allowance.²⁵ On the system of rapporteur allowances the Department of Finance notes:

This allowance is allocated to the Chairman of various Committees pursuant to Section 5 of the Oireachtas (Allowances to Members) and Ministerial, Judicial and Court Officers (Amendment) Act 1998. The allowance is taxable.

When a Committee decides to undertake a project (for example a report on a particular issue relevant to the Committee) it formally nominates a member or number of members to carry out this project and agrees an amount payable to carry out this project.

Upon completion of the project the Committee formally adopts the report/findings at a meeting and agree that payment be made to the member(s) who carried out the project.

However, it should be noted that any member who is in receipt of another allowance (Chairman, Vice-Chairman, Convenor) can only receive the higher of the two allowances (i.e. Rapporteurs or other allowance).

The Clerk to the Committee will then formally request that the agreed amount be paid to the member(s).²⁶

In practice an individual member would approach the committee with a view to completing a piece of work relating to the committee subject area. Committee agreement was required for such a piece of work to go ahead. How the work was carried out was subject to the individual's preference, but support from the secretariat was limited – the report was often completed with assistance of the Member's own staff or through outside work assistance from academia.²⁷

The individual was required to submit a draft report to the committee by a specified date, at which point the committee would propose amendments. Once these amendments were added the report would again pass through the committee who would finalise it. In certain cases the committee Clerk may become involved with the drafting of the report at this stage – to ensure that the final report is in keeping with style typical of committee reports. Two points are significant here:

- No allowance was paid to the member in advance, only upon completion of the report; and
- The final report was considered a committee report although the member responsible for it would receive specific acknowledgement.²⁸

Examples of reports completed this way include:

- Joint Committee on Justice, Defence and Women's Rights – Third Report -The Defence Forces – A role in promoting Physical Fitness: Rapporteur Deputy Jimmy Deenihan, accessible here;
- Joint Committee on Enterprise, Trade and Innovation – What is Required to Expand Employment in the Agri-Food Sector: Rapporteur Deputy Arthur Morgan, accessible here; and

24 Correspondence with Oireachtas 24 October 2011

25 Standing Committee of Tynwald on Emoluments First Report 2010-2011 <http://www.tynwald.org.im/papers/reports/2010-2011/r0023.pdf>

26 Department of Finance <http://www.finance.gov.ie/documents/publications/other/2009/boirdsnippap09/finhousoir.pdf>

27 Correspondence with Oireachtas 24 October 2011

28 Ibid

- Joint Committee on Education and Skills First Report – Staying in Education: A New Way Forward School and Out-of-School Factors Protecting Against Early School Leaving: Rapporteur Senator Healy-Eames, accessible [here](#).

The reaction to specific reports varies with some, the ‘Staying Education’ report being an example, receiving considerable media attention.

With the introduction of the current session of the Dáil the rapporteur allowance system was removed by the Minister of Finance, with this role being taken up by the Oireachtas’ internal Library and Research service. This change came about for two reasons. Firstly, fiscal constraints and increased scrutiny of public spending led to revisions to the allowance system. Secondly, the use of internal research was seen to encourage consistency in the final product and allowed for a more practical system of quality assurance.²⁹

Committee Members may still choose to put themselves forward as rapporteurs on issues they believe significant, they will not, however, receive an allowance for doing so under the current system.³⁰

29 Ibid

30 Ibid



Northern Ireland
Assembly

Research and Library Service
Research Paper

22 December 2011

NIAR 851-11

Aidan Stennett

Northern Ireland R&D policy and performance - update

1 Introduction

The following paper updates previous Research and Information paper NIAR 281-11 R&D policy and performance. It outlines R&D policy developments as introduced by the Draft Programme for Government and Draft Economic Strategy, and provides an overview of the latest data on Northern Ireland's R&D performance.

2 Draft Programme for Government

The Draft Programme for Government (PFG) introduces three targets which directly impact Northern Ireland's R&D landscape, all of which fall under the broader priority of Growing a Sustainable Economy and Investing in the Future. These targets can be divided into those which focus on the businesses sector, and those which focus on higher education. The first is to 'support £300m investment by businesses in R&D, with at least 20% coming from Small and Medium sized Enterprises'. Should the 20% target for small and medium enterprises be reached this would equate to £60m in R&D investment from companies of this size over the three year life span of the PFG. The £300m investment target is spread out across the three years as follows:

- 2012/13 – support £150m investment in R&D (note: 2012/13 figure includes figures for 2011/12);
- 2013/14 – support £75m investment in R&D; and,
- 2014/15 – support £75m investment in R&D.¹

The equivalent targets in the previous incarnation of the PFG were:

- Increase SME annual growth in BERD (Business expenditure on R&D) by 8%; and,
- Increase larger company growth in BERD by 5%.²

A second business focussed target is to 'support 200 projects through the Creative Industries Innovation Fund'. This target is to be brought forward by the Department of Culture, Arts and Leisure. There are three sub-targets across the three years covered by the PFG:

- 2012/13 – 100 projects supported overall;
- 2013/14 – 150 projects supported overall; and,
- 2014/15 – 200 projects supported overall.

Whilst not exclusively linked to business R&D, the Creative Industries Innovation Fund (CIIF) has assisted in the development of innovation within business in Northern Ireland. The previous incarnation of the fund, which ran from 2008-2011, supported 134 projects with grant support totalling £2.7m (average per project grant was £20,187, although this varied support according to sector with the largest average grants received by the TV and Radio sector, £39,140 per project on average, and the lowest grants received by fashion sector, £9,008 per project on average). Table 1 outlines grant allocation from the CIIF between 2008 and 2011. The total fund in this period amounted to £4.1m over the three year period, aside from the funding allocated to projects (Table 1) the fund was also used to finance Arts Council (who distributed the fund) administration (£290,551), the Strategic Action Plan (£23,735), Evaluation (£53,135), interim support arrangements for the music industry (£50,000 for 2010/11). A further £971,943 was allocated in grant support to sectoral bodies.³

A continuation of the CIIF was announced in July 2011, with a budget of £4m over a four year period. The Minister of Culture, Arts and Leisure has stated that Year 1 of the fund

1 Northern Ireland Executive *Draft Programme for Government 2011-2015* <http://www.northernireland.gov.uk/draft-pfg-2011-2015.pdf>

2 DETI *Regional Innovation Action Plan 2008-2011* <http://www.detini.gov.uk/eco-dev-pubs-4>

3 Northern Ireland Assembly Research *The Creative Industries: background, definitions and recent policy development* (September 2011) <http://www.niassembly.gov.uk/globalassets/documents/raise/publications/2011/culture-arts-leisure/9311.pdf>

(2011/12) is 'for businesses leading digital content development projects', and that although Years 2–4 'will be open to all creative industries sub-sectors...digital content projects are likely to remain prioritised'⁴

The corresponding target in the previous PFG was to grow 'the creative industries sector by up to 15% by 2011'.⁵

Table 1: Total CIIF grants allocated by sector, 2008–2011

CIIF Sector	No. of Awards	% of Awards	£ Mean	£ Total amount allocated
Advertising	1	0.75%	10,000	10,000
Craft	26	19.40%	10,062	261,618
Design	14	10.45%	13,082	183,148
Fashion	4	2.99%	9,008	36,030
Film	7	5.22%	37,760	264,320
Multimedia	20	14.92%	29,904	598,088
Music	24	17.91%	22,590	542,150
Performing Arts	9	6.72%	19,141	172,267
Software	10	7.46%	14,422	144,220
TV & Radio	6	4.48%	39,140	234,838
Visual Arts	13	9.70%	19,875	258,377
Total	134		20,187	2,705,056

From the perspective of the higher education sector, the PFG sets a target of increasing uptake in economically relevant Science, Technology, Engineering and Mathematics (STEM) places as follows:

- 2012/13 – 180 additional places;
- 2013/14 – 360 additional places; and,
- 2014/15 – 540 additional places.⁶

In an announcement on the 7 December 2011, however, the Minister for Employment and Learning stated that the Department would be targeting the creation of 'at least 700 additional places', adding that:

*All the additional places will be in economically relevant Science, Technology, Engineering and Mathematics (STEM) subjects which will ensure that we are delivering the right skills to support the rebalancing and growth of our local economy.*⁷

The additional places will be spread across Northern Ireland's higher education institutes as follows:

4 Minister for Culture, Arts and Leisure. 26.7.11. Letter to the CAL Committee: COR/1088/2011.

5 Northern Ireland Executive Programme For Government 2008-2011 <http://www.northernireland.gov.uk/pfgfinal.pdf>

6 Northern Ireland Executive Draft Programme for Government 2011-2015 <http://www.northernireland.gov.uk/draft-pfg-2011-2015.pdf>

7 Northern Ireland Executive Farry announces significant increase in higher education student places (7December 2011) <http://www.northernireland.gov.uk/news-del-071211-farry-announces-significant>

- The University of Ulster – 322 additional places;
- Queens University – 308 additional places; and,
- Further education institutes – 70 additional places.

The PFG also contains a range of measures that, whilst not directly aimed at stimulating R&D, should, if successful, lead to a strengthening of the businesses, infrastructure and skills base, and could indirectly facilitate an environment more conducive to R&D and innovation. These measures again fall under the broader priority of Growing a Sustainable Economy and Investing in the Future, they include (not exhaustive):

- Support the promotion of over 25,000 new jobs;
- Press for the devolution of Corporation Tax and reduce its level;
- Achieve £300 million investment through Foreign Direct Investment;
- Increase the value of manufacturing exports by 15%;
- Aid liquidity of SMEs through a £50 million loan fund;
- Introduce extension of Small Business Rate Relief Scheme to 2015;
- Hold the Regional Rate increases to the rate of inflation;
- Eliminate Air Passenger duty on direct long haul flights;
- Increase the proportion of young people from disadvantaged backgrounds who achieve at least 5 GCSE's at A*- C or equivalent including GCSE's in Maths and English; and,
- Up-skill the working age population by delivering over 200,000 qualifications.⁸

3 Draft Economic Strategy

The Department of Enterprise, Trade and Investment's Draft Economic Strategy (the Strategy) seeks to achieve a rebalancing and a rebuilding of the Northern Ireland economy. R&D and innovation are seen as vital tools for achieving this, although their role is viewed to lie in the rebalancing side. The Strategy, referencing the Departments recent work on global best practice, states:

As part of our review of global best practice, we gathered extensive evidence which demonstrates the strong links between innovation and value-added economic growth... we are clear on the need to devote significant resources to develop our capacity, particularly in the key MATRIX market sectors. This prioritisation recognises the need to develop our existing strengths as a comparatively small regional economy. This includes an increased focus on supporting and growing our areas of excellence in advanced manufacturing and engineering over the next decade and beyond.

As part of addressing this priority, we recognise that encouraging companies to embrace ambitious growth plans, including increased emphasis on exports and external sales, is a critical part of stimulating innovation and R&D. This highlights how our priorities interact with each other in order to drive forward sustainable growth and prosperity.⁹

The Strategy identifies a number of challenges to stimulating R&D and innovation in Northern Ireland:

- Northern Ireland has historically trailed behind the UK average on overall R&D spend;
- Whilst over half of Northern Ireland firms engaged in innovation in the period 2006-08, this is the lowest figure of the UK regions;
- Whilst Northern Ireland public spending on R&D is in-line with the UK average, much of this spend is in the agriculture sector. The Strategy recognises the need to diversify suggesting that biotechnology, health research, engineering and 'other science based area' should be the target areas; and,
- A great emphasis should be placed upon supporting high technology manufacturing industries.¹⁰

There is also recognition in the Strategy of the cross-departmental nature of R&D and innovation. A range of strategies are highlighted which exemplify this cross-departmental aspect:

- DARD's Evidence and Innovation Strategy identifies the key strategic research areas for the agri-food and rural businesses sector;
- DCAL's Strategic Action Plan for the creative industries recognised the sector as an important driver of economic and social innovation. A framework for future growth and development of the creative sector will be published early in 2012;
- DEL's Success through Skills – Transforming Futures recognises that skills are the bedrock of an innovation-based knowledge economy, from the schools system, to further and higher education and lifelong learning;
- A Higher Education (HE) Strategy for NI is scheduled for publication early in 2012 and this will highlight the importance of the HE sector to R&D and innovation; and,

9 Department of Enterprise, Trade and Investment Draft Economic Strategy (November 2011) http://www.detini.gov.uk/economic_strategy__web_.pdf

10 Ibid

- DHSSPS's R&D Strategy Research for Health and Wellbeing identifies the need to support and develop the clinical research capacity and infrastructure.¹¹

The Strategy also highlights a number of cross-departmental key actions which will be further developed in an action plan in 2011/12. These actions are:

- Support £300m investment in R&D, with at least 20% from SMEs;
- Support 500 businesses to undertake R&D for the first time and secure 120 Collaborative Projects in R&D;
- Expand the Collaborative Network Programme targeting future market opportunities;
- Provide £54m funding for University research and investing in collaborative HE/FE engagement with business in 2011/12;
- Support Universities to establish 8 spin-out companies by 2013;
- Support Universities and FE colleges to undertake 155 knowledge transfer projects on behalf of local businesses by 2014;
- Support businesses and academia to apply for national and EU funding/programmes;
- Ensure 100 applications for transnational R&D funding Invest £4m via the Creative Industries Innovation Fund and wider sectoral initiatives to stimulate innovation, R&D and creativity;
- Significantly increase cross-border innovation and trade activity;
- Provide funding for agri-food research and knowledge exchange, including new PhD studentships;
- Invest up to £2.8m in further tranches of the agri-food research challenge fund; and,
- Provide technology support services to the land based and food sectors.¹²

The Strategy also contains the medium to longer terms goals of: exploring how the NI Science Park can further evolve into an Open Innovation Centre; progressing the alignment of publically funded research with defined economic priorities to increase the potential for knowledge transfer between business and academia; examining ways to increase the rate of commercialisation of publically funded research and public sector Intellectual Property; fostering innovation through public procurement; identifying areas of collaboration between the health sector and business; and, examining the establishment of an Innovation Council.

DETI published a draft Comprehensive Action Plan which sets timeframes for when the above actions will be achieved. The relevant section of Action Plan is contained in Appendix 1.

11 Ibid

12 Ibid

5 Northern Ireland's R&D Performance – statistical update

2010 R&D expenditure figures (cash terms) from latest Northern Ireland Research & Development Statistics (November 2011) (Table 2) show the following:

- The proportional spread of total R&D expenditure (£521.4m) in 2010 was: business expenditure 66%; higher education expenditure 31%; and, government expenditure 3%;
- Total expenditure increased by 8% between 2009 and 2010, between 2008 and 2009 it increased by 40%. Between 2005 and 2010 total expenditure increased by 66% and between 2001 and 2010 it increased by 97.6%;
- Business expenditure increased by 6% between 2009 and 2010, between 2008 and 2009 it increased by 76%. Between 2005 and 2010 business expenditure increased by 122.9%, between 2001 and 2010 it increased by 121.9%;
- Higher education expenditure increased by 13% between 2009 and 2010, between 2008 and 2009 it fell by 0.8%. Between 2005 and 2010 higher education expenditure increased by 10.7%, between 2001 and 2010 it increased by 63.8%; and,
- Government expenditure fell by 3.1% between 2009 and 2010, between 2008 and 2009 it increased by 1.3%. Between 2005 and 2010 government expenditure increased by 14.7%, between 2001 and 2010 it increased by 56%.¹³

Northern Ireland Statistics and Research Agency statistical press release on the latest R&D statistics notes the following:

- The percentage increase in Northern Ireland (in-house) business R&D expenditure (9.1%) between 2009 and 2010 was the second biggest of the 12 UK regions. Of the 12 UK regions, nine showed an increase in cash terms over the period.
- The ten biggest spending companies accounted for 59% of the total R&D spend in Northern Ireland in 2010, slightly higher than in 2009 (57%).
- Externally owned companies accounted for 68% of Business R&D expenditure compared to 32% by locally owned companies. However, R&D spend by locally owned companies reported an annual increase of 27%.
- Expenditure by businesses with less than 250 employees fell by £10.9m (-8%) from 2009 to 2010, in cash terms. However, since 2005 such expenditure has increased by 78% to £133.4m.¹⁴

13 Department of Finance and Personnel | Northern Ireland Research & Development Statistics (press release) (November 2010) http://www.detini.gov.uk/r_d_2010_december_2011.pdf

14 Department of Finance and Personnel | Northern Ireland Research & Development Statistics (statistical bulletin) (November 2010) http://www.detini.gov.uk/r_d_2010_december_2011.pdf

Table 2: Total Expenditure on R&D in Cash Terms 2001-2010 (£million)¹⁵

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Expenditure on R&D	263.8	272.5	261.8	277.4	314.1	330.8	351.1	344.0	482.8	521.4
Business Expenditure	155.0	156.6	121.3	129.0	154.3	167.0	185.1	183.9	323.7	344.0
HE Expenditure	98.8	105.8	127.8	136.1	146.2	150.1	151.3	144.2	143.0	161.8
Government	10.0	10.1	12.7	12.3	13.6	13.7	14.7	15.9	16.1	15.6

Appendix 1: DETI Draft Comprehensive Action Plan – Stimulating Innovation, R&D and Creativity

No.	Objective	Action	Responsible Organisation	Timescale
A1	Increase Levels of Business Expenditure on Research & Development (BERD) by incentivising businesses to increase their capability and capacity to undertake R&D	Maximise returns from the grant for R&D programme by securing £300m investment in R&D (with at least 20% from SMEs).	DETI/Invest NI	March 2015
A2		Support 500 businesses to undertake R&D for the first time.		March 2015
A3		Secure 120 Collaborative Projects in R&D.		March 2015
A4		Secure up to £5.6m additional investment in agri-food R&D (50% from SMEs/ industry organisations and 50% from DARD) by implementing further tranches of the agri-food Research Challenge Fund.	DARD	March 2015
A5	Increase innovation in SMEs through joint projects with the Higher and Further Education sectors	Expand the Innovation Voucher Scheme by delivering 800 Innovation Voucher projects to stimulate increased levels of innovation within small enterprises (with less than 50 employees).	DETI/Invest NI	March 2015
A6		Support our universities and FE colleges to undertake 155 Knowledge Transfer Partnerships (KTP) projects on behalf of local businesses by 2014.	DETI/Invest NI/ DEL	March 2015
A7		Introduce an enhanced Proof of Concept (PoC) scheme to support 40 PoC projects (University or Health and Social Care (HSC) based).	DETI/Invest NI	March 2015

No.	Objective	Action	Responsible Organisation	Timescale
A8	Support business to develop their capabilities, improve business competitiveness and maximise efficiencies	Support SMEs to increase productivity through improved efficiencies by identifying £60m of resource and waste prevention savings.	DETI/Invest NI	March 2015
A9		Support 600 E-business projects to assist SMEs to increase innovation and productivity.		March 2015
A10		Improve awareness and understanding of Intellectual Property and the commercialisation of products and services and deliver 440 Technical Projects to assist commercialisation.		March 2015
A11		Maximise participation with Invest NI's Design Service to encourage 1,200 companies to utilise design as a key driver and enabler of innovation.		March 2015
A12	Incentivise business-led local and international collaboration in pursuit of more open innovation	Increase the commercialisation of knowledge by establishing 4 Competence Innovation Centres.	DETI/Invest NI	March 2015
A13		Expand the Collaborative Network Programme, targeting the future market opportunities identified by MATRIX, to support establishment of 25 networks.		March 2015
A14	Promote awareness of and support businesses and academia to apply for national and EU funding / programmes	<p>Increase engagement with NI companies and researchers to:</p> <ul style="list-style-type: none"> • Encourage NI based companies/researchers to engage with INI Collaborative Support Service leading to 100 applications for transnational R&D funding; and • Secure 36 Transnational Technology Transfer Agreements through the Enterprise Europe Network. 	DETI/Invest NI	March 2015

No.	Objective	Action	Responsible Organisation	Timescale
A15	Establish a structured programme to facilitate NI businesses to exploit the market opportunities identified by MATRIX	Develop a mechanism to facilitate NI businesses to exploit the market opportunities identified by MATRIX.	DETI/Invest NI	December 2011
A16	Support research and commercialisation activities in HE/FE institutions to ensure they continue to fulfil their central role in developing and sustaining a world-class research base in NI.	Maintain the core funding of the Universities' knowledge transfer activities through NI Higher Education Innovation Funding (£3m per annum) until 31 July 2013 with targets for the Universities to: <ul style="list-style-type: none"> • Undertake 1,140 business engagements; • Secure £863k income from Intellectual Property; and • Establish 8 spin out businesses. 	DEL	July 2013
A17		Provide £50m funding for University research based on quality-assessed outcomes.		July 2012
A18		Maintain strategic investment (£1m per annum) in collaborative Higher Education / Further Education engagement with business through the Connected programme with a target for the Universities and FE Colleges establish 14 major sectoral projects with local businesses involving at least one University and one regional college.		March 2014
A19	Promote a culture of creativity and innovation and grow the Creative and Cultural Industries sector	Develop a framework to grow the creative industries and a broader culture of creativity and design-thinking.	DCAL	March 2015
A20		Invest £4m via the Creative Industries Innovation Fund and wider sectoral initiatives to stimulate innovation, R&D and creativity.		March 2015
A21		Support 200 innovation projects through the Creative Industries Innovation Fund.		March 2015

No.	Objective	Action	Responsible Organisation	Timescale
A22	To deliver a Knowledge and Technology Transfer (KTT) Programme to the agri-food sector	Develop, demonstrate and encourage adoption of the latest technologies to the agri-food sector with a target of at least 1500 technologies adopted on an annual basis.	DARD	March 2015
A23	Ensure that publicly funded research promoted by DARD is aligned with the policy priorities set out in the DARD Evidence and Innovation Strategy	Provide funding for up to £2.8m worth of new agri-food research per year (within a rolling programme) in line with the DARD Evidence and Innovation Strategy.	DARD	March 2015
A24	Significantly increase cross-border innovation and trade activity	Increase the number of businesses involved in cross-border innovation and trade activity by 10,000, through access to, and exploitation of, Intertradelreland information, advice services and business support programmes.	DETI/ Intertradelreland	March 2013
A25		Complete a study on the innovation ecosystem that will identify opportunities and remove barriers.		March 2013
A26		Develop a pilot programme to deliver enhanced innovation capability leading to transformational change – the Innovation Challenge Programme.		March 2013
A27		Increase North/South participation in EU Research & Development programmes.		March 2013
A28		Provide support for wider North/South research connections.		March 2013
A29		Facilitate the expansion of the US Ireland R&D Partnership.		March 2013

No.	Objective	Action	Responsible Organisation	Timescale
A30	Stimulating Innovation, R&D & Creativity	Explore how the NI Science Park can further evolve into an Open Innovation Centre to create the environment where partnerships and collaboration can flourish across sectors.	DETI	Dec 2012
A31		Based upon the views of MATRIX and the Foresight process, progress the alignment of publically funded research with our economic priorities in order to increase the potential for greater knowledge transfer between business and academia to maximise the economic return.	DETI/Invest NI/DEL	Ongoing
A32		Examine ways to increase the rate of commercialisation of publically funded research and public sector Intellectual Property.	DETI	Ongoing
A33		Foster the degree of innovation through increased use of innovative forms of public procurement.	DFP and all Departments	Ongoing
A34		Identify areas where there can be greater collaboration between the health sector and business in order to develop economic development opportunities that support a shared "Health and Prosperity" agenda. These will primarily cover R&D and Connected Health.	DHSSPS/DETI/Invest NI	30 June 2012
A35		Examine the need for the establishment of an Innovation Council to ensure that, at the highest level, the Executive, Academia and Business work together to further embed innovation across the NI economy.	DETI/Invest NI/DEL	Ongoing
A36		Maximise the returns from Health and Social Care R&D funding and examine and exploit opportunities to increase R&D funding through UK-wide or international funding partnerships or investment.	DHSSPS/Public Health Agency	Annually

No.	Objective	Action	Responsible Organisation	Timescale
A37		Support Health and Social Care innovations to manage the commercialisation of intellectual property arising from HSC Trusts.	DHSSPS/Public Health Agency	Ongoing
A38		Develop and launch a new strategy for Health and Social Care R&D for 2012 - 2017	DHSSPS/Public Health Agency	Spring 2012



Northern Ireland
Assembly

Research and Library Service Research Paper

Paper 849-12

13 January 2012

NIAR 849-12

Fergal Campbell

Identification of best performing Higher Education Institutions for R&D in the UK and ROI

The following paper provides a brief overview of research systems and funding in UK and the Republic of Ireland universities and identifies the top research performers.

Research and Information Service briefings are compiled for the benefit of MLAs and their support staff. Authors are available to discuss the contents of these papers with Members and their staff but cannot advise members of the general public. We do, however, welcome written evidence that relate to our papers and these should be sent to the Research and Information Service, Northern Ireland Assembly, Room 139, Parliament Buildings, Belfast BT4 3XX or e-mailed to RLS@niassembly.gov.uk

Key Points

In 2009 the UK Higher Education sector received €9,150m of research support.

In the Republic of Ireland (ROI) expenditure on R&D performed in the higher education sector in 2008 amounted to €660m, of which the government funded €550m

In the Times Higher Education ranking, Queens University Belfast (QUB) ranks 40th out of the 56 UK and ROI universities for research. University College Dublin (UCD) and Trinity College Dublin (TCD) are the highest placed universities in Northern Ireland (NI) and ROI.

Research excellence in the UK is determined by the Research Assessment Exercise (RAE). Factors influencing research excellence include:

- The number of times an institute's published work is cited globally;
- A high density of research students
- The presence of an active postgraduate community; and
- A university's ability to help industry with innovations, inventions and consultancy

In the RAE, 90% of the research produced by QUB was of international standard (level 2* and above), with 84% of academic staff taking part in the RAE.

In the University of Ulster, 86% of the research produced by UU was of international standard (level 2* and above).

University research has a distinctive contribution to make in creating value through supporting company innovation processes, and thus has a role in contributing to economic development.

The top four universities in NI and ROI have all demonstrated knowledge transfer and links to business innovation through spin-off companies and innovation centres.

- In QUB, QUBIS Ltd has created more than 50 high technology companies and over 1,000 jobs;
- In UU, Innovation Ulster Ltd engages commercially with the business community and investors;
- In UCD, €3.6 million has been generated from commercialisation research and 56 start-ups have availed of NovaUCD's incubation facilities; and
- In TCD, the innovation centre has fostered links with industry and business to set up over 40 companies, creating over 1,000 jobs.

Executive Summary

The UK government have aimed to reach a ratio of Gross Domestic Expenditure on Research & Development (GERD) to Gross Domestic Product (GDP) of 2.5% by 2014.

In 2009, the UK Higher Education sector received €9,150m of research support. This support is drawn from several sources: €2,455m (27%) came from the research councils;¹ €3,031m (33%) from Higher Education Funding Councils and similar bodies; €767m (8%) from government directly; €353m (4%) came from industry and business; €1,214m (13%) from private, non-profit sector; and €937m (10%) came from overseas sources.

In the Republic of Ireland (ROI) expenditure on R&D performed in the higher education sector in 2008 amounted to €660m, of which the government funded €550m

In Northern Ireland, the Department for Employment and Learning (DEL) is responsible for developing and maintaining Higher Education research policy and is the core funder of HERD (Higher Education Expenditure on Research & Development) in Northern Ireland.

The majority of government funds are provided by four corresponding mechanisms which, in turn:

- Support the costs of research staff involved in specific basic and strategic research projects and programmes (competitive grants from the Research Councils);
- Support to cover the costs of permanent academic staff and research facilities (block funding from the Higher Education Funding Councils);
- Support to upgrade and improve universities' research infrastructure (the Research Capital Investment Fund); and
- Provide an incentive for universities to develop their capacity to engage with business and the wider community (Higher Education Fund).

In ROI expenditure on R&D performed in the higher education sector in 2008 amounted to €660m, of which the government funded €550m. In 2009 GERD was 1.77% of GDP with the private sector equating 63.3% and the public sector 33.7% of GERD.²

In 2008, 95% of the research carried out by the higher education sector in ROI was undertaken in the seven universities. University College Dublin, Trinity College Dublin and University College Cork, accounted for almost two-thirds of the research performed in the sector.

This paper used the Times Higher Education rankings and the Research Assessment Exercise (RAE) to indicate the Top research performers in Higher Education.

In the Times Higher Education rankings, Out of the top 400 world ranking universities, 56 of these are from the UK and ROI (51 – UK, 5 – ROI). The University of Oxford and the University of Cambridge achieved the highest scores in research excellence in the UK and ROI.

Queens University Belfast (QUB) ranks 40th out of the 56 UK and ROI universities for research, University College Dublin (UCD) and Trinity College Dublin (TCD) are the highest placed universities in NI and ROI. The University of Ulster did not rank in the top 400 universities in the world and as a result the Times Higher Education ranking does not provide a research score.

Research excellence in the UK is determined by the Research Assessment Exercise (RAE).

1 There are seven UK research councils responsible for funding research, they are: Arts and Humanities Research Council (AHRC); Biotechnology and Biological Sciences Research Council (BBSRC); Engineering and Physical Sciences Research Council (EPSRC); Economic and Social Research Council (ESRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); and Science and Technology Facilities Council (STFC)

2 Ibid

The majority of research funding in Northern Ireland (95%) is distributed based on the RAE and is known as Quality-related Research (QR) funding.

The most recent RAE was carried out in 2008 and had three key outputs:

- Quality ratings;
- The number of full time equivalent research staff; and
- The proportion of total staff submitted as research staff.

Quality levels are assessed based on three overarching components of the submission research outputs, research environment and indicators of esteem.

QUB submitted 38 research areas for analysis. In total, 90% of the research produced by QUB was of international standard (level 2* and above).

The UU submitted 25 research areas to the assessment exercise. 86% of the research produced by UU was of international standard (level 2* and above).

Case studies showed that companies valued both the specific deliverables from research collaborations and a broader set of benefits:

- The expertise developed in individual researchers as a result of a collection of previous research projects;
- Access to a broad base of information which includes research journals and conference papers to locate academics and understand their expertise; and
- The methods, techniques and data developed in the course of any research.

In 2009/10 Northern Ireland (i.e. Queen's University Belfast and the University of Ulster) had the highest number (20) of spin-outs per institution of all the UK countries (with some university ownership and which are still active after 3 years) (i.e. 40 overall). This per institution figure of 20 is four times greater than the UK average of 5 per HEI.

A major factor in this success is QUBIS Ltd which, over the past 25 years, has created more than 50 high technology companies and over 1,000 jobs, and is continuing to make a very significant contribution to the local economy generating an expected turnover of £104m in 2010.

The nearest equivalent to QUBIS at the University of Ulster is Innovation Ulster Ltd which is a legally constituted vehicle through which the University engages commercially with the business community and investors.

Contents

- 1 Introduction
- 2 Research and Development in the United Kingdom (UK)
- 3 Research and Development in the Republic of Ireland (ROI)
- 4 Top Performing Higher Education Institutes in Research and Development in UK and ROI
 - 4.1 The Times Higher Education (THE) world rankings
 - 4.2 Research Assessment Exercise (RAE)
- 5 Knowledge transfer between university research and business.

1 Introduction

This paper provides a brief overview of research systems and funding in UK and ROI universities and identifies the top research performers.

2 Research and Development in the United Kingdom (UK)

The UK research system is highly centralised, although regional autonomy for innovation policy has been increased in recent years through the devolved administrations.³ Higher education institutes are block funded by separate funding councils in each country and also by the research councils that have a UK wide remit.

Research policy is an important part of the government's policy on innovation, competitiveness and economic growth. The UK Government see a strong science and technology base as a vital component of the national innovation system and that national competitiveness is reinforced by a well-functioning R&D system.⁴

In the UK the most significant support mechanism of R&D appears to be the funding received by higher education research from the Higher Education Funding and Research Councils⁵

The UK government have aimed to reach a ratio of Gross Domestic Expenditure on Research & Development (GERD) to Gross Domestic Product (GDP) of 2.5% by 2014.⁶

2.1 Research in UK Higher Education Institutions

As of August 2010, there were 165 HEIs in the UK of which 115 were universities.⁷ In 2009 the UK Higher Education sector received €9,150m of research support.⁸ This support is drawn from several sources: €2,455m (27%) came from the research councils;⁹ €3,031m (33%) from Higher Education Funding Councils and similar bodies; €767m (8%) from government directly; €353m (4%) came from industry and business; €1,214m (13%) from private, non-profit sector; and €937m (10%) came from overseas sources.¹⁰

3 Erawatch – UK http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/gb/country?section=Overview&subsection=Overview (Accessed 06/12/2011)

4 Ibid

5 Ibid

6 Science and Innovation Investment Framework (2004-2014) http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/d/science_406.pdf

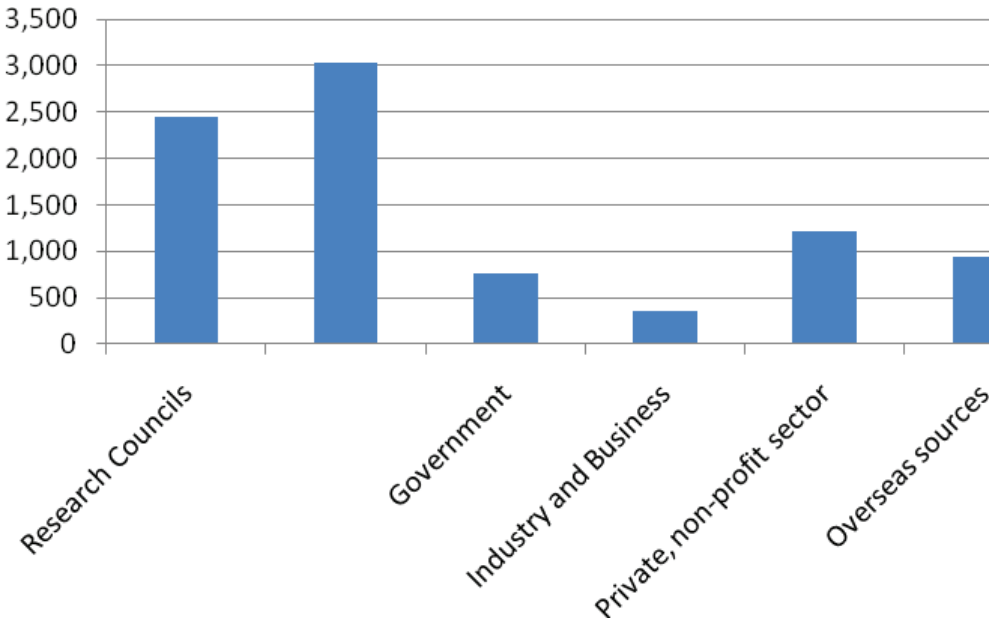
7 Erawatch – UK http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/gb/country?section=ResearchPerformers&subsection=HigherEducationInstitutions (Accessed 06/12/2011)

8 Ibid

9 There are seven UK research councils responsible for funding research, they are: Arts and Humanities Research Council (AHRC); Biotechnology and Biological Sciences Research Council (BBSRC); Engineering and Physical Sciences Research Council (EPSRC); Economic and Social Research Council (ESRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); and Science and Technology Facilities Council (STFC)

10 Erawatch – UK http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/gb/country?section=ResearchPerformers&subsection=HigherEducationInstitutions (Accessed 06/12/2011)

Figure 1: Sources of funding for research in UK Higher Education Institutions (€m)



The majority of government funds are provided by four corresponding mechanisms which, in turn:¹¹

- Support the costs of research staff involved in specific basic and strategic research projects and programmes (competitive grants from the Research Councils)
- Support to cover the costs of permanent academic staff and research facilities (block funding from the Higher Education Funding Councils)
- Support to upgrade and improve universities' research infrastructure (the Research Capital Investment Fund); and
- Provide an incentive for universities to develop their capacity to engage with business and the wider community (Higher Education Fund)

Universities in the UK are free to seek funding from a variety of sources. However, the majority of their funding is sought via Higher Education Funding Councils to support the costs of academic staff and research facilities. Research councils provide funding for the research projects. The charitable, non-profit sector is the other principal funding source for research. Universities UK is the representative body and membership organisation comprised of the executive heads of the UK's universities.

The UK Higher Education sector comprises an extremely diverse collection of institutions which range from large, highly research intensive, internationally renowned institutions to small teaching-focused institutes which often serve particular regional or sectorial demands.¹²

2.2 Research in NI Higher Education Institutions

In Northern Ireland, the Department for Employment and Learning (DEL) is responsible for developing and maintaining Higher Education research policy in the Northern Ireland universities. This differs from the GB position where the policy and funding functions are carried out separately by Government Departments and their delivery bodies, the Higher Education Funding Councils.

11 Ibid

12 Ibid

The Department is the core funder of HERD (Higher Education Expenditure on Research & Development) in Northern Ireland. HERD comprises all research and development expenditure made by the universities. When expressed as a percentage of Gross Domestic Product (GDP), Northern Ireland, with a figure of 0.52%, is performing above the UK average of 0.51%.¹³ Appendix 1 provides a detailed breakdown of Higher Education R&D spend throughout the United Kingdom. The breakdown shows that in 2009, NI's expenditure on R&D by higher education was £163 million and 0.52% of GDP. Appendix 2 provides the most recent similar information relating to the Republic of Ireland (ROI) and confirms that Northern Ireland is also performing above the ROI level.

13 DEL – Funding of Research paper

3 Republic of Ireland (ROI) R&D policy

The research system in ROI is highly centralised; with regions having little or no involvement in policy development. Funding for research is primarily provided by the Department of Jobs, Enterprise & Innovation and the Department of Education & Skills.

Until the mid-nineties, the ROI was lacking in research policy with the first science policy published in 1996.¹⁴ A technology foresight exercise carried out in the late nineties resulted in a government investment in biotechnology and ICT, and a programme for research in third level institutions which provided funding for research infrastructure in the higher education infrastructures.¹⁵ In 2006, the government set out ROI's ambitions to be a leading knowledge economy in the Strategy for Science, Technology and Innovation.¹⁶ This was followed two years later by the policy framework document, Building Ireland's Smart Economy: A Framework for Sustainable Economic Renewal which highlighted ways to stimulate the economy including an emphasis on investing in research and development and building the innovation component of the economy through the utilisation of human capital.¹⁷

3.1 Research in ROI Higher Education Institutions

The ROI higher education sector comprises of seven universities and fourteen institutes of technology, colleges of education and other recognised institutions.¹⁸ In 2008, 95% of the research carried out in the ROI higher education sector was undertaken in the seven universities. University College Dublin, Trinity College Dublin and University College Cork, accounted for almost two-thirds of the research performed in the sector.¹⁹ The purposes of the higher education sector are teaching and research, though a greater role for the HEIs in Knowledge and technology transfer is being sought by the government.²⁰ In 2009, Trinity College Dublin and University College Dublin announced the creation of a new 4th level innovation academy in order to develop Ireland as a knowledge society in the new global economy.²¹ The core of Graduate/PhD training will be the will be the development of an independent researcher in a world class environment, offering a rounded education and research training programme to all students.²²

Key elements of 4th level Ireland are:²³

- Core Masters and PhD programmes;
- Feeder pathways which will enhance access to the best of university education;
- New programmes of lifelong learning and skills development;
- Strong links to external stakeholders, with opportunities for placements in relevant economic sectors;
- Investment in the arts, humanities and social sciences to promote the research, scholarship and creativity to compliment scientific, technological and commercial advances;

14 Erawatch – Ireland http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/ie/country?section=Overview&subsection=Overview (Accessed 12/12/11)

15 Ibid

16 Ibid

17 Ibid

18 Erawatch – Ireland http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/ie/country?section=ResearchPerformers&subsection=HigherEducationInstitutions (Accessed 12/12/11)

19 Ibid

20 Ibid

21 IUA Irish Universities Association <http://www.iua.ie/iua-activities/4th-level-ireland/index.html> Accessed (07/12/11)

22 Ibid

23 Ibid

- Taught elements in generic skills and advanced disciplinary courses; and
- Teaching/tutorial experience.

The 4th level scheme is funded through the Irish Government's Strategic Innovation Fund and aims to provide a new cohort of researchers at doctoral and postdoctoral experience.²⁴ The Strategic Innovation Fund is a multi-annual fund, amounting to €510 million over the period 2006-2013, which is directed towards support for innovation in HEIs.²⁵

Expenditure on R&D performed in the higher education sector in 2008 amounted to €660m, of which the government funded €550m.²⁶ In 2009 GERD was 1.77% of GDP with the private sector equating 63.3% and the public sector 33.7% of GERD.²⁷

24 Ibid

25 IUA Irish Universities Association <http://www.iua.ie/iua-activities/strategic-innovation-fund.html> (Accessed 08/12/11)

26 Erawatch – Ireland http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/ie/country?section=ResearchPerformers&subsection=HigherEducationInstitutions (Accessed 12/12/11)

27 Ibid

4 Top Performing Higher Education Institutes in Research and Development in UK and ROI

The Times Higher Education (THE) rankings and the Research Assessment Exercise (RAE) both determine research excellence in the UK and Ireland. The Times Higher Education rank the top 400 universities in the world on 13 performance indicators, three of those are research related and are weighted 30% of the ranking. The RAE is a UK based peer review benchmarking exercise, with the quality ratings for RAE and the data provided by institutions used to distribute funds for research based on quality.

4.1 Characteristics of research excellence

The characteristics of research excellence are embedded in the indicators and criteria used in The Times Higher Education (THE) rankings and the Research Assessment Exercise (RAE).

Research excellence is often achieved in institutions that have a prestigious learning environment as perceived by academic peers. Furthermore, a university's research influence is apparent in the number of times all of its published work is cited by scholars around the world. Institutions with a high density of research students are more knowledge-intensive, and the presence of an active postgraduate community is a marker of a research-led teaching environment capable of excellence.²⁸

A university's ability to help industry with innovations, inventions and consultancy has become such an important activity that it is often known as its "third mission", alongside teaching and research.²⁹ This suggests the extent to which businesses are willing to pay for research and a university's ability to attract funding in the competitive commercial marketplace - key indicators of quality.³⁰

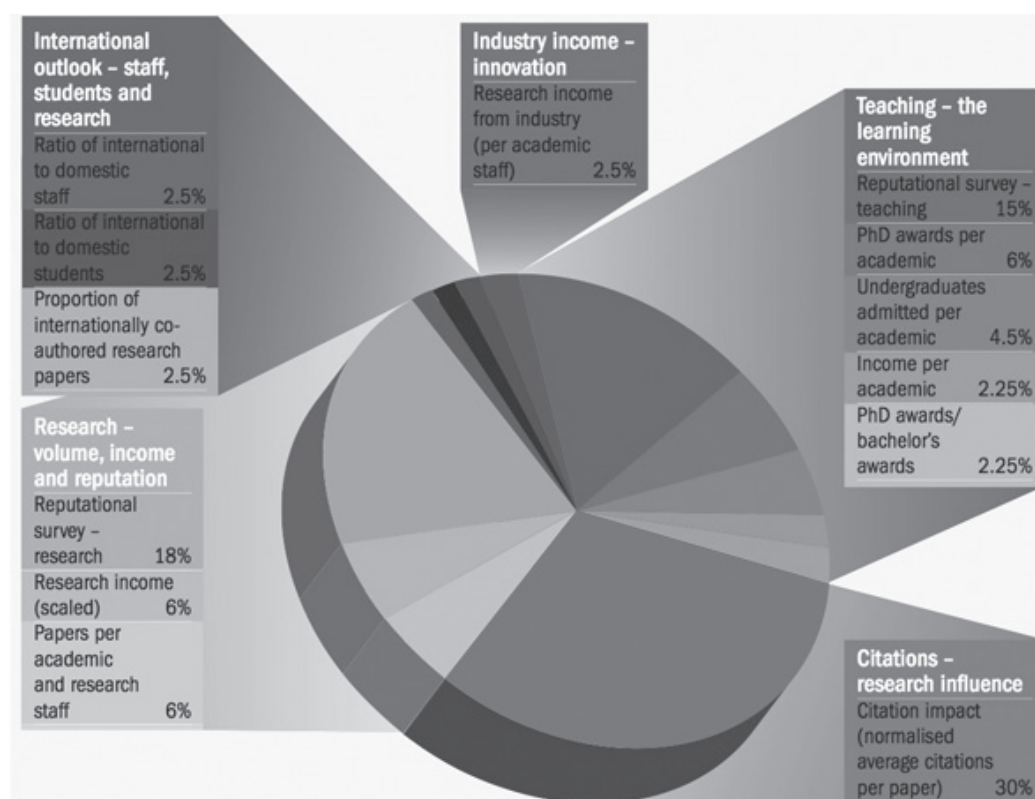
4.2 The Times Higher Education (THE) world rankings

The Times Higher Education ranking is based on performance indicators in 5 different categories.

28 Times Higher Education <http://www.timeshighereducation.co.uk/world-university-rankings/2011-2012/analysis-rankings-methodology.html> (Accessed 13/12/11)

29 Ibid

30 Ibid

Figure 2: Performance Indicators for higher education rankings (%)³¹

Source: Times Higher Education

The research category comprises of three separate indicators that together represent 30% of the overall THE ranking, they are volume; income; and reputation.

The most prominent indicator examines a university's reputation for research excellence among its peers, based on the 17,000-plus responses to the annual Academic Reputation survey.³² The peer review has greater weight because academics are likely to be more knowledgeable about the reputation of research departments in their specialist fields.³³

The category also looks at a university's research income, scaled against staff numbers and normalised for purchasing-power parity. The indicator is normalised to take into account the higher funding science subjects receive in comparison to other subjects.

The final indicator measures the research output scaled against staff numbers. This is measured as the number of papers published in academic journals per academic staff member, scaled for a university's total size.³⁴

31 Times Higher Education <http://www.timeshighereducation.co.uk/world-university-rankings/2011-2012/analysis-rankings-methodology.html> (Accessed 13/12/11)

32 Ibid

33 Ibid

34 Ibid

The weighting for each indicator is as follows:

Table 1: Percentage weighting for research performance indicators³⁵

Indicator	Weighting
Reputation	18%
Income	6%
Volume	6%

Source: Times Higher Education

It should be noted that the reliability of some indicators has been questioned. For instance, research excellence on the basis of income may be skewed as income can be influenced by national policy and economic circumstances. The counter argument to this holds that its inclusion accounts for the important role research income plays important in the development of a world-class research system, and because income is subject to competition and peer review.³⁶

4.2.1 The Times Higher Education rankings for research

As mentioned above, the Times Higher Education rankings assess five different indicators to rank university performance. This paper will take into account the research scores - of the UK & ROI universities - in isolation, as an indication of research excellence.

The Times Higher Education ranking covers the top 400 universities in the world. Table 2 illustrates the top 10 universities for research excellence in the UK & ROI and also indicates the placing of NI and ROI universities outside the top 10. It is important to note that the research rankings only apply to the indicated regions, although it includes each university's overall worldwide ranking.

Table 2: Research excellence in the UK and ROI³⁷

University	Research Ranking (UK)	Research Score	Overall World Ranking
University of Oxford	1	96.6	4
University of Cambridge	2	94.2	6
Imperial College London	3	88.7	8
University College London	4	84.3	17
London School of Economics	5	75.4	47
University of Edinburgh	6	61.4	36
University of Manchester	7	61.1	48
Kings College London	8	54.2	56
University of Bristol	9	47.7	66
University of Sheffield	10	46	101
NI and ROI Universities			
University College Dublin	36	23.7	159
Trinity College Dublin	37	23.5	117
Queens University Belfast	40	21.3	264
University College Cork	44	19.2	343
National University of Ireland, Maynooth	45	18.6	379
National University of Ireland, Galway	54	12.2	378

35 Ibid

36 Ibid

37 THE rankings <http://www.timeshighereducation.co.uk/world-university-rankings/2011-2012/top-400.html> (Accessed 12/12/2011)

The research rankings indicate that of the top 10 universities, all but one is located in England with four located in London. The University of Edinburgh is the only non-English institution in the top 10.

Out of the top 400 world ranking universities, 56 of these are from the UK and ROI (51 – UK, 5 – ROI). Queens University Belfast (QUB) ranks 40th among UK and ROI universities for research, University College Dublin (UCD) and Trinity College Dublin (TCD) are the highest placed universities in NI and ROI. It is important to note the difference between the research scores in the top 10, University of Oxford have 96.6 in first place whereas the University of Sheffield, in 10th, scored 46. This is a significant scoring difference for two universities placed closely together whereas the variance between 10th place and QUB in 40th is only 24.7.

QUB is the only NI University placed in the ranking, achieving 40th in research scores for UK & ROI and 264th in the world rankings. This is a very respectable standing considering that the ranking covers every university that offers both undergraduate and postgraduate qualifications in the world. The University of Ulster on the other hand does not feature in the top 400 so it is difficult to gauge their research excellence using the Times Higher Education rankings.

In ROI, 5 out of the 7 universities feature in the top 400 rankings. UCD and TCD are leaders in research excellence and are both in the top 200 universities worldwide (ranked 159 and 117 respectfully). .

4.3 Research Assessment Exercise (RAE)

Research excellence in the UK is determined by the Research Assessment Exercise (RAE). The RAE is sponsored by the four higher education funding bodies in the UK (the Department for Employment and Learning (DEL), the Higher Education Funding Council for England (HEFCE), Scottish Funding Council (SFC), and the Higher Education Funding Council for Wales (HEFCW).

The RAE is a peer review based benchmarking exercise, with the Department using both the quality ratings for RAE and the data provided by institutions (including the number of academic staff, research students and research income) to distribute funds for research based on quality.³⁸

The majority of research funding in Northern Ireland (95%) is distributed based on the RAE and is known as Quality-related Research (QR) funding.³⁹

The most recent RAE was carried out in 2008⁴⁰ and had three key outputs:

- Quality ratings;
- The number of full time equivalent research staff; and
- The proportion of total staff submitted as research staff.

Quality levels are assessed based on three overarching components of the submission research outputs, research environment and indicators of esteem. The quality level is subsequently scaled as:⁴¹

- 4* - Quality that is world leading in terms of originality, significance and rigour;
- 3* - Quality that is internationally excellent in terms of originality, significance and rigour but which nonetheless falls short of the highest standards of excellence;
- 2* - Quality is recognised internationally in terms of originality, significance and rigour;

38 Northern Ireland Academic and Research Excellence, NIAR 790-2011

39 Ibid

40 It is important to note that in 2014 a new, revised exercise will be implemented.

41 Ibid

- 1* - Quality that is recognised nationally in terms of originality, significance and rigour; and
- Unclassified – Quality that falls below the standard of nationally recognised work or work which does not meet the published definition of research for the purpose of the assessment.

The overall average score is the “grade-point average” (GPA) of the institution’s quality profile. To find the GPA, the percentage of staff within an institution to receive a 4* grade is multiplied by 4, the percentage of staff to receive a 3* is multiplied by 3, the percentage of staff to receive a 2* is multiplied by 2 and the percentage of staff to receive a 1* is multiplied by 1; the results are added together and divided by 100 to give an average score of between 0 and 4.⁴²

In total 132 Higher Education Institutes submitted applications to the RAE with assessments carried out on 67 different research areas. This is one of the key differences between the Times Higher Education rankings and the RAE. The Times Higher Education ranks performance indicators across the universities as a whole whereas the RAE carries out assessments on several research areas. Also, the RAE has a UK only remit so the exercise does not include ROI.

The RAE encourages competition for research funding, high-quality researchers and postgraduate research students. However, caution is required when viewing the RAE classifications as the formulae used by the funding councils to convert the quality and volume of research into a funding allocation are heavily influenced by government policy to concentrate funds in a few ‘research intensive’ departments that can support large research teams strong enough to compete internationally.⁴³

Tables 3 and 4 following detail the results for Queen’s University Belfast and the University of Ulster by UoA (Units of Assessment)⁴⁴. Please note, the results shown are the percentage of research activity in the submission judged to meet the standard for each quality level.

42 Times Higher Education RAE 2008: The results <http://www.timeshighereducation.co.uk/story.asp?storycode=404786> (Accessed 14/12/2011)

43 Brown, R. Higher Education and the Market (2011) Routledge; New York.

44 Research Assessment Exercise 2008, <http://www.rae.ac.uk/Results/>. Results for other UK Higher Education Institutions can be accessed on the RAE website.

Table 3: QUB 2008 RAE results⁴⁵

Unit of assessment name	FTE staff submitted	4*	3*	2*	1*	unclassified
Cancer Studies	37	10	40	45	5	0
Other Hospital Based Clinical Subjects	13	10	35	45	10	0
Other Laboratory Based Clinical Subjects	8	5	25	55	15	0
Epidemiology and Public Health	23.5	5	35	50	10	0
Dentistry	13	5	60	30	5	0
Nursing and Midwifery	10.68	10	30	30	25	5
Allied Health Professions and Studies	14	15	45	30	10	0
Pharmacy	23	15	40	40	5	0
Biological Sciences	35	5	25	50	20	0
Agriculture, Veterinary and Food Science	13	5	25	55	15	0
Chemistry	32.6	5	40	50	5	0
Physics	50	10	40	40	10	0
Pure Mathematics	8.2	5	40	50	5	0
Computer Science and Informatics	21	15	45	30	10	0
Electrical and Electronic Engineering	32	20	40	30	10	0
Civil Engineering	24.05	20	55	25	0	0
Mechanical, Aeronautical and Manufacturing Engineering	25	15	50	30	5	0
Town and Country Planning	12	10	20	45	25	0
Geography and Environmental Studies	20	10	40	45	5	0
Archaeology	15	25	30	40	5	0
Business and Management Studies	44	15	40	40	5	0
Law	35.5	25	35	35	5	0
Politics and International Studies	31	10	40	30	20	0
Social Work and Social Policy & Administration	21.61	20	35	35	10	0
Sociology	23	20	35	30	15	0
Anthropology	12	35	20	20	25	0
Psychology	19.5	5	25	50	20	0
Education	19	10	40	30	15	5
French	9	5	45	30	20	0
German, Dutch and Scandinavian Languages	3.5	5	10	50	35	0
Iberian and Latin American Languages	9	15	40	35	10	0
Celtic Studies	5	10	20	35	35	0
English Language and Literature	36.1	35	30	25	10	0
Classics, Ancient History, Byzantine and Modern Greek Studies	2.5	20	10	25	40	5
Philosophy	6.33	5	60	25	10	0
History	30.5	15	45	35	5	0
Drama, Dance and Performing Arts	14.2	15	40	30	10	5
Music	18.5	35	35	20	10	0

Source: NIAR 790-2011

As can be seen in Table 2, QUB submitted 38 research areas for analysis.

The majority of research produced at QUB received ratings of 3* and 2* (36% in each), with 14% of all research receiving a 4* rating. Music, Anthropology and English Language and Literature were the highest scoring UoAs for QUB (35% of research at Level 4*).

In total, 90% of the research produced by QUB was of international standard (level 2* and above), with 84% of academic staff taking part in the RAE.

Of the 38 research areas, QUB had 11 subject areas ranked within the top 10 in the UK and 24 in the top 20⁴⁶. Only three subject areas produced “Unclassified” research (Education – 5%; Classics, Ancient History, Byzantine and Modern Greek studies – 5%; and Drama, Dance and Performing Arts - 5%).

Table 4 following provides the RAE results for the University of Ulster.

Table 4: UU 2008 RAE results⁴⁷

Unit of assessment name	FTE Category A staff submitted	4 ^a	3 ^a	2 ^a	1 ^a	Unclassified
Nursing and Midwifery	25.9	40	40	20	0	0
Allied Health Professions and Studies	60.75	25	35	35	5	0
Allied Health Professions and Studies	14	0	20	35	40	5
Agriculture, Veterinary and Food Science	7	0	35	55	10	0
Earth Systems and Environmental Sciences	24	5	35	50	10	0
Computer Science and Informatics	41	10	45	35	10	0
Metallurgy and Materials	12	5	45	45	5	0
Architecture and the Built Environment	32.8	15	50	30	5	0
Business and Management Studies	30.5	5	30	50	15	0
Law	24.4	20	35	35	10	0
Politics and International Studies	8	10	25	35	30	0
Social Work and Social Policy & Administration	15.6	10	50	35	5	0
Psychology	27	5	20	45	30	0
Education	13	10	15	50	25	0
Sports-Related Studies	7	5	25	45	25	0
French	9	5	20	35	35	5
German, Dutch and Scandinavian Languages	3	10	15	50	25	0
Iberian and Latin American Languages	3	0	10	50	40	0
Celtic Studies	11.2	35	40	25	0	0
English Language and Literature	17.75	5	30	50	15	0
Linguistics	3	15	25	40	10	10
History	20	15	40	30	15	0
Art and Design	46.25	20	25	30	15	10
Communication, Culture and Society	17	10	65	20	5	0
Music	8	0	30	50	15	5

Source: NIAR 790-2011

The UU submitted 25 research areas to the assessment exercise. Of these 11% received 4* ratings (with Nursing and Midwifery – 40% and Celtic Studies – 35% receiving the highest scores for all the submitted categories).

As with QUB, the majority of results were focused on levels 3* and 2*, with 32% and 39% respectively. 86% of the research produced by UU was of international standard (level 2* and above).

Five of subject areas received an unclassified rating, although this amounted to only 1% of the total percentage of results, with 13% at level 1*.

5 Knowledge transfer between university research and business.

University research has a distinctive contribution to make in creating value through supporting company innovation processes, and thus has a role in contributing to economic impact.⁴⁸

Case studies showed that companies valued both the specific deliverables from research collaborations and a broader set of benefits:⁴⁹

- the expertise developed in individual researchers as a result of a collection of previous research projects;
- access to a broad base of information which includes research journals and conference papers to locate academics and understand their expertise;
- the methods, techniques and data developed in the course of any research.

Knowledge transfer is the universities' "Third Mission" after teaching and research. Knowledge transfer refers to the universities' interaction with business and the wider community, and also to the commercial exploitation of the research base through licensing, through other commercial agreements and spinning out new companies (usually owned or part owned by the university).⁵⁰

In 2009/10, Northern Ireland (i.e. Queen's University Belfast and the University of Ulster) had the highest number (20) of spin-outs per institution of all the UK countries (with some university ownership and which are still active after 3 years) (i.e. 40 overall). This per institution figure of 20 is four times greater than the UK average of 5 per HEI.⁵¹

A major factor in this success is QUBIS Ltd which, over the past 25 years, has created more than 50 high technology companies and over 1,000 jobs, and is continuing to make a very significant contribution to the local economy generating an expected turnover of £104m in 2010.⁵²

The nearest equivalent to QUBIS at the University of Ulster is Innovation Ulster Ltd which is a legally constituted vehicle through which the University engages commercially with the business community and investors.⁵³ Profits and surpluses from commercial activity are brought back into the University for distribution to the academic community and associated faculties and schools.

Trinity College Dublin nurture strong research capabilities and develop new ways to exploit this resource, an Innovation Centre was founded in 1986. In addition to fostering links between industry and the academic research base, the Innovation Centre also serves as an incubator for small businesses which spin-off from research.⁵⁴ Over 40 companies have been set up, creating over 1,000 jobs.

NovaUCD, the Innovation and Technology Transfer Centre, is the hub of innovation and knowledge transfer activities at University College Dublin. NovaUCD's vision is to become an international leader in the commercialisation of research and other knowledge-intensive

48 Absorbing Research – The role of university research in business and market innovation <http://www.cihe.co.uk/cihe-explores-the-role-of-university-research-in-business-and-market-innovation/> (Accessed 13/12/2011)

49 Ibid

50 DEL – Funding of Research paper

51 Ibid

52 Ibid

53 Ibid

54 Postgrad Ireland <http://postgradireland.com/institution/6386> (Accessed 09/01/2012)

activity for the benefit of the economy and society.⁵⁵ Since 2004, €3.6 million has been generated from commercialisation research and 56 start-ups have availed of NovaUCD's incubation facilities.⁵⁶ Furthermore, 16 new spin-offs have been incorporated with ChangingWorlds, a technology company, acquired by Amdocs for \$60 Million.⁵⁷

55 Nova UCD annual report http://www.ucd.ie/nova/mediacentre/novaucdannualreports/2010/NovaUCD_2010_Annual_Report_Single_Page.pdf (Accessed 10/01/2012)

56 Ibid

57 UCD News, http://www.ucd.ie/news/2008/11NOV08/101108_nova.html (Accessed 09/01/2012)

Appendix 1

Expenditure on R&D performed in Higher Education by Government Office Region:

Current prices & as a percentage of GDP, 1999 to 2009

	Higher Education R&D Expenditure (£million)											% of total	% of GDP1										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2009	2009	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Scotland	411	440	525	608	618	641	689	772	870	939	984	13.6	0.54	0.56	0.65	0.71	0.68	0.67	0.69	0.72	0.77	0.82	0.86
London	837	895	1,007	1,108	1,148	1,188	1,356	1,458	1,559	1,647r	1,732	24.0	0.46	0.47	0.51	0.52	0.50	0.49	0.53	0.54	0.53r	0.55r	0.58
North East	113	122	146	166	170	176	189	206	222	231	242	3.3	0.36	0.38	0.43	0.47	0.45	0.45	0.46	0.48	0.49	0.51	0.54
Yorkshire & Humber	270	284	326	356	373	388	419	457	493	501	527	7.3	0.39	0.40	0.44	0.45	0.45	0.45	0.47	0.49	0.50	0.51	0.54
Wales	129	139	159	188	188	198	221	235	254	261	263	3.6	0.36	0.38	0.42	0.47	0.44	0.45	0.48	0.49	0.50	0.52	0.53
Northern Ireland	64	70	75	88	107	124	134	139	139	146	163	2.3	0.30	0.32	0.33	0.36	0.42	0.45	0.47	0.46	0.43r	0.46	0.52
East of England	255	324	376	421	442	464	506	520	580	590	617	8.5	0.32	0.39	0.44	0.46	0.45	0.45	0.46	0.45	0.47	0.48	0.51
South East	493	515	578	636	659	678	772	836	912	955	1,016	14.1	0.37	0.37	0.39	0.40r	0.40	0.39	0.42r	0.44	0.45	0.48	0.51
North West	260	287	331	370	390	416	475	531	560	569	611	8.5	0.28	0.29	0.33	0.35	0.35	0.35	0.39	0.42	0.42	0.43	0.46
East Midlands	182	204	230	246	239	244	271	289	307	311	362	5.0	0.31	0.33	0.36	0.36	0.33	0.32	0.34	0.35r	0.35	0.35	0.42

	Higher Education R&D Expenditure (£million)											% of total	% of GDP ¹										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2009	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
West Midlands	180	192	213	231	245	269	293	303	322	334	361	5.0	0.24	0.25	0.26	0.27	0.27	0.29	0.31	0.30	0.31	0.32	0.35
South West	148	160	183	200	206	218	255	278	300	315	350	4.8	0.21	0.22	0.24	0.24	0.23	0.24	0.26	0.27	0.28	0.29	0.33
UK	3,324	3,691	4,149	4,618	4,785	5,004	5,580	6,022	6,519	6,798 ^r	7,228	100.0	0.35	0.37	0.40	0.42	0.41	0.41	0.44	0.45	0.46	0.47	0.51

Source: DEL – Funding of Research paper

Notes:

1. Market price GDP estimated for the regions based on the UK GVA to GDP ratio.
2. r denotes revised figures.
3. Ranked by percentage of GDP 2009.

Appendix 2

Republic of Ireland – HERD as a percentage of GDP

	1998	2000	2002	2004	2006	2008
HE expenditure on R&D	N/K	N/K	€322m	€492m	€601m	€750m
HERD GDP Ireland	0.26%	0.23%	0.25%	0.33%	0.34%	0.39%

Source: DEL – Funding of Research paper



Northern Ireland
Assembly

Research and Library Service Research Paper

Paper 848-11

26 January 2012

NIAR 848-11

Aidan Stennett

R&D and Innovation – strategy and support in the UK, Scotland, Wales and Republic of Ireland

This paper examines the R&D and innovation strategy, funding and support mechanisms in operation at a national level in the UK and Republic of Ireland, and at a regional level in Scotland and Wales

Research and Information Service briefings are compiled for the benefit of MLAs and their support staff. Authors are available to discuss the contents of these papers with Members and their staff but cannot advise members of the general public. We do, however, welcome written evidence that relate to our papers and these should be sent to the Research and Information Service, Northern Ireland Assembly, Room 139, Parliament Buildings, Belfast BT4 3XX or e-mailed to RLS@niassembly.gov.uk

Key Points

- In all four regions examined R&D and innovation are viewed as key drivers of economic development and productivity growth.
- The UK and the Republic of Ireland have bespoke R&D and Innovation strategies. In Scotland and Wales these elements are woven into their current economic recovery strategies.
- Scotland and Wales have identified key sectors with which to secure economic growth.
- All regions offer, at regional level, a range of research funding and support. This is generally tailored to businesses size (i.e. whether SMEs or large companies) and targeted towards different stages in the R&D and innovation process – feasibility studies, pre-production development, prototype development and commercialisation.
- The national and regional policies of the areas examined also prioritise business-to-business and business-to-academia collaboration.
- Scotland targets research funding to SMEs in its Highlands and Islands through the Highlands and Island Enterprise R&D funding scheme. In Wales, local authorities fund SMEs through its Local Investment Fund.
- Scotland and the Republic of Ireland both use enterprise agencies to deliver aspects of their R&D and innovation programme. In Wales these functions have been taken over by the Department for Economic Development and Transport
- Investment finance is available in the UK through the Enterprise Capital Funds which is jointly funded by public and private money. Businesses in Wales may secure private investment through Finance Wales.
- In the UK the combined level of research grant funding by the seven Research Councils in the academic year 2011/12 is £1.2bn. The largest proportion of funding (£409m) is delivered through the Engineering and Physical Science Research Council. Five out of the seven Councils target approximately 50% of their total funding towards research grants.
- A key aspect of the Republic of Ireland's current policy is to encourage cross-border linkages and synergies, with a view to collaboration on EU funded projects (FP7). This may provide opportunities to businesses and academic institutions in Northern Ireland.

Executive Summary

UK

The UK's R&D and innovation strategy Innovation and Research Strategy for Growth (2010) is targeted at addressing the twin challenges of reducing the deficit and promoting growth'.

The strategy contains an array of actions which focus on: discovery and development, innovative business, knowledge and innovation, global collaboration and innovation challenges.

There are a wide variety of support mechanisms available to UK businesses:

- Knowledge transfer support;
- Virtual support networks;
- The Enterprise Europe Network;
- Business Innovation Centres;
- Science Parks; and
- Business Clusters.

Funding schemes open to all UK businesses include:

- The SMART Grant Programme offers three types of grants – Proof of Market; Proof of Concept; and Prototype development;
- Collaborative R&D – The Technology Strategy Board funds collaborative research under four themes – Challenge led innovation; technological-inspired innovation; the innovation climate; and working with partners. This scheme offers grant based, competitive funding.
- The Small Business Research Initiative funds SME s wishing to carry out feasibility studies and/or develop prototypes. This scheme offers grant based, competitive funding.
- Enterprise Capital Funds – provide equity finance to SMEs jointly funded by the public and private sector. The scheme is not directly targeted at R&D and innovation, but at encouraging enterprise and productivity growth.
- R&D Tax Credit - tax relief for R&D.

Academic funding in the UK is distributed by the seven Research Councils:

- The Arts and Humanities Research Council;
- The Biotechnology and Biological Sciences Research Council;
- The Engineering and Physical Science Research Council;
- The Economic and Social Research Council;
- Medical Research Council;
- The Natural Environment Research Council; and,
- Science and Technology Facilities Council.

The combined level of research grant funding for the seven councils in for the academic year 2011/12 is £1.2bn. The largest proportion of funding (£409m) is delivered through the Engineering and Physical Science Research Council. Five of the Councils target approximately 50% of their total funding towards research grants. The Science and Technology Facilities Council will target 25-30% of its funding over the next four years and the Natural Environment Research Council 40% over the same period.

Scotland

The current Scottish Economic Strategy (September 2011) has R&D and innovation woven into its strategic objectives. It seeks to:

- Support the development of innovation and its commercialisation;
- Invest in universities and the creative industries, and tailor Scottish life sciences to assist in the development of key sectors – creative industries; energy (including renewables); financial and business services; food and drink (including agriculture, and fisheries); life sciences; sustainable tourism; and universities;
- Develop a skills base that is responsive to the needs of business; and
- Support innovative low carbon technology to assist transition to a low-carbon economy.

The Scottish Department for Enterprise, Energy and Tourism 2011 revenue budget totalled £410.7m, including an allocation of £45.2m for the industry and technology grants, part of which was allocated to the SMART Scotland grant scheme (see below for further details). The same budget included £283.4m allocation to the region's enterprise bodies and an Innovation and Industries budget of £5.8m.

Delivery of R&D and innovation policy is facilitated by a number of agencies – the Scottish Science Advisory Council (SSAC), Scottish Enterprise (SE), Highlands and Islands Enterprise (HIE), and the Scottish Funding Council (SFC).

The role of the SSAC is to:

- Advise the Scottish Government's Chief Scientific Officer on specific issues and science related policy with a view to promoting economic growth; and,
- Ensure that its membership is drawn across a wide spectrum on stakeholders, including science, business and academia

SE is a Scottish development agency. The agency earmarked £22.3m funding for innovation during 2011/12. Further funding is also targeted to this area through the 'RSA and SMART support' (£43.2m) and the 'Commercialisation – Development & Exploitation of Intellectual Assets' (£16.3m) in the same year.

SE offers a range of grants and supports:

- SMART Scotland;
- R&D Grants;
- Seven Framework Programme ;
- R&D Tax Credits; and
- Advice; and
- Access to the Winning through Innovation Programme.

HIE is a development agency with a specific focus on the Highlands and Islands regions of Scotland. It offers the following finance and support:

- The HIE R&D funding scheme which funds fundamental research, industrial research and experimental development;
- The Small Business Research Initiative (SBRI);
- Grants of up to £5000 are available to businesses in the Highlands and Islands area to support collaborative projects between businesses and academia; and
- Supporting businesses to maximise the impact technology can have on their operations.

The Scottish Funding Council (SFC) is the main funding body for Scottish universities and colleges

University allocation for the academic year 2011/12 was £1.12bn. This funding was distributed across Scotland's 16 universities. The total funding consisted of:

- £129.5m of Horizon funding - which supports strategic initiatives in universities including research activities; and,
- £994.1m in general funding for core teaching activities

Wales

Current Welsh Assembly Government policy on R&D and innovation is outlined in the 2011 policy document Economic Renewal: A new direction.

Priority 4 includes a range of measures that are intended to encourage innovation and move Wales 'towards a more R&D intensive and knowledge-based economy where the right conditions exist for innovation to flourish'. It contains commitments to:

- Address under-used business incubation capacity; and
- Adopt a more focused approach, talking barriers to investment in R&D and innovation.

The Welsh Government's 2011 budget contained a revenue allocation of £3.16m for Encouraging Innovation. The budget for 2012 allocates £5.785m of revenue to Encouraging Innovation, representing an 83% increase on the previous year.

In 2006 the Welsh Development Agency was merged with the Welsh Assembly Government, with the responsibility for business support measures transferred to the Department for Economic Development and Transport.

The main funding stream for R&D in Wales falls under the banner of repayable finance, it is however, not repayable. Funding supports industrial research, experimental development, and exploitation.

Funding is also available at a local level through the Local Investment Fund, tailored toward SMEs. Private investment is facilitated through Finance Wales. Early stage finance is focussed upon technology businesses.

The Higher Education Funding Council for Wales distributes funding amongst the 11 Welsh universities

Funding for the three main areas of work is broken down as follows for the financial year 2011/12:

- Teaching – £284m;
- Research – £71m; and,
- Postgraduate Research - £5.2m.

Republic of Ireland

There are a number of actors involved in the setting of the RoI's research and innovation policy; the Department of Jobs, Trade and Innovation; Department of Education and Skills; the sub-departmental Office of Science, Technology and Innovation; the Cabinet Sub Committee on Science, Technology and Innovation; the Inter-departmental Committee on Science, Technology and Innovation; Chief Scientific Advisor; the Advisory Council for Science, Technology and Innovation; and the Innovation Taskforce Implementation Group.

The key strategy document Science for Technology and Innovation, published by the Department of Jobs, Trade and Innovation in 2006 contains measures which seek to promote:

- Academic research;
- Graduate schools;
- Commercialisation;
- Industrial research;
- Public sectoral research;
- Public awareness; and
- Cross-border and international cooperation.

In the RoI 50% of R&D funding is drawn from business enterprises, with the government providing 31% of funding.

Government funding of R&D, since 2000, peaked in 2008 when €942m was allocated, falling to €872 in 2010.

The largest share of Government funding in RoI (33.1%) is allocated to the higher education sector through the Higher Education Authority – €288.7m in 2010, made up of €136.2m (47%) through the HEA block grant and €49m (17%) through the Programme for Research in Third Level Institutions (PRTL).

Enterprise Ireland offers a range of funding and other mechanisms to support R&D and innovation in businesses and academia. Industry targeted funding includes:

- R&D Stimulation Grant;
- R&D Fund: Small Projects;
- R&D Fund: Large Projects;
- Innovative High Potential Start Up support;
- Funding for collaborate on Research and Development Projects with Colleges and/or Companies;
- Innovation Vouchers;
- R&D Advocates Scheme;
- Innovation Partnership Programme;
- Applied Research Enhancement;
- Technology Centres; and
- Support accessing FP7 funding and other EU streams.

IDA Ireland offers grant aid for RD&I projects including grants for RD&I Feasibility Studies and Training. Total funding for IDA R&D funding for 2010 was €82m.

Intertradelreland's Fusion programme offers €33,150 to companies to enable them to recruit 'a talented graduate to lead a business improvement project'. The agency's Innova programme offers companies a grant of up to €285,000 for carrying out an innovation programme in partnership with a company from Northern Ireland.

In addition, companies in RoI can avail of a 25% R&D tax credit.

Contents

- 1 Introduction
- 2 UK
 - 2.1 Policy
 - 2.2 Funding streams and support mechanisms for business
 - 2.3 R&D Funding at UK universities and Research Institutes
- 3 Scotland
 - 3.1 Policy
 - 3.2 Policy delivery and funding to business
 - 3.3 Policy delivery and funding to academia
- 4 Wales
 - 4.1 Policy
 - 4.2 Policy delivery and funding to business
 - 4.3 Policy delivery and funding to academia
- 5 Republic of Ireland
 - 5.1 Governance Structure
 - 5.2 Key Government Strategy
 - 5.3 Government Funding
 - 5.3.1 Support to Academia
 - 5.3.2 Support to Business

1 Introduction

The following paper examines the R&D and innovation strategy, funding and support mechanisms in operation at a national level in the UK and Republic of Ireland, and at a regional level in Scotland and Wales. The paper's central focus is on support to business, although academic funding is also examined.

2 UK

2.1 Policy

The Innovation and Research Strategy for Growth, published by the Department for Business, Innovation and Skill (December 2010), ‘builds on the UK’s recognised strengths, and sets out how [it] will work with business and the knowledge base to underpin private sector led growth’.¹

The strategy aims at building on measures previously introduced by the coalition government:

- £4.6bn ring-fence for science and research programme funding;
- A rebranding of Technology and Innovation Centres as Catapult Centres which will act as a ‘bridge between academia and business and to support the commercialisation of new technologies in sectors such as high-value manufacture, cell therapy and offshore renewable energy’; and,
- Increasing the Small Company R&D Tax Credit from 175% to 225% (note: the tax credit provided over £1bn in support in 2009/10, making it the largest single innovation support scheme in the UK).

Before outlining the measures which will build on the above the strategy outlines what the government view as the ‘the twin challenges of reducing the deficit and promoting growth’, the strategy states:

We have limited resources to invest, and must prioritise our investments into emerging technologies on the basis of rigorous criteria, and an independent assessment of UK capability to exploit their potential and succeed in global markets.

Additional challenges are also identified in creating government policy which ‘stimulates, rather than hinders, UK innovation’ in the areas of:

- Public procurement;
- Increasing access to public data; and
- Accepting the recommendations which arise from the Professor Hargreaves review of intellectual property.²

The key action outlined in the strategy, including lead agents of delivery and significant targets are outlined in Table 1. Key actions are divided into five broader categories: discovery and development, innovative business, knowledge and innovation, global collaboration and innovation challenges.³

1 The Department for Business, Innovation and Skills Innovation and Research Strategy for Growth <http://www.bis.gov.uk/assets/biscore/innovation/docs/i/11-1387-innovation-and-research-strategy-for-growth.pdf>

2 Ibid

3 Ibid

Table 1: UK Innovation and Research Strategy for Growth – key actions, agencies and dates

Action	Lead agency	Timescale
Discovery and development		
Invest over £200m between 2011-15 in Catapult centres (note: three Catapult centres have been announced in High-value manufacture, Cell Therapy and Offshore Renewables)	Technology Strategy Board (TSB)	Three further Catapult Centres will be announced in 2012, with all six being operational by 2013
Identify priorities for investment in emerging technologies through the TSB, initial focus will be on synthetic biology, energy efficient computing and energy harvesting	TSB	During 2012
Invest £50m in the development of the Graphene Global Research and Technology UB	Engineering and Physical Sciences Research Council (EPSRC & TSB)	To be fully operational by 2015
Innovative Businesses		
Raise the rate of tax relief for SME R&D to 225% of qualifying expenditure	BIS, HM Treasury (HMT)	By April 2012
Increase take up of tax credit by: working with HMT, HM Revenue and Devolved administrations to increase awareness and take-up of SME scheme; working with the design sector to raise awareness; and simplify the scheme by piloting a pre-approval scheme for small companies	HMT	Increase of SME scheme by 2014, begin pre-approval scheme 2011
Introduce an 'above the line' tax credit to encourage R&D activity in larger companies	HMT	Consultation at Budget 2012, with implementation 2013
Increase funding of the Designing Demand programme to £1.3m	Design Council (DC)	Up to 100 SMEs per year receiving design mentoring April 2012
Invest £25m in enabling large-scale demonstrators in areas such as integrated systems for cities	TSB	Demonstrators established by 2014
Deliver a Major conference in London 2012 around the Olympics to ensure investment for 'leading' innovative UK companies	BIS, US Dept of Commerce, British Venture Capitalist Association, National Venture Capitalist Association, NESTA, UK Trade and Industry, TSB	By July 2012

Innovative Businesses			
Establish, within the TSB, a team focussed on maximising support from the European Regional Development Fund (ERDF) to support innovation	TSB		Operational by 2012
Intellectual Property Office (IPO) to adapt training courses for advisors increase accessibly and to develop an online training tool	IPO		By March 2013
IPO to consult businesses, business advisors and Intellectual Property specialists on providing lower cost legal advice at paralegal level	IPO		By March 2013
IPO to redevelop its dispute resolution service to be more customer focussed	IPO		By March 2013
Sector Skills Council to improve skill levels including management and leaderships skills	Lantra & Improve Sector Skills Councils		During 2012
Enable innovation in power distribution	TSB		During 2012
Increase innovation in the UK water industry to increase ability to compete in overseas markets	TSB		During 2013
Support agri-food and utilities businesses to innovate including raising awareness of support from TSB and R&D Tax Credit	BIS, HMT, HMRC, Design Council, IPO		During 2012
Action		Lead agency	Timescale
Knowledge and Innovation			
Invest £158m to improve 'e-infrastructure' and 'make the UK a world leader in supercomputing research'	BIS		By March 2012 (for investment)
Implement new innovation voucher programme to support collaboration between SMEs and external knowledge providers	TSB		Invest £1m pa in staged implementation of programme in 2012-13 with first vouchers awarded 2012
Research and Funding Councils, in discussion with individual universities and consortia to develop a principles-based Framework for treatment and submission of multi-institutional funding bids	Research Councils		Published by February 2012

Action	Lead agency	Timescale
Launchpad support extended to develop clusters throughout UK	TSB	Three Launchpads to run in 2012
Introduce EU VAT cost-sharing exemption to enable universities and charities to ensure VAT is not incurred when services are shared	HMT	During 2012
Respond to the Wilson review of University-business collaboration	BIS	Spring 2012

Action	Lead agency	Timescale
Global Collaboration		
UKTI to deliver measures to assist innovative UK SMES to connect with overseas finance	UKTI	To be announce before end of 2011
Olympic Games to be used as a platform to showcase business research capabilities	UKTI	Programme of events to take place summer 2012
UKTI to launch online platform 'Open Export' to enable innovative companies to support on another	UKTI	Beta version launched 2012
Review of support system for UK businesses seeking EU funding in preparation for Horizon 2020	BIS and TSB	New system to be in place by Summer 2013
Establishment of an agreement with Chinese Ministry of Science and Technology to fund bilateral research projects	BIS, Research Council, TSB	Details and research calls 2012

Action	Lead agency	Timescale
New Innovation Challenges		
Consider and act on the recommendations of the Dame Janet finch Publications Working Group	BIS	Autumn 2012
Consider and act on the recommendations of the Alan Langlands Administrative Data Tack Force	BIS	Late 2012
Research Councils to develop online 'Gateway to Research' search facility	Research Councils	2013/14
Open Data Institute to be developed	TSB	Implementation plan April 2012
NESTA to develop UK Prize Centre and Prize fund to be directed at areas where innovation is most needed	NESTA	Centre to be established Spring 2012. first prize awarded 2013
Public sector to develop Procurement Centres Expertise for innovative products and services in key areas, initially focussing on sustainability and health care	BIS	At least one centre to be established by Summer 2012
Public Private Procurement Compacts to be developed in catering, heat and power, and low carbon vehicles	BIS	Compacts to be signed in Spring 2012
Design Council to deliver commissioning toolkit for government departments and public sector, as well as a training programme for senior civil servants	Design Council (DC)	During 2012
NESTA and ESRC to advance public sector understanding of 'evidence and the case for backing that works' via UK Alliance for Useful Evidence	NESTA and ESRC	Alliance launched and work plan in development

2.2 Funding streams and support mechanisms for business

A range of support mechanisms and funding streams are available to UK businesses. Support mechanisms include:

- Knowledge transfer support – mechanisms under this category are designed to help businesses benefit from the knowledge and expertise of academia and other businesses. A key aspect of this work is Knowledge Transfer Partnerships (KTPs). KTPs place recently qualified people (at NVQ level 4 or above) with businesses for between three weeks and ten years, to assist with product design, manufacturing, product or management processes, computing or management information. KTPs are part-funded by a government grant. SMEs would contribute approximately one third of the costs of the project (around £20,000, mostly contributing to employment cost). For businesses larger than SME size the costs of a long-term project increase to approximately £30,000.⁴
- Virtual support networks – virtual support networks are online portals which enable businesses to interact and share ideas. There are websites offering mutual support in specific sectors, the Innovators Council and Advisory Service for Scotland for example. However, the equivalent site for Northern Ireland, Business Innovation Link, is down, replaced by email contacts in Invest Northern Ireland.⁵
- The Enterprise Europe Network – provides advice and support to businesses throughout Europe on a range of topics – EU legislation, help in finding business partners, access to innovation networks, bringing together buyers and sellers of innovation ideas, and assistance in promoting new technology. The Network partners UK businesses. Their work includes: visiting companies to discuss their needs; identify technologies that could assist businesses; helping companies promote their innovations; helping companies make innovative products available to one another through technology transfer; advising on stages of technology transfer; developing R&D and innovation capacities of SMEs; and help businesses participate in research programmes and avail of funding, particularly Framework Programme Seven.⁶
- Business innovation centres (BICs) – BICs provide support to innovative businesses by providing; information on sharing premises with similar companies; advice management, strategy and planning; technology help; assistance in finding manufacturers and markets for innovative products; training and mentoring; and access to training.⁷
- Science Parks – Science Parks bring together knowledge-based businesses. They offer support including: help with premises; technology expertise; and business services (from advice of intellectual property to cleaning facilities). Science Parks are funded by a mixture of local, regional, national and European funds. The parks differ in their aims, with different types in operation, for example: incubator parks support new businesses; industry specific science parks specialise in a particular sector; and research parks specialise in R&D. The parks have links with centres of knowledge creation (e.g. universities) in areas such as: technology transfer; sourcing venture capital; student placements; and marketing assistance.⁸

4 Knowledge Transfer Partnerships, How does it work? <http://www.ktponline.org.uk/how-does-ktp-work>

5 Business Link Virtual Support Networks <http://www.businesslink.gov.uk/bdotg/action/detail?itemId=1075084775&type=RESOURCES>

6 Business Link The Enterprise Europe Network <http://www.businesslink.gov.uk/bdotg/action/detail?itemId=1074419297&type=RESOURCES>

7 Business Link Business Innovation Centre <http://www.businesslink.gov.uk/bdotg/action/detail?itemId=1074419384&type=RESOURCES>

8 Business Link Science Parks <http://www.businesslink.gov.uk/bdotg/action/detail?itemId=1078965315&type=RESOURCES>

- Chambers of Commerce – Chambers of Commerce throughout the UK provide access to services including: training; information; resources; networking; and saving on overheads. They also offer a conduit to informal networks, often with an industry-specific orientation.⁹
- Business Clusters – the UK government offers support for clusters including: assisting companies to access a skilled workforce; universities; good sites; and investment capital.¹⁰

UK business may also avail of a number of funding schemes:

- The SMART grant, facilitated by the Technology Strategy Board (TSB), is open to UK SMEs in any sector. It has three strands:
 - Proof of Market Grant – enables companies to assess: the commercial viability of a project through market research; market testing and competitor analysis; their intellectual property position; and assistance with the initial planning phases. Projects can last up to nine months, with maximum grants of up to £25,000 or 60% of total costs available.
 - Proof of Concept Grant – enables SMEs to explore the technical feasibility and commercial of a new technology, product or process. The following activities are funded: initial feasibility studies; basic prototyping; specialist testing and/or demonstration to provide basic proof of technical feasibility; intellectual property protection; and the investigation of production or assembly options. Projects can last up to 18 months, with a maximum grant of £100,000 or 60% of total costs available.
 - Development of Prototype Grant – enables SMEs to fund the following activities: small demonstrations; intellectual property protection; trials and testing; and market testing. Projects can last up to two years with maximum grants of £250,000 available, or 35% of project costs for small business, and 45% for medium sized businesses.¹¹

The grants available are matched funded ensuring that businesses must find alternative funding for the remaining projects. Pre-start-up companies can receive funding, along with university spin-out companies that are less than 50% owned by their academic partner.¹²

- Collaborative R&D – the TSB runs regular competitions for funded collaborative research projects. Between 2004 and June 2007 600 projects had been supported, with an investment in excess of £1bn. Projects are published on the TSB's competition webpage. The level of funding available, project types and lengths vary on a per competition basis. The projects fall under the TSB's four strategic areas:
 - Challenge-led innovation – addressing the challenges facing society and the economy;
 - Technological-inspired innovation – supporting core-expertise and leading edge technologies; and
 - The innovation climate – fostering national confidence in the innovation to create and provide economic growth; and
 - Working with partners – the Board works closely with other bodies, combining and focusing resources; activities are often jointly funded with research councils,

9 Business Link Chambers of Commerce <http://www.businesslink.gov.uk/bdotg/action/detail?itemId=1074419547&type=RESOURCES>

10 Business Link Business Clusters <http://www.businesslink.gov.uk/bdotg/action/detail?itemId=1084674502&type=RESOURCES>

11 The Technology Strategy Board SMART <http://www.innovateuk.org/deliveringinnovation/smart.ashx>

12 The Technology Strategy Board SMART FAQs http://www.innovateuk.org/_assets/smart%20faqs.docx

government departments, regional development agencies and the devolved administrations of Scotland, Wales and Northern Ireland.¹³

- The Small Business Research Initiative (SBRI) – The SBRI is also facilitated by the TSB. Through the TSB government departments run competitions to seek solutions to specific problems. Successful applicants receive fully funded development contracts with departments. The business retains any intellectual property rights. Projects receive funding in two phases:
 - Phase 1 – demonstration of scientific, technical and commercial feasibility: projects last six months, with grants of between £50,000 and £100,000 available. Projects are then assessed for Phase 2, not all projects will progress to the second phase.
 - Phase 2 – prototype development: projects last up to two years, with funding of between £250,000 and £1m available. Once Phase 2 is complete, business can commercialise their product and offer it to government departments and others under procurement procedures.¹⁴
- Enterprise Capital Funds (ECF) – ECF funds are designed to address equity gaps. They take the form of public and private money and provide equity finance to SMEs. They are, however, temporary funds and subject to specific deadlines. The ECF has no specific regional or sectoral targets, nor is it specifically a research and development/innovation focussed project. Rather it is targeted at encouraging enterprise and productivity growth. The government will contribute up to £25m to a specific fund, or twice the private capital, whichever is lower. There is a limit of £2m for each investment under the fund. An ECF 'may only invest in an SME where the purpose of the relevant investment is, or the application of the proceeds of such investment by the relevant company or undertaking shall be, predominantly related to or for the benefit of the economy of the UK'. In other words 'investments will need to be in UK based SMEs or to fund the UK operations of SMEs'. There are nine EDFs in operation, facilitated by the following firms:
 - IQ Capital Fund;
 - 21st Century Sustainable Technology Growth Fund;
 - The Seraphim Capital Fund;
 - The Amadeus Enterprise Fund;
 - The Catapult Growth Fund;
 - Dawn Capital ECF;
 - Oxford Technology Management ECF;
 - MMC Venture Managers;
 - Panoramic Growth Equity; and
 - Passion Capital.¹⁵
- R&D Tax Credit - tax relief for R&D. Two schemes are in operation, one for companies with less than 500 full-time staff (the 'SME scheme') and one for large companies. The 2011 Budget announced that rate of relief for SMEs would increase from 175% to 200% of qualifying R&D expenditure when calculating profit for corporation tax purposes from April 2011. There will also be a further increase to 225% from April 2012. Businesses not in profit could qualify for a cash payment of about 24.5% for every pound of expenditure

13 Technology Strategy Board Collaborative R&D <http://www.innovateuk.org/deliveringinnovation/collaborativeresearchanddevelopment.ashx>

14 Technology Strategy Board The Small Business Research Initiative <http://www.innovateuk.org/deliveringinnovation/smallbusinessresearchinitiative.ashx>

15 Department for Business, Innovation and Skills Enterprise Capital Fund <http://www.bis.gov.uk/policies/enterprise-and-business-support/access-to-finance/enterprise-capital-funds>

on qualifying R&D. Larger companies can claim relief of up to 130% of qualifying expenditure.¹⁶

2.3 R&D Funding at UK universities and Research Institutes

Research Councils in the UK invest approximately £3bn per year into university and research institute research. The councils fund within a broad set of subject disciplines:

The Arts and Humanities Research Council's, over the period 2011 to 2015, will focus on:

- History research which improves understanding of intellectual development and of the creative output of the UK's heritage and the heritage of countries with which the UK engages with diplomatically, culturally and economically.
- Research that encourages better communications with partner and competitor nations and with the UK's multi-cultural communities.
- Arts and humanities research that influences public policy and community cohesion;
- Supports and refreshes creative arts traditions; and
- Builds capacity in endangered areas of heritage science and increases the roll of culture in economic regeneration.¹⁷

Table 2 provides a breakdown of funding in the Arts and humanities over the period 2011/12 to 2014/15. In each year research funding accounts for over 50% of total funding. It is notable that actual research grant funding is predicted to fall for four consecutive years.

Table 2: Arts and Humanities Research Council Programme Allocation 2011-2015¹⁸

	2011/12		2012/13		2013/14		2014/15	
	£m	%	£m	%	£m	%	£m	%
Research	51.2	51	51.1	52	51	52	50.9	52
Postgraduate	44.1	44	42.6	43	42.6	43	42.6	43
International Engagement	1.3	1	1.3	1	1.3	1	1.3	1
Dedicated Knowledge Exchange	3.5	4	3.6	4	3.7	4	3.8	4
Resource Income	-0.23	-	-0.23	-	-0.23	-	-0.23	-
Resource Total	99.9	-	98.4	-	98.4	-	98.4	-

The Biotechnology and Biological Sciences Research Council's (BBSRC) research priorities in the period 2010 to 2015 are:

- Food security – bioscience for sustainable supply of sufficient, affordable, nutritious and safe food;
- Bioenergy and industrial biotechnology – developing biofuels and industrial materials from novel biological resources, reducing dependency on petrochemicals and aiding the development of a low carbon economy in the UK;

16 NI Business Info R&D Tax Credit <http://www.nibusinessinfo.co.uk/bdotg/action/detail?itemId=1086266055&site=191&type=RESOURCES> (accessed 21/09/11)

17 Arts and Humanities Research Council Delivery Plan 2001-2015 <http://www.ahrc.ac.uk/About/Policy/Documents/DeliveryPlan2011.pdf>

18 Ibid

- Basis bioscience underpinning health – facilitating advances in fundamental biosciences for better health and improved quality of life.¹⁹

Table 3 provides a breakdown of the BBSRC funding for the period 2011 to 2015. Planned research funding is in excess of 50% for each year. It is notable that the research grant funding is predicted to fall for three consecutive years and remain flat for the fourth year.

Table 3: Biotechnology and Biological Sciences Research Council Programme Allocation 2011-2015²⁰

	2011/12		2012/13		2013/14		2014/15	
	£m	%	£m	%	£m	%	£m	%
Research Grants	210	57	203	57	198	56	198	56
Institute specific programme grants	57	15	54	15	53	15	51	15
Studentships	51	14	51	14	49	14	49	14
Fellowships	9	2	9	3	7	2	6	2
Multi-user, Council owned or sponsored national facilities	22	6	22	6	22	6	22	6
National infrastructure - Pirbright	6	2	6	2	6	2	6	2
International Subscriptions	1	0	1	0	1	0	1	0
Knowledge Exchange facilities	20	5	25	7	27	8	30	9
Resource income	-6	-	-12	-	-12	-	-12	-
Resource Total	370	-	359	-	351	-	351	-

The Engineering and Physical Science Research Council's (EPSRC) research priorities for the period 2011 to 2015 including:

- National Capability – support for long-term disciplinary and multi-disciplinary research in engineering and physical sciences;
- Maintaining the flow of skilled researchers – support for the most talented and forward thinking researchers and investment in the next generation of scientists and engineers;
- Large-scale research facilities – ensuring access to 'large-scale infrastructure, facilities and equipment' to facilitate internationally-leading engineering and physical science research;
- Global economic and societal challenge themes – sponsorship of research which seeks to address the challenges facing the UK, including building a strong economy, producing sustainable energy, developing an integrated infrastructure and healthy society;

¹⁹ The Biotechnology and Biological Sciences Research Council Strategic Plan: overview <http://www.bbsrc.ac.uk/publications/planning/strategy/strategy-overview.aspx>

²⁰ The Biotechnology and Biological Sciences Research Council Delivery Report 2011-2015 http://www.bbsrc.ac.uk/web/FILES/Publications/delivery_plan_2011_2015.pdf

- Cross-council themes – developing partnerships with other research councils to integrate the contribution of research in engineering and physical sciences with cross-council themes: living with environmental change; and global uncertainties.

Table 4 provides a breakdown of EPSRC's funding over the period 2011 to 2015. Research grant funding is predicted to be above 50% of total funding for three consecutive years, falling to just below 50% for the fourth year. Actual research grant funding allocation is predicted to decrease across the four years of the delivery plan.

Table 4: EPSRC programme allocation 2011 to 2015

	2011/12		2012/13		2013/14		2014/15	
	£m	%	£m	%	£m	%	£m	%
Research grants	409	53.8	385	51.5	382	51.1	372	49.7
Studentships	133	17.5	137	18.3	138	18.4	142	19.0
Fellowships	44	5.8	44	5.9	44	5.9	46	6.1
Multi-user council owned/ sponsored facilities (HPC)	11	1.4	11	1.5	11	1.5	11	1.5
International subscriptions	0	-	0	-	0	-	0	-
Knowledge transfer activities (excluding ETI)	152	20.0	156	20.9	154	20.6	154	20.6
ETI	15	2.0	17	2.3	19	2.5	21	2.8
Programme operations	12	1.6	12	1.6	12	1.6	12	1.6
Co-funding	-12	-	-11	-	-10	-	-8	-
Earned income	-4	-	-3	-	-2	-	-2	-
Resource Total	760	-	748	-	748	-	748	-

The Economic and Social Research Council's (ESRC) strategic priorities for the period 2011 to 2015 are:

- Economic performance and sustainable growth;
- Influencing behaviour and informing interventions; and
- A vibrant fair society.²¹

21

ESRC Our mission, strategy and priorities <http://www.esrc.ac.uk/about-esrc/what-we-do/mission-strategy-priorities/index.aspx>

Table 5 provides a breakdown of total ESRC programme allocations for the period 2011 to 2015. Total research funding is predicted to above 50% of total programme allocations for the period. The amount allocated to research is set to increase year-on-year for the first three years of the programme period, and flat in the final year.²²

Table 5: ESRC Programme allocation 2011 to 2015²³

	2011/12		2012/13		2013/14		2014/15	
	£m	%	£m	%	£m	%	£m	%
Responsive Research	48	30.8	48	31.4	48	31.4	48	31.4
Strategic and Collaborative Research	33.4	21.4	35	22.9	37	24.2	37	24.2
Total Research	81	52.2	83	54.2	85	55.6	85	55.6
Training and Skills	48	30.8	47	30.7	45	29.4	45	29.4
Knowledge Exchange, Impact and Evaluation	8.2	5.3	8.2	5.4	8.2	5.4	8.2	5.4
Methods and Infrastructure	10.3	6.6	7.3	4.8	4.3	2.8	4.3	2.8
Other Programme and International	7.8	5.0	7.8	5.1	7.8	5.1	7.8	5.1
Total	155.8	-	153	-	153	-	153	-

The research priorities of the Medical Research Council (MRC) for the period 2011 to 2015 are:

- Resilience and replacement;
- Living a long and health life;
- Bringing the benefits of excellent research to all sections of society;
- Accelerating progress in international health research; and,
- Sustaining a robust and flourishing environment for world-class medical research.²⁴

The MRC's budget allocations (excluding capital allocations) are outlined in Table 6. Research grants contribute to just below 50% of total resource allocation in the first two years, increasing to just above 50% for the remaining two years. Actually resource grant allocation increases year-on-year for each of the four years.

22 ESRC Delivery plan 2011 to 2015 http://www.esrc.ac.uk/_images/ESRC%20Delivery%20Plan%202011-15_tcm8-13455.pdf

23 Ibid

24 MRC delivery Plan 2011 to 2015 http://www.mrc.ac.uk/consumption/idcplg?IdcService=GET_FILE&dID=30667&dDocName=MRC007642&allowInterrupt=1

Table 6: MRC programme resource allocation 2011 to 2015²⁵

	2011/12		2012/13		2013/14		2014/15	
	£m	%	£m	%	£m	%	£m	%
Grants	265	49.4	271	49.6	290	51.8	291	50.6
Studentships	23	4.3	24	4.4	25	4.5	26	4.5
Fellowships	59	11.0	61	11.2	65	11.6	65	11.3
Units	214	39.9	210	38.5	210	37.5	210	36.5
International Subs	21	3.9	20	3.7	20	3.6	21	3.7
Restructuring	-	-	-	-	-	-	-	-
LMB Transition	2	0.4	4	0.7	-	-	-	-
UKCMRI Transition	-	-	6	1.1	-	-	14	2.4
Contingency	1	0.2	1	0.2	1	0.2	1	0.2
Net Earned income	-49	-	-51	-	-52	-	-53	-
Total Resource programme	536	-	546	-	560	-	575	-

The Natural Environment Research Council's (NERC) priorities for the period 2011 to 2015 are:

- Increase focus on strategic research;
- Increase economic and social benefit;
- Attract and retain top talent to the UK;
- Transform delivery of national capacity; and
- Shift resources into front line science.

Table 7 outlines the NERC's programme resource allocations (excluding capital funding) for the same period. For the first two years of the allocation period research grants account for below 40% of total resource allocation, rising to 41% in year three and 45% in year four. Total resource allocation rises year-on-year for each of the four years.²⁶

Table 7: NERC Programme resource allocation 2011 to 2015²⁷

	2011/12		2012/13		2013/14		2014/15	
	£m	%	£m	%	£m	%	£m	%
Research grants	115	38.5	117	39.4	123	41.0	130	45.0
Doctoral Studentships	21	7.0	23	7.7	23	7.7	23	8.0
Masters	2	0.7	0	-	0	-	0	-
Fellowships	10	3.3	10	3.4	10	3.3	10	3.5
Institutes Programme Costs	191	63.9	186	62.6	183	61.0	161	55.7
Multi-user Council Facilities	1	0.3	3	1.0	1	0.3	2	0.7
International Subscriptions	6	2.0	6	2.0	6	2.0	5	1.7
Knowledge Exchange Activities	10	3.3	9	3.0	9	3.0	10	3.5
Organisation Restructuring	0	-	0	-	0	-	0	-
Resource Income	-42	-	-40	-	-38	-	-38	-
Co-funding Income	-16	-	-16	-	-16	-	-14	-
Total Resources	299	-	297	-	300	-	289	-

The Science and Technology Facilities Council (STFC) strategic priorities for the period 2011 to 2015 are:

- World class research;
- Innovation; and
- Skills.

Its aim is to 'sustain the UK's position as a global scientific nation, by strengthening the potential of the UK's physics sector to provide economic growth, high-value employment and inward investment'. Table 8 outlines the STFC resource allocations for the period 2011 to 2015. The resource allocation for research grants equates to just above 18% of total resource allocation for the first two years and just above 19% for the remaining two years. Total resource allocation on research grants falls from the first to the second year, but increases in years three and four.²⁸

²⁶ NERC Delivery Plan 2011 to 2015 <http://www.nerc.ac.uk/about/perform/documents/deliveryplan201012.pdf>

²⁷ Ibid

²⁸ STFC Delivery Plan 2011 to 2015 <http://www.stfc.ac.uk/resources/pdf/DP2011-15.pdf>

Table 8: STFC Programme Resource Allocation 2011 to 2015²⁹

	2011/12		2012/13		2013/14		2014/15	
	£m	%	£m	%	£m	%	£m	%
Institute programmes costs	116.65	31.04	93.21	25.12	88.4	23.55	87.21	22.67
International Subscriptions	108.6	28.90	119.52	32.22	121.7	32.43	123.07	31.99
Studentships	19.54	5.20	18.49	4.98	18.11	4.83	18.48	4.80
Fellowships	9.2	2.45	8.7	2.35	8.52	2.27	8.7	2.26
Research Grants	69.38	18.46	67.22	18.12	71.78	19.13	74.9	19.47
Facilities	87.77	23.35	86.78	23.39	87.41	23.29	94.17	24.48
Innovations, Campus Development and Collaborative programmes	13.69	3.64	20.27	5.46	21.69	5.78	20.6	5.35
Income	-49	-	-43.19	-	-42.29	-	-42.51	-
Total resource	375.83	-	371	-	375.31	-	384.73	-

3 Scotland

3.1 Policy

The current Scottish Economic Strategy (September 2011), whilst not exclusively or explicitly focussed upon R&D and innovation, does have the two concepts woven into its objective strands. R&D and innovation are situated within a number of broader strategic objectives:

- Developing a supportive business environment;
- Learning skills and wellbeing;
- Transition to a low carbon economy; and
- Infrastructure development.³⁰

Innovation and commercialisation takes a central role within the developing a supportive business environment objective. They are identified as 'key drivers of productivity and competitiveness, particularly in an increasingly interconnected global economy'. They are also viewed as tools which can 'create new products, new services and jobs in existing industries and industries of the future'.

Actions to support the development of innovation and commercialisation include the:

- Launch of a Scotland-wide interface to provide business with a central point via which they can access academia;
- Streamlining of support offered by the two enterprise agencies – Scottish Enterprise and Highlands and Islands Enterprise (more details are below);
- Introduction of a new approach to improve leadership and management skills;

29 Ibid

30 The Government Economic Strategy <http://www.scotland.gov.uk/Resource/Doc/357756/0120893.pdf>

- Development of an innovative culture, with a specific focus on the public sector. For example, the Scottish Government will examine ways to encourage innovation within the NHS;
- Further development of research pools – which focus on the sharing of research resources and infrastructure across universities and supporting university collaboration with SMEs;
- Engagement with European Commission to ensure the design of Horizon 2020 ‘complements Scotland’s research and innovation strengths’.³¹

A focus on stimulating growth industry sectors is also situated within the developing a supportive business objective. The sectors identified as growth areas are: creative industries; energy (including renewables); financial and business services; food and drink (including agriculture and fisheries); life sciences; sustainable tourism; and universities. R&D and innovation measures which fall within this sub-category include:

- Supporting investment in the creative industries through ‘Creative Scotland’;
- Investing in universities;
- Maintaining Scotland’s ‘world leading position in university research and maximising its contribution to increasing sustainable economic growth’;
- Tailoring Scotland’s life sciences to global trends in health care, wellbeing, demographics.

The drive to create an education system ‘that is responsive and aligned to demand’, which forms part of the learning skills and wellbeing objective, is, although not directly targeted at encouraging R&D and innovation, likely to have a positive impact on its development. A key goal within this sub-objective is:

...to support employers by better understanding and assessing the skills required for future success and ensuring that the supply of skills, training and qualifications is sufficiently responsive.

To achieve this, the strategy sets out a range of actions which are targeted at up-skilling the population. These include:

- Working with Scotland’s colleges and universities to enable them to respond quickly and flexibly to employer demand;³²
- To prioritise skill development based on key sectors which support growth – these sectors are aligned with the growth industries identified above: creative industries; energy (including renewables); financial and business services; food and drink (including agriculture and fisheries); life sciences; sustainable tourism; and universities. Skill development is underpinned by the recognition that skills are ‘essential to innovation’ and that a ‘better education and skills base has the potential to translate into more scientists, analysts, technicians, and inventors; working to increase the stock ledge via the development of new processes and technologies’;³³ and
- Ensuring Scottish colleges and universities can respond quickly and flexibly to employer demand and new economic challenges and opportunities.³⁴

Within the broad objective transition to a low carbon economy the strategy highlights the importance of:

...supporting innovative low-carbon technologies and funding innovation (in particular in the energy, transport and building, waste, water and environmental management sectors)...

31 Ibid

32 The Government Economic Strategy <http://www.scotland.gov.uk/Resource/Doc/357756/0120893.pdf>

33 Skills for Scotland Accelerating the Recovery and Increasing Sustainable Economic Growth (2010) <http://www.scotland.gov.uk/Resource/Doc/326739/0105315.pdf>

34 The Government Economic Strategy <http://www.scotland.gov.uk/Resource/Doc/357756/0120893.pdf>

[in]...providing the Supportive Business Environment that is required to make the most of these growth opportunities.

Furthermore the action outlined in the learning, skills and well-being objective are viewed as a way in which to facilitate the growth of these technologies.

In addition to the above measures, the infrastructure development measures outlined in the strategy include a range of measures for enhancing Scotland's digital infrastructure in order to (amongst other reasons) support innovation in the digital economy.

3.2 Policy delivery and funding to business

The Scottish Department for Enterprise, Energy and Tourism 2011 revenue budget totalled £410.7m, including an allocation of £45.2m for the industry and technology grants, part of which was allocated to the SMART Scotland grant scheme (see below for further details). The same budget included £283.4m allocation to the region's enterprise bodies and an Innovation and Industries budget of £5.8m.³⁵

The enterprise body budget is intended to encourage Scottish enterprises to:

- Internationalise, invest in innovation, and commercialise innovation;
- To provide finance through the Scottish Investment Bank; and,
- To support businesses in developing their leadership and workforce.³⁶

The Innovation and Industry budget funds Scottish Executive Expertise, Knowledge and Innovation Transfer and Knowledge Transfer Partnerships, and the Innovators Counselling and Advisory Service for Scotland.³⁷

In 2012, the industry and technology grants budget was transferred into the Enterprise Bodies budget line. The total budget for Enterprise Bodies for 2012 is forecast at £320m. The Innovation and Industries budget will remain at £5.8m for 2012.³⁸

Delivery of R&D and innovation policy is facilitated by a number of agencies – the Scottish Science Advisory Council (SSAC), Scottish Enterprise (SE), Highlands and Islands Enterprise (HIE), and the Scottish Funding Council (SFC).

Scottish Science Advisory Council

The role of the SSAC is to:

- Advise the Scottish Government's Chief Scientific Officer on specific issues and science related policy with a view to promoting economic growth;
- Ensure that its membership is drawn across a wide spectrum on stakeholders, including science, business and academia.³⁹

The work of SSAC is conducted through two sub-groups the Science Education sub-group and the Innovation sub-group. The Science Education sub-group is currently engaged in work which is aimed at enhancing the links between schools, universities and businesses. Current work by the Innovation sub-group seeks to investigate ways in which the Scottish economy might

35 Scottish Government Scottish Spending Review 2011 and Draft Budget 2012-2013 (September 2011) <http://www.scotland.gov.uk/Publications/2011/10/04153155/0>

36 Ibid

37 Ibid

38 Ibid

39 The Scottish Science Advisory Council <http://www.scottishscience.org.uk/>

grow through innovation investment. In 2009 the SSAC published 'Business R&D in Scotland – A missing link' which contained the following recommendations:

- Business should be encouraged to recognise the value of R&D;
- The Scottish Government should incentivise business R&D and 'strengthen the pipeline of support mechanisms' to business;
- Constraints on knowledge-transfer partnerships between universities and businesses should be removed;
- Proof of concept support should be expanded to include business innovation;
- The Government and Scottish Enterprise should introduce measures to enhance management skills in business R&D;
- A toolkit which supports business R&D manager in their decision making process should be introduced;
- Research should be carried out to enhance the understanding of R&D in the service sector; and
- Develop a public forum for information dissemination and consensus building to encourage greater investment in business R&D.⁴⁰

Scottish Enterprise

SE is a Scottish development agency. The agency earmarked £22.3m funding for innovation during the first year (2011/12) of its current business plan (the plan will run from 2011 to 2014). Further funding is also targeted to this area through the 'RSA and SMART support' (£43.2m) and the 'Commercialisation – Development & Exploitation of Intellectual Assets' (£16.3m) in the same year. The business plan set the following targets under the broad category of innovation over its lifespan:

- Between £65m to £75m of additional business R&D investment from SE-assisted projects (R&D and SMART grants);
- 350-450 companies introducing new products/services/process that generate significant value;
- Increased leverage of collaborative R&D funds from other public sources (Technology Strategy board, Framework programme 7 and Small business Research Initiative); and
- Number of companies accessing key sector market intelligence initiatives.

SE offer specific support and funding for innovation and R&D through a number of instruments:

- SMART Scotland – programme which offers support of up to 75% of project costs for technical and commercial feasibility studies (projects should last between six and 18 months, an upper limit of £100,000 is placed on grants) and up to 35% of project costs for R&D projects which seek to develop pre-production prototypes of new products or processes (projects should last 6 to thirty-six months, a maximum grant of £600,000 is available and projects must have project costs of above £75,000). SMEs meeting the eligibility criteria may apply for a R&D grant irrespective of whether they receive feasibility study support. Between April 2008 and September 2011 approximately £16.7m in funding has been issued by SE to businesses through the SMART programme. In the six months

40 The Scottish Science Advisory Council Business R&D in Scotland – a missing link (August 2009) <http://www.scottishscience.org.uk/sites/default/files/article-attachments/SSAC-Report-business-R%26D-in-Scotland-A-missing-link.pdf>

between April and September 2011 £1.975m was provided to companies through the SMART programme.⁴¹

- R&D Grants – grants are provided in two categories – industrial research and experimental development. Projects receiving funding last between six to 36 months. Funding levels are differentiated by company size and project cost: 45% of project cost for SMEs with a maximum of grant of £40,000; 35% of project cost for SMEs with grants in excess of £40,000; and, 25% of project cost for large companies receiving all grant sizes. A positive impact on R&D jobs must be demonstrated in order to receive a grant in excess of £40,000. All companies receiving grants (of any size) must demonstrate the commercial prospects of the end product, that they have the necessary managerial and technical expertise (either bought-in or in-house) and that financial assistance is essential. In the six months between April and September 2011 £2.5m was provided to companies through the R&D Grant.⁴²
- The Technology Transfer Board (TSB) – proposals are currently being sought for a TSB/ SE £15m fund for enabling technology. Funding of £250k to £500k is available for collaborative projects led by business;
- Seven Framework Programme (FP7)– SE can offer advice to client on accessing FP7 funding; and,
- R&D Tax Credits – UK wide tax credits are available to Scottish firms engaging in R&D.

SE also offers companies:

- Advice on: funding high-risk and speculative projects; evaluating ideas and examining potential markets; support to deal with ideas regulation and protection; and, developing new approaches to processes and improve productivity;⁴³ and
- Access to the Winning Through Innovation Programme, a series of events designed to aid companies in bringing their products to market – event topics include using social media as a marketing tool, how to get customers to endorse a business, and inbound marketing.⁴⁴

Highlands and Islands Enterprise

HIE is a development agency with a specific focus on the Highlands and Islands regions of Scotland.⁴⁵ The agency has a client base of 350 companies deemed to be high-growth companies with a view to developing trade on a national and international level. The also support high-growth start-ups.⁴⁶ HIE act as a conduit to SMART Scotland, TSB and FP7 funding offering advice on how to access the scheme and promoting them with their region. In addition, HIE offer funding through the following streams:

- The HIE R&D funding scheme: a scheme which funds fundamental research, industrial research and experimental development.⁴⁷ In the past year approximately £385k has

41 Scottish Enterprise SMART Scotland <http://www.scottish-enterprise.com/fund-your-business/Innovation-and-RD-grants/SMART-SCOTLAND.aspx>

42 Scottish Enterprise R&D Grant <http://www.scottish-enterprise.com/fund-your-business/Innovation-and-RD-grants/RD-Grant.aspx>

43 Scottish Enterprise, Grow your business – innovation <http://www.scottish-enterprise.com/grow-your-business/innovation.aspx>

44 Scottish Enterprise Winning through innovation <http://www.scottish-enterprise.com/grow-your-business/innovation/innovation-events.aspx>

45 Highlands and Islands Enterprise About us <http://www.hie.co.uk/about-hie/about-hie/what-we-do.html>

46 Conversation with Highlands and Islands Enterprise 10 January 2012

47 Highlands and Islands Enterprise Funding programmes for research and development <http://www.hie.co.uk/support-for-business/innovation/research-and-development.html>

been provided to businesses through the schemes. Over the last three years the total is £1.4m⁴⁸; and,

- The Small Business Research Initiative (SBRI): a scheme that provides SME's with greater access to Research and Development opportunities by facilitating access to Government departments procurement (see section 2 for further details).

The agency provides support to businesses wishing to access knowledge transfer networks, through the Interface matchmaking scheme and by facilitating partnerships between academia and business. Grants of up to £5000 are available to businesses in the Highlands and Islands area to support collaborative projects between businesses and academia.⁴⁹

In addition HIE has developed partnerships with Massachusetts Institute of Technology's Sloan School of Management to deliver a Business Growth Programme and a new Sectoral Acceleration Programme in order to embed a culture of innovation amongst businesses and business support organisations.⁵⁰

The agency also supports businesses in maximising the impact technology can have on their operations.⁵¹

3.3 Policy delivery and funding to academia

Scottish Funding Council

The Scottish Funding Council (SFC) is the main funding body for Scottish universities and colleges. It provides funding for teaching, research and other activities to 41 colleges and 19 universities and higher education institutes.

The SFC delivers approximately £1.5bn directly to universities and colleges annually for teaching, learning, research and other activities in support of Government priorities.

University allocation for the academic year 2011/12 was £1.12bn. This funding was distributed across Scotland's 16 universities. The total funding consisted of:

- £129.5m of Horizon funding - which supports strategic initiatives in universities including research activities; and,
- £994.1m in general funding for core teaching, research and knowledge transfer activities.⁵²

College funding in the period totalled £564.1m, spread across 41 colleges. The total fund consisted of:

- £421m – teaching grant;
- £78.7m – bursary support; and
- £16.9m – discretionary funds and childcare.

48 Conversation with Highlands and Islands Enterprise 10 January 2012

49 Highlands and Islands Enterprise Knowledge Transfer I <http://www.hie.co.uk/support-for-business/innovation/knowledge-transfer/knowledge-transfer.html>

50 Highlands and Islands Enterprise End year performance 2009-10 <http://www.hie.co.uk/common/handlers/download-document.ashx?id=aac38e38-8174-4f07-b300-2db08415f691>

51 Highlands and Islands Enterprise Technology <http://www.hie.co.uk/support-for-business/innovation/technology.html>

52 Scottish Funding Council University funding http://www.sfc.ac.uk/funding/universities/allocation_university_funding/university_funding_allocations.aspx

4 Wales

4.1 Policy

Current Welsh Assembly Government policy on R&D and innovation is outlined in 2011 policy document Economic Renewal: A new direction. Priority 4 includes a range of measures that are intended to encourage innovation and move Wales 'towards a more R&D intensive and knowledge-based economy where the right conditions exist for innovation to flourish'. A number of desired outcomes have been identified with specific commitments made which are designed to meet these outcomes.⁵³

Commitments made to 'address under-used business incubation capacity' include:

- Reviewing the Technium approach (note: the Technium refers to innovation centres);
- Close Technium facilities that are not securing a 'good return overall';
- Encourage academia to build capacity to meet the needs of business, with a focus on six key sectors – ICT, energy and the environment, advanced materials and manufacturing; creative industries; life sciences; and financial services and professional services.
- Encourage collaboration between researchers across Higher Education (HE) institutes, and to increase the capacity of the Welsh HE sector as a whole to participate in higher value research contracts and increase the quality of competitive bids;
- Promote Wales as a place for innovation and as a destination for knowledge based business;
- Work with business to develop their innovative capacity;
- Encourage HE institutes to put review mechanisms in place to ensure more successful research bids;
- Build on existing centres of expertise and specialist facilities to develop pan-Wales research collaborations (including HE and business);
- Facilitate greater involvement in the Small Business Research Initiative.⁵⁴

Commitments designed to 'encourage businesses to invest in R&D and to harness the commercial opportunities of innovation and research', include:

- Promoting the importance of business innovation (R&D, product and service innovation); and
- Increase awareness of support available to business and academia for collaborative R&D and commercialisation activity – to this end, a pilot web portal Expertise Wales was launched in February 2011.⁵⁵

Commitments under the heading 'adopt a more focused approach, tackling barriers to investment in R&D and innovation' include:

- Providing specialist facilities (including incubation centres) that will create an environment which will foster the growth of technologically focussed, knowledge based industry;
- Develop the recommendations of the Economy & Ministerial Advisory Group report on R&D and Commercialisation. These recommendations were as follows:
- Further engagement with UK Research Councils, the TSB, charities, EU Framework Programme and other EU programme as well as with universities applying for this funding.

53 Welsh Government Economic Renewal – a new direction (2010) <http://wales.gov.uk/topics/businessandconomy/economicrenewal/programmepapers/anewdirection/?lang=en>

54 Ibid

55 Ibid

This has included a mapping exercise to align R&D priority measures with key sectors, and to identify strengths in relation to Research Council, TSN and FP7 funding areas.

- Ensure a 'whole government', cross-departmental approach to supporting R&D.
- Educate, attract and retain scientists, engineers, technologists and mathematicians and ensure that those who wish to pursue research careers in Wales have the opportunity to do so. Delivery of this commitment involves steps to increase the uptake of STEM subjects at all levels, the establishment of a National Science Academy, and the promotion and development of key sectors (as defined above); and,
- The introduction of a revised Science Policy for Wales (2011) (Note: the policy was intended for publication in autumn 2011, but is still in preparation).⁵⁶

4.2 Policy delivery and funding to business

The Welsh Government's 2011 budget originally contained a revenue allocation of £2.16m for Encouraging Innovation. This was increased by £1m during the June Supplementary Budget period to bring the final allocation to £3.16m (representing a 46% increase on the original allocation). The same budget included £0.433m of capital allocation under the Encouraging Innovation stream.⁵⁷

The budget for 2012 allocates £5.785m of revenue to Encouraging Innovation, representing an 83% increase on the previous year. The capital allocation for 2012 is £0.357m, an 18% decrease on the previous year.⁵⁸

In 2006 the Welsh Development Agency was merged with the Welsh Assembly Government with the responsibility for business support measures being transferred to the Department for Economic Development and Transport.

In addition to the UK wide and EU funding available to Welsh businesses may avail of the Government's Repayable Finance Scheme. The scheme is based on the principle that: companies repay funding without interest (except in the case of the late payments) so that it can be 'recycled and continue to benefit more businesses in the long term'. Funding is aligned to the six priority areas outlined in the Economic Renewal document. Applicants to the scheme must demonstrate that they meet one or more of the following objectives:

- Encourage new investment which increases competitiveness and productivity, especially within the Assisted Areas of Wales;
- Help create, safeguard or maintain better skilled jobs;
- Encourage innovative research and technological development with commercial potential;
- Encourage industrial collaborations to carry out industrial research and precompetitive development;
- Increase entrepreneurship and the development of small and medium sized enterprises (SMEs);
- Increase and improve the modern commercial building stock in Wales; and,
- Develop the six key sectors in Wales.⁵⁹

56 Ibid

57 Welsh Government Supplementary Budget 2011-12 (June 2011) <http://wales.gov.uk/docs/finance/report/110621megsen.pdf>

58 Welsh Government Final Budget 2012-13 (November 2011) <http://wales.gov.uk/docs/finance/report/111129megsen.pdf>

59 Welsh Government A Guide to Welsh Government Repayable Business Finance http://business.wales.gov.uk/FS4BWales_files/WAG1012422_Repayable_Finance_Brochure_WEB_E.pdf

As of the 30 September 2011, 20 offers of business support have been made through the repayable finance scheme, totalling £5.7m. The repayment profiles are unavailable as each offer has unique terms and conditions dependent on the repayment mechanism, timing and specific conditions. Commercial confidentiality prevents identification of individual companies in receipt of funding.⁶⁰

The three major areas of funding have been capital projects, job creation and R&D and innovation. With regard to the latter, R&D and innovation support, while situated within the repayable finance scheme is not repayable. On this, the Welsh Government has stated:

There is an integrated package of support for Research and Development and Innovation in sector-aligned Welsh businesses. The Fund will support technologically innovative businesses in the development of new products and processes and technologies to meet the first objective of the Innovation and R&D Strategic Framework. To maximise the participation of appropriate businesses in the Welsh economy the financial support is not repayable. The grant support will be used as an incentive.⁶¹ (Emphasis added)

R&D and innovation funding is available throughout the various stages of development from technical and commercial feasibility exploration to commercial exploitation. There are three types of R&D and innovation funding available:

- Industrial research funding is targeted toward research which aims to develop an early bench top model of process representing a technological advance. Projects should last from three months to one year, with funding of up to £100,000 available.
- Experimental development funding is targeted toward the development of pre-production prototypes. Projects should last from six months to two years, with funding of up to £200,000 available.
- Exploitation funding is targeted at companies seeking to commercially exploit products or process developed through previous R&D. Projects should last from one month to one year, with maximum funding of £20,000 available.⁶²

Funding is provided to cover costs associated with the project. Eligible project costs include:

- Pay of staff directly involved in the project;
- National insurance and pension contributions;
- Overheads attributed to the project phase;
- Materials and consumables;
- Capital equipment;
- External cost including sub-contracts, consultancy, fees for trials and testing, acquisition of technology, market assessment, registration of new intellectual property and 'buying-in' intellectual property rights (external cost should not exceed 30% of total cost of industrial research and experimental development projects).

Funding offered through the scheme is governed by EU state rules. This sets limits on the type of projects which can receive funding. Funding may only be offered to projects which, without funding, would:

- Not go ahead;
- Proceed on a reduced scale; or,

60 Letter from the Minister for Business, Enterprise, Technology and Science to the Committee for Enterprise and Business, provided by Welsh Assembly research via email

61 Ibid

62 Welsh Government A Guide to Welsh Government Repayable Business Finance http://business.wales.gov.uk/FS4BWales_files/WAG1012422_Repayable_Finance_Brochure_WEB_E.pdf

- Take longer to complete.⁶³

SMEs applying for support can only do so if they submit an application before work on the project has begun.⁶⁴

Alternative financing is also available to Welsh businesses:

- Finance Wales invests in SMEs. Their investment streams included early stage investment in technology businesses (£50,000 to £1m initial invest and follow on investments of up to £5m). Companies receiving early stage investment must show unique technology, novel intellectual property, an experienced and commercially focussed management team, a commercialisation strategy and an exit plan.⁶⁵ Development investment, microloans (of between £5,000 and £25,000) and succession deals are also available; and
- The Local Investment Fund, which is available through local authorities, supports SMEs to finance projects that meet specific objectives. Introducing new products to market is one of the qualifying objectives. The grants cover up to 40% of project costs, subject to a minimum grant of £1,000 and a maximum of £10,000. Grants are part funded by the European Regional Development Fund.⁶⁶

4.3 Policy delivery and funding to academia

The Higher Education Funding Council for Wales distributes funding amongst the 11 Welsh universities. Funding is targeted to three main areas – teaching, research and postgraduate research funding. The Council also provides capital funding and ‘special funding’. Funding for the three main areas of work is broken down as follows for the financial year 2011/12:

- Teaching – £284m;
- Research – £71m; and,
- Postgraduate Research - £5.2m.⁶⁷

5 Republic of Ireland

5.1 Governance Structure

There are a number of actors involved in the setting of the RoI's research and innovation policy; the Department of Jobs, Trade and Innovation; Department of Education and Skills; the sub-departmental Office of Science, Technology and Innovation; the Cabinet Sub Committee on Science, Technology and Innovation; the Inter-departmental Committee on Science, Technology and Innovation; Chief Scientific Advisor; the Advisory Council for Science, Technology and Innovation; and the Innovation Taskforce Implementation Group.

The Office of Science, Technology and Innovation, a sub-department of DJTI, has responsibility for the ‘development, promotion and coordination of Ireland's Science, Technology and Innovation policy; and Ireland's policy in European and international research activities’. Rather than solely focusing on R&D, the Office's remit is broader, covering research, technological development and innovation (RTDI).

The Strategy for Science, Technology and Innovation 2006-13 (SSTI), published in 2006 (further details are below), led to the creation a number of new structures – Technology Ireland, the Higher Education Research Group and the Health Research all of which report to

63 Ibid

64 Ibid

65 Finance Wales Early Stage http://financewales.co.uk/what_we_do/how_we_invest/early_stage.aspx

66 Local Investment Fund About LIF Cymru <http://www.lifcymru.org.uk/english/pages/aboutlifcymru.aspx>

67 The Higher Education Funding Council for Wales Strategic Implementation Fund - Overall allocations http://www.hefcw.ac.uk/documents/about_he_in_wales/funding_he_in_wales/Overall%20breakdown%20of%20the%20total%20funding%20awarded%20in%202011.12.pdf

the Inter-Departmental Committee on Science, Technology and Innovation. The main role of these bodies is implementation of the SSTI.

In 2009, the Innovation Taskforce was appointed to advise the government on mechanism to position RoI as an international innovation hub. The taskforce published a report in 2010 with the Innovation Taskforce Implementation Group established following this to implement the recommendations of the report (see below).

A further delivery mechanism is Forás, RoI's 'advisory board enterprise, trade, science, technology and innovation'. Forás provides 'certain corporate services' for its 'sister agencies':

- Enterprise Ireland: responsible for the development and promotion of indigenous business;
- IDA Ireland: responsible for securing overseas investment; and,
- Science Foundation Ireland: investor in academic research.

5.2 Key Government Strategy

The key strategy document covering ROI R&D and innovation policy is the publication Science for Technology and Innovation 2006-2013 (STI). The main aims and actions of that document are summarised in Figure 1. Greater detail on the specific actions is available [here](#).

Figure 1: Aims and Actions of the Science for Technology and Innovation Strategy⁶⁸

Academic research	<p>Significantly increase the number of research teams led by internationally competitive Principal Investigators;</p> <p>Upgrade existing research infrastructure and develop new facilities;</p> <p>Develop sustainable career paths for researchers;</p> <p>Enhance the mobility of researchers; and</p> <p>Double the number of PhD graduates in science, engineering and technology to nearly one thousand per annum by 2013.</p>
Graduate schools	<p>Establish a number of graduate schools to provide high-quality training of researchers, and equip them with generic and transferable professional skills that are relevant to a modern knowledge-based enterprise economy; and</p> <p>Accommodate industrial placements to facilitate development of enterprise expertise.</p>
Commercialisation	<p>Increase outputs of economically relevant knowledge, know-how and patents from third-level institutions; and</p> <p>Strengthen the Intellectual Property/ Commercialisation functions within Higher Education Institutes and provide them with expertise to translate research into applications.</p>
Industrial research	<p>Transform the quality and quantity of research undertaken by enterprise – both directly and in cooperation with third-level institutions;</p> <p>Grow business annual expenditure on R&D from €1 billion in 2003 to €2.5 billion by 2013; and</p> <p>Develop a number of industry-led research-driven Competence Centres with research facilities in third-level institutes.</p>
Sectoral research	<p>Enhance the contribution of research to economic and social development across all relevant areas of public policy; and</p> <p>Provide a competitive fund to encourage excellent research in areas of social, economic or environmental need, such as sustainable agriculture, treatment of specific medical conditions, and energy security.</p>
Public awareness	<p>Increase public awareness and appreciation of the role of science in society, with a particular focus on schoolchildren and those that influence them; and</p> <p>Increase the number of schoolchildren taking science subjects.</p>
Cross-border and international cooperation	<p>Increase international cooperation in science and technology and participation in transnational research activity; and</p> <p>Encourage Irish researchers to collaborate internationally and to avail of EU Framework Programme funding. Leverage complementary strengths in institutions and enterprises in Ireland and Northern Ireland through increased cross-border cooperation.</p>

In 2008, a supplementary policy, Innovation Ireland, was published. The document built upon the STI Strategy. Its central aim was to:

In short, our ambition is to put innovation at the core of our policies and strategies for the future, so that Ireland becomes a leader in innovation.

⁶⁹Full details of the strategy are available here.

5.3 Government Funding

Figure 2 illustrates the distribution of R&D funding in RoI by funding sector. The figure shows that 50% of R&D funding is drawn from business enterprises, with the government providing 31% of funding. It is also notable that 16% of funding came from abroad. This section outlines the range of government funding available to those wishing to take part in

⁶⁸ Department of Jobs, Enterprise and Innovation, Innovation in Ireland (2008) <http://www.djei.ie/publications/science/innovationpolicystatement.pdf>

⁶⁹ Ibid

R&D or innovation in RoI (with a focus on academic institutions, indigenous businesses and international businesses).

Figure 2: RoI – funding of R&D by type of funder

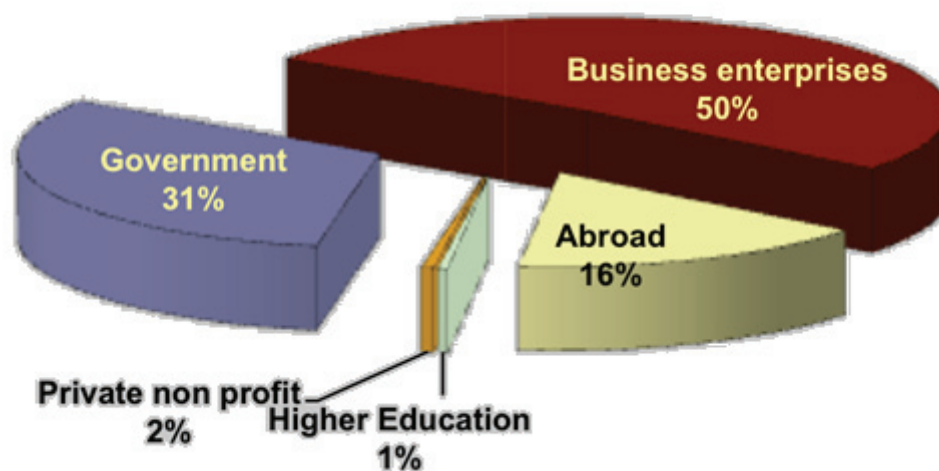


Figure 3, illustrates the level of government funding targeted to R&D since 2000. Funding peaked in 2008 when €942m was allocated to R&D, falling to €872 in 2010. Funding is targeted to three areas:

- Higher education – administered the Department of Education and Skills, the Higher Education Authority and the Science foundation;
- Business sector – administered via state agencies including IDA Ireland, Enterprise Ireland; and
- Funding for the government sector performed R&D – including the Marine Institute and non-teaching hospitals.

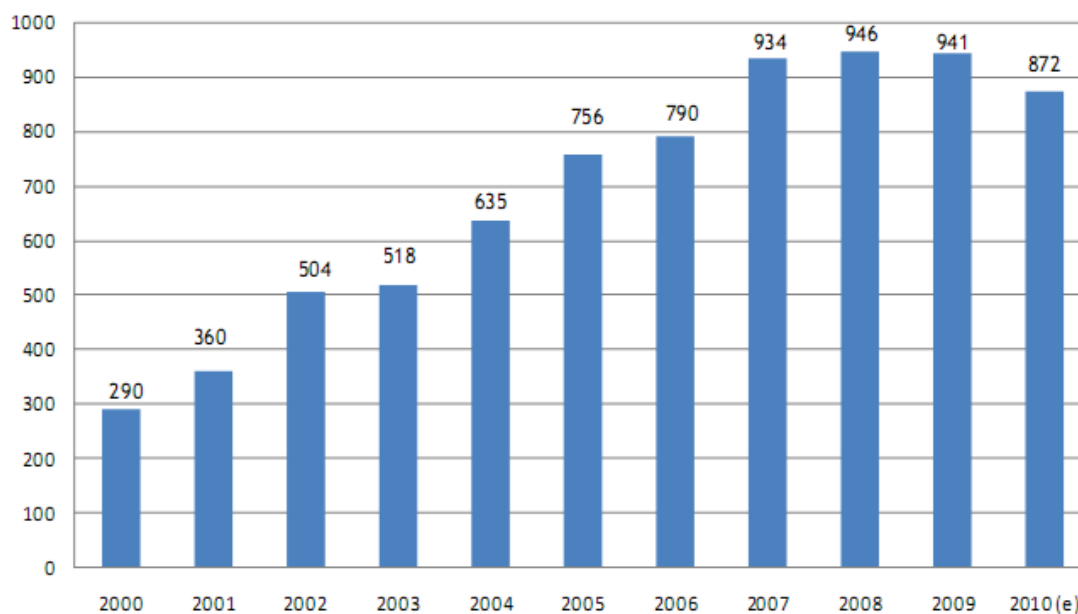
Figure 3: Government Budgeting and spending on R&D 2000-2010 (€m, 2010 estimate)

Table 9 outlines funding estimate for the various R&D funders for 2010, the section that follows provides further details on funding to academia, business, and the public sector.

Table 9: Government department and agencies funding R&D activities (2010 estimates)

Funding Department/Agency	2010 (€m)	% of Total
Higher Education Authority	288.7	33.1
Science Foundation Ireland	150.0	17.2
IDA Ireland	82.0	9.4
Enterprise Ireland	69.6	8.0
Teagasc	48.5	5.6
Health Research Board	44.4	5.1
Department of Agriculture, Fisheries and Food	29.0	3.2
Sustainable Energy Authority	28.3	3.2
Irish Research Council for Science Engineering & Technology	24.0	2.7
Department of Enterprise, Trade and Innovation	15.9	1.8
Department of Communications, Energy & Natural Resources	15.7	1.8
Environmental Protection Agency	13.0	1.5
Irish Research Council for Humanities and Social Science	11.8	1.3
Marine Institute	9.0	1.0
Others	44.6	5.1
Total	872.0	100.0

5.3.1 Support to Academia

The largest share of Government funding in RoI (33.1%) is allocated to the higher education sector through the Higher Education Authority – €288.7m in 2010, made up of €136.2m

(47%) through the HEA block grant and €49m (17%) through the Programme for Research in Third Level Institutions (PRTL). Block grant funding covers teaching and research within institutions, although it is up to each institution how it is distributed. PRTL is competitive funding, which provides financial support for 'institutional strategies, and infrastructure projects in key areas of research'. The programme has three objectives:

- To enable third-level institutes to develop strategies and plans that aid the long-term development of their research capabilities and which are consistent with existing strengths and goals, and with national goals;
- To develop research capabilities in third-level institutes with a view to enhancing the quality and relevance of graduate skills;
- To provide support for 'outlandishly talented individual researchers and teams within institutions' and for inter-institutional cooperation within RoI, the EU and internationally (note funding is only available to RoI institutions⁷⁰).⁷¹

Total previous and future funding breaks down as follows:

- Cycle 1: announced 1999 for the period 2000-2003, total funding of €206.1m, €177.5 of which was for buildings and equipment, €28.6m for research programmes and people.
- Cycle 2: announced 2000 for the period 2001-2004, total funding of €78.5m, €48.8m of which was for buildings and equipment, €28.6m for research programmes and people.
- Cycle 3: announced 2001 for the period 2002-2006, total funding of €320.4m, €178 of which was for buildings and equipment, €142.4m for research programmes and people.
- Cycle 4: announced 2007 for the period 2007-20012/13, total funding of €260.7m, €131.3m of which was for buildings and equipment, €129.4m for research programmes and people.
- Cycle 5: announced 2010 for the period 2011-2015, total funding of €347.6m, €248m of which was for buildings and equipment, €99.6m for research programmes and people.
- Total funding over the period is €1.2bn.⁷²

PRTL applications are judged by 'an international panel of distinguished researchers and scholars' with awards offered on the basis of: strategic planning and focus; inter-institutional collaboration; research quality; and impact of research on teaching and learning.⁷³ In 2010, overall responsibility for PRTL was moved from Department of Education and Skills to the Department of Jobs, Enterprise and Innovation on the basis that this would align the work of academia with the needs of enterprise.

The HEA also administers the Strategic Innovation fund, valued at €510m over the period 2006-2013. In 2010 €6m was made available through the fund, which aims to: enhance collaboration between HE institutions; improve teaching and learning; support institutional reform, and develop fourth level education (graduate education⁷⁴).⁷⁵

A further competitive funding programme available to the higher-education sector is delivered through the Science Foundation Ireland (SFI). SFI funding is prioritised towards science and engineering, a directed to bio-technology, information and communications technology, and sustainable energy and energy efficient technologies, in line with government priorities. The

70 ERA Watch Programme for Research in Third Level Institutions (2010) http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/ie/supportmeasure/support_mig_0016

71 Higher Education Authority Programme for Research in Third Level Institutions <http://www.heai.ie/en/prtli>

72 Ibid

73 Ibid

74 Fourth Level Ireland <http://www.4thlevelireland.ie/>

75 ERA Watch Country Profile: Ireland http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/ie/country?section=ResearchFunders&subsection=GovernmentAndRegionalAuthorities

SFI provides grants to Universities and Institutes of Technologies. It also 'strongly encourages research collaboration between SFI funded scientists and engineers and industry'. Over 30% of SFI funded researchers have established collaborations with industry. The proportion of SFI funded researchers working with SMEs in 2009 increased by 53% on the previous year.⁷⁶ In 2010, the SFI distributed €150m in funding.⁷⁷

A full breakdown of HEA funding for 2010 is outlined in Table 10.

Table 10: HEA Funding by Stream 2010

Funding Stream	€K
HEA Total	288,715
PRITL	48,996
The Technology Sector Research Fund	6,000
HEAnet	7,500
E journals	5,000
Research Facilities Enhancement Scheme	470
Institutes of Technology	21,608
Strategic Innovation Fund	6,000
Recurrent (Core) funding	136,222
Capital Grant	56,919

5.3.2 Support to Business

Enterprise Ireland offers a range of funding and other mechanisms to support R&D and innovation in businesses and academia. Industry targeted funding includes:

- Direct R&D Funding – Enterprise Ireland's direct R&D funding is spread across five streams ;
 - R&D Stimulation Grant – aimed at assisting companies not involved in R&D to investigate the potential their business holds for embarking on R&D. The programme offers grants of 50% of eligible expenditure up to a ceiling of €30,000. Eligible spending includes: Salaries and wages of promoters undertaking their own research who can demonstrate a loss of income can claim up to €1,000 per week; consultancy fees of up to €900 per day for the first 20 days and €700 for subsequent days; 25% of feasibility study cost (including prototype design and fabrication expenditure); travel and subsistence costs within RoI and overseas. Scheme is open to Enterprise Ireland client SMEs involved in manufacturing and selected service sectors.⁷⁸
 - R&D Fund: Small Projects – targeted toward projects with an expenditure of less than €150,000 provided to companies who wish to: establish or increase R&D activity; demonstrate a connection between business and R&D objectives; develop a culture of innovative thinking; increase R&D capacity and capability; and develop R&D management systems. The fund is open to companies of all sizes that are clients of Enterprise Ireland, Údarás na Gaeltachta and City or County Enterprise Boards. Grants are determined by company size – small companies may receive up to 45%

76 The Science Foundation Ireland Funding Overview <http://www.sfi.ie/funding/funding-overview/>

77 ERA Watch Country Profile: Ireland http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/ie/country?section=ResearchFunders&subsection=GovernmentAndRegionalAuthorities

78 Enterprise Ireland R&D Stimulation Grant <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/R-D-Funding/R-D-Stimulation-Fund.shortcut.html>

of total project cost, for medium companies this drops to 35% and to 25% for large companies.⁷⁹

- R&D Fund: Large Projects – available on projects with a total cost of up to €650,000 available to all manufacturing or internationally traded services company. The fund targets companies based on the criteria established in the Small Projects R&D Fund. The level of grant is again determined by company size along the same lines as the Small Projects fund.⁸⁰
- Innovative High Potential Start Up (HPSU) Fund – equity investment to co-fund start-up costs of HPSU companies including R & D costs.
- Collaborate on Research and Development Projects with Colleges and/or Companies – includes pooled innovation vouchers (see below), a 15% bonus as part of the R&D fund (large and small projects) takes place, and other projects (see here) designed to encourage company to company and company to academia collaboration.
- Innovation Vouchers – open to small companies (with less than 50 employees), the voucher scheme is designed to encourage businesses to ‘explore a business opportunity or problem with a registered knowledge provider’. Vouchers valued at €5,000 are available to individual businesses, although up to ten companies can pool together to receive a voucher of up to €50,000.⁸¹
- R&D Advocates Scheme – the scheme assists companies to grow through participation in technical innovation. Companies are appointed an innovation advocate who will help the company appraise the business and examine ways to develop innovation. The initial advocate visit lasts for half a day, leading to a further three sessions should the first be deemed successful. The first visit is free, with subsequent visits paid for jointly by Enterprise Ireland (€600) and the client (€300). The scheme is open to SMEs in manufacturing and selected service sectors that are clients of Enterprise Ireland, Údaras na Gaeltachta or City & County Enterprise Boards.⁸²
- Innovation Partnership Programme – offers grants of up to 80% of project cost or projects that involve R&I based business and college collaboration. The proposal process and administration of the project is managed by the participating third level research institution. To qualify for funding, the research project must outline how the company will benefit in terms of its growth, the evolution of strategic R&D within the company and the creation of new knowledge that can be used by the company to generate commercial advantage. The programme is open to all R&I based manufacturing and internationally traded services businesses. Funding ceilings are set at €9,000 for phase one (feasibility study) and up to €200,000 at phase two (full proposal stage), although funding for early stage companies (pre-HPSU) is capped at €100,000 for this phase.⁸³
- Applied Research Enhancement (ARE) Centres - research facilities funded by Enterprise Ireland specialising in a number of technology fields including ICT and Software, Bio-life sciences and pharmaceuticals, and bio-medical devices and materials. The centres exist to enable businesses to engage in collaborative research projects. Such projects are funded by companies using innovation vouchers.⁸⁴

79 Enterprise Ireland R&D Fund: Small Project <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/R-D-Funding/R-D-Fund-Small-Projects-.shortcut.html>

80 Enterprise Ireland R&D Fund: Large Projects <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/R-D-Funding/R-D-Fund-Large-Projects-.shortcut.html>

81 Enterprise Ireland Innovation Vouchers <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/Collaborate-with-companies-research-institutes/Innovation-Voucher.shortcut.html>

82 Enterprise Ireland R&D Advocate Scheme <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/R-D-Funding/R-D-Advocates-Programme.html>

83 Enterprise Ireland Innovation Partnerships <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/Access-EU-Research-Innovation-reports/Access-EU-research-and-innovation-supports-overview.html>

84 Enterprise Ireland Applied Research Enhancement (ARE) Centres I <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/Collaborate-with-companies-research-institutes/Applied-Research-Enhancement-Centres-.html>

- Technology Centres – government funded centres staffed by researchers who are empowered to undertake market focussed strategic R&D for the benefit of industry.⁸⁵
- EU and ESA Research and Innovation Supports – Enterprise Ireland assists companies in accessing FP7 and other EU programmes.⁸⁶

A full break down of Enterprise Ireland funding for 2010 is available in Table 11.

Table 11: Enterprise Ireland funding by stream 2010

Funding Stream	€K
EI Total	69,611
R&D Fund	53,220
Applied Research Enhancements	3,552
Industry Led Networks	1,741
Basic Research Grants	-
Innovation Partnerships	7,698
International Collaboration	3,400

IDA Ireland offers grant aid for RD&I projects including grants for RD&I Feasibility Studies and Training. Total funding for IDA R&D funding for 2010 was €82m.

Funding is also available to companies in Rol through IntertradeIreland. The agency's Fusion programme offers €33,150 to companies to enable them to recruit 'a talented graduate to lead a business improvement project'. The scheme partners companies with a third level institution that offers expertise. The programme partners businesses with a graduate for a 12 month period. According to IntertradeIreland:

On average, each company taking part on the programme benefits from over £1 million worth of sales and efficiency savings as a result of cost savings, new product development, increased sales and/or process improvements.⁸⁷

A second programme offered by the agency is Innova which offers companies a grant of up to €285,000 for carrying out an innovation programme in partnership with a company from Northern Ireland (the programme works in the other direction, with Northern Ireland companies potentially receiving for working with Rol companies). To receive funding, projects should have 'strong commercial potential'. Applicants must identify an R&D partner prior to application.⁸⁸

In addition, companies in Rol can avail of a 25% R&D tax credit – designed to encourage companies to undertake new or additional R&D activity in Ireland. The tax credit covers wages, equipment, buildings and related overhead costs of establishing a R&D and Innovation activity in Ireland.⁸⁹

85 Enterprise Ireland Technology centres I <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/Collaborate-with-companies-research-institutes/Competence-Centres-Initiative.html>

86 Enterprise Ireland EU and ESA Research and Innovation Supports <http://www.enterprise-ireland.com/en/Research-Innovation/Companies/Access-EU-Research-Innovation-reports/Access-EU-research-and-innovation-supports-overview.html>

87 IntertradeIreland Innovate, Financial Support <http://www.intertradeireland.com/innovate/financialsupport/>

88 Ibid

89 R&D Tax Guidelines <http://www.revenue.ie/en/tax/ct/leaflets/research-dev.pdf>



Northern Ireland
Assembly

Research and Library Service Research Paper

Paper 850-11

27 January 2012

NIAR 850-11

Aidan Stennett

Regional Innovation Systems

Paper providing an overview OECD Regional Innovation System theory and best practice with comparisons to Northern Ireland's Regional Innovation Action Plan 2008-2011

Research and Information Service briefings are compiled for the benefit of MLAs and their support staff. Authors are available to discuss the contents of these papers with Members and their staff but cannot advise members of the general public. We do, however, welcome written evidence that relate to our papers and these should be sent to the Research and Information Service, Northern Ireland Assembly, Room 139, Parliament Buildings, Belfast BT4 3XX or e-mailed to RLS@niassembly.gov.uk

Key Points

- The OECD views regions as playing a significant role in fostering innovation.
- They argue in favour of regions developing Regional Innovation Systems which view R&D as an integral building block of a broader multidimensional system.
- The policy mix used to develop such a system is likely to be context specific. That is, it will be influenced by a range of factors particular to the region: its institutional arrangements; the interactions with national policy; the challenges and opportunities faced; the stage they are at in the development cycle (building, transforming, or catching-up); a region's goal; stakeholders input.
- Northern Ireland's Regional Innovation Strategy Action Plan 2008-2001 includes many of these aspects.
- DETI's own assessment of the policy showed that the Department successfully met the majority of targets.
- The Northern Ireland R&D Statistics 2010 shows that total R&D expenditure and Business R&D expenditure increased between 2009 and 2010, suggesting that the action plan has been successful.
- Companies with 250 or more employees accounted for 61% of business R&D expenditure in 2010, although they represented only 10% of R&D performing companies'.
- The statistical bulletin also shows that R&D employment has increased in recent years. According to the bulletin, however, collaboration has decreased slightly between 2009 and 2010.
- The Northern Ireland R&D Statistics is the region's key publication assessing R&D performance. Its main focus is R&D expenditure, although it does include data on other measures, notably human capital and collaboration. There may be benefits to extending the scope of this publication to include a wider variety of measures. One suggestion would be to develop a publication that mirrors the EU's Innovation Union Scoreboard.
- In a 2009 assessment of Northern Ireland's Regional Innovation System NESTA has noted that Northern Ireland's policy demonstrates a commitment to improving innovation performance and has created opportunities to undertake more innovation and R&D.
- They also argued, the establishing Innovation Council capabilities to 'analyse, challenge and support developments in innovation capability', would addresses Northern Ireland's institutional shortcomings and improve monitoring, analysis and challenge functions.
- The case studies presented in this paper provide an illustration of how specific policy mixes have been adapted to particular contexts, goals and challenges. The policy instruments utilised reflect the different starting points of each region, although there is a degree of overlap.

Executive Summary

OECD – Theory and Practice

The OECD (Organisation for Economic Development) notes that regions have become increasingly significant in innovation policy for two reasons:

- The inclusion of regions within national innovation policy; and
- A paradigm shift in regional development.

OECD literature has a tendency to focus upon innovation systems within which R&D is viewed as an integral building block of the broader systems. The organisation reason that in beyond R&D policy makers should consider:

- The interaction of a range of complementary assets, such as software, human capital and new organisational structures;
- Complementary strategies which move beyond 'simplified' divisions between 'technological' or 'non-technological' innovation;
- Collaboration;
- Multidisciplinary/interdisciplinary research;

This is not to suggest that the OECD no longer views traditional measures, such as business R&D expenditure, as important – to the contrary, it notes that the '27 "big hub" regions outperform other regions, especially with respect to innovation indicators such as business expenditures on R&D, patenting and collaborative arrangements for innovation'

The OECD tends to favour the Regional Innovation System (RIS) concept as it expresses the totality of what makes up the 'multiple development patterns and growth models for success' employed by OECD regions.

A more precise definition is 'a cumulative and non-linear systemic process' in which businesses play a central role, but are dependent upon the performance of other agencies (universities and research centres), regional frameworks (standards and regulations) and forces influencing demand.

The wider concept of a Regional Innovation System is applied, by the OECD, policy development and policy assessment.

The OECD stresses that there is no 'standard one-size-fits-all' approach around a single model'. Rather the model of Regional Innovation System adopted by a particular region will depend upon:

- The policy tools available to it;
- How it interacts with national policy;
- The quality of the policy process;
- The evidence upon which policy is based;
- The participation of regional stakeholders in the policy making process; and
- The challenges and socio-economic opportunities particular to a region.

Regions are required to make strategic choices, which will be influenced by their specific context and stage of development. Three development stages are identified:

- Building on current advantages – where a region is already a world leader in one or more areas of innovation and wish to maintain or enhance that position;
- Supporting socio-economic transition – applicable to regions that had previously been successful in one sector but are required to adapt new models of development where older models are failing; and

- Catching-up – applies to regions that lag behind in income per capita, productivity growth and employment generation. Such regions often lack in high value-added economic activities, infrastructure and high-quality services.

Northern Ireland could be considered to be situated between the catching-up and supporting socio-economic transition categories.

A number of policy instruments are available to regions as they seek to develop a Regional Innovation System. How these instruments are used and their value to a region will depend upon that region's institutional arrangements, the stage they are at in the development cycle (building, transforming, or catching-up), a region's goal, as well as the input from stakeholders. Policy instruments are divided according to the area they are intended to impact – knowledge generation, knowledge diffusion or knowledge exploitation. They are also divided into traditional, emergent and experimental instruments. A successful policy mix will also draw upon a number of policy areas:

- Regional development policy;
- Science and technology policy;
- Industrial and enterprise policy, including SME policy; and
- Higher education policy.

In developing a policy mix a region should:

- Avoid negative policy interaction and maintain positive ones;
- Develop a clear understanding of how the current regional system is working and the identification of bottlenecks;
- Set clear objectives and targets which are evaluated enabling policy refinements; and,
- Policy mixes should be focussed on outcomes.

Northern Ireland Regional Innovation System

Examining Northern Ireland's Regional Innovation Strategy Action Plan 2008-2011, in the context of OECD best practice, reveals positive results. The Action Plan fits well within the OECD model:

- It put forward a contextual, multi-dimensional, systemic approach to innovation;
- R&D is an integral feature but not the exclusive measure of development;
- It set out a clear vision, based on opportunities and challenges, and was developed with stakeholder input;
- The policy mix reflected the identified challenges and opportunities, and also Northern Ireland's institutional arrangements;
- The policy mix contained instruments from the OECD three policy areas – knowledge generation, diffusion and exploitation;
- The policy mix contained actions to encourage collaboration at a number of levels;
- Mechanisms for review and benchmarking were also included in the policy; and
- It took a long-term view of innovation policy, leaving room for flexibility and incremental progress.

DETI's own assessment of the Action Plan shows it to be a success with most targets met across the four strategic imperatives.

The publication Northern Ireland R&D Statistics 2010 shows that total R&D expenditure and Business R&D expenditure increased between 2009 and 2010, suggesting that the action plan has been successful. Although it should be noted that in this period 'Companies with 250 or more employees accounted for 61% of business R&D expenditure in 2010, although they represented only 10% of R&D performing companies'.

The statistical bulletin also shows that R&D employment has increased in recent years. According to the bulletin, however, coloration has decreased slightly between 2009 and 2010.

The Northern Ireland R&D Statistics is the region's key publication assessing R&D performance. Its main focus is R&D expenditure, although it does include data on other measures, notably human capital and collaboration. There may be benefits to extending the scope of this publication to include a wider variety of measures. One suggestion would be to developing a publication the mirrors the EU's Innovation Union Scoreboard.

NESTA's (National Endowment for Science Technology and the Arts) assessment of the Action Plan and of Northern Ireland's innovation in general contains positive and negative points. They see the Action Plan as important as it 'demonstrates the commitment of a wide range of Northern Ireland organisations to improving innovation performance'. Furthermore they concluded that the plan exhibited 'a very significant level of support' and, in doing so, created 'opportunities to change behaviours and to encourage firms to undertake more R&D and innovation'.

NESTA argued, the establishing Innovation Council capabilities to 'analyse, challenge and support developments in innovation capability', would addresses Northern Ireland's institutional shortcomings and improve monitoring, analysis and challenge functions. They also suggested the introduction of a Service Innovation Grant, a requirement of collaboration, and a remodelling of the University funding system towards the Scottish Horizon fund approach.

Case Studies

The three case studies presented in this paper provide details on the Regional Innovation System in practice in regions corresponding to the three development stages identified by the OECD: Building on current advantages; supporting socio-economic transition; and catching-up.

The case studies provide an illustration of how specific policy mixes have been adapted to particular contexts, goals and challenges. The resulting policy mixes have been established to address these factors. The policy instruments utilised reflect the different starting points of each regions, although there is a degree of overlap.

In Baden-Württemberg, the region building from current advantages, the policy mix includes actions aimed at:

- Maintaining current advantages in scientific excellence;
- Improving partnership cooperation and developing clusters; and
- Developing the future generation of scientists and researchers.

In the Basque Country, the 'supporting socio-economic transition' region, the policy mix includes actions aimed at:

- Encouraging business innovation;
- Improving the use of ICT in the business sector;
- Promoting R&D within specific business sectors; and
- Building networks.

In Wielkopolska, the 'catching-up region', the policy mix includes actions aimed at:

- Encouraging innovative Foreign Direct Investment to enter the region;
- Supporting the development of emerging innovative companies;
- Establishing a modern education and training system; and
- Building networks.

Contents

- 1 Introduction
- 2 Theory and road-maps
 - 2.1 Why are regions important?
 - 2.2 Beyond R&D in a regional context
 - 2.3 What makes a successful regional innovation system?
- 3 Northern Ireland's regional innovation strategy
- 4 Case studies
 - 4.1 Baden-Württemberg, Germany – building from current advantages
 - 4.2 The Basque Country – socio-economic transformation
 - 4.3 Wielkopolska, Poland – Catching up

1 Introduction

The following paper outlines OECD best practice on Regional Innovation Systems, examines Northern Ireland's recent Regional Innovation Strategy from the prism of this best practice and provides case studies of European Regional Innovation Systems.

2 Theory and road-maps

2.1 Why are regions important?

In their 2011 publication, *Reviews of Regional Innovation – Regions and innovation Policy*, the OECD (Organisation for Economic Cooperation and Development) notes the increasing significance regions play in national and supra-national innovation systems. The reasons for this are twofold. Firstly, there has been a trend towards ‘the inclusion of regions and their specific assets in national innovation policy’ and secondly, because of a ‘paradigm shift in regional development policy’.¹

Explaining this further, OECD states:

Many OECD regions are formulating regional innovation strategies to increase their economic competitiveness, with a tradition of institutions supporting innovation for regional growth. For some countries, like the new member countries of the EU, this is a new trend based on increased democratisation, devolution and decentralisation. For others, such as Canada, Germany, Spain and the United States, there has been long-standing regional action in innovation.

*In EU Countries, the availability of structural funds has helped regions mobilise their assets for knowledge-based growth. Innovation has become one of the main pillars of EU regional policy. From 1989-1993, approximately 4% of regional policy funds were devoted to innovation (2 out of 50 billion). The share of broadly defined innovation-related spending for the period 2007-2013 is projected to be approximately 25%, totalling around EUR 86 billion. Nevertheless, persistent knowledge, technology and innovation gaps between and within countries demand improved and better targeted policies.*²

2.2 Beyond R&D in a regional context

OECD literature has a tendency to focus upon innovation systems within which R&D is viewed as an integral building block of the broader systems.

In assessing and measuring innovation systems, the OECD examines a range of factors:

- **Intangible assets:** the OECD views innovation as the result of the interaction of a range of complementary assets. Significantly, they are of the view that regions should not focus exclusively upon, and should rather look beyond R&D. Significant assets include software, human capital and new organisational structures. The OECD note that investment in these intangible assets is increasing and overtaking more traditional investment in physical capital (machinery and equipment) in states with higher innovation performance; in Finland, Sweden and the United States for example. Furthermore, firms may introduce new products on the market without engaging in R&D. For example, in Australia and Norway the tendency to introduce new-to-market product innovation is similar whether or not the firm performs R&D.
- **Mixed modes of innovation:** OECD data suggest that innovative firms tend toward complementary strategies. Rather than seeing a division between ‘technological’ or ‘non-technological’ innovation, the OECD view such terms simplifications. They note that ‘innovative firms introduce both product and process innovations, as well as marketing or organisational innovations’ and that ‘this is true for firms in both manufacturing and services’ allowing for ‘differences by sector and firm size’ (For example, a larger share of firms in services than in manufacturing introduce only marketing or organisational innovation’.

1 OECD (2011), *Regions and Innovation Policy*, OECD Reviews of regional innovation – regions and innovation policy, OECD Publishing <http://dx.doi.org/10.1787/97892640970803-en> p31

2 Ibid

- Collaboration and networks: collaboration is, according to the OECD, 'essential'. It notes that 'firms that collaborate on innovation spend more on innovation than those that do not', suggesting 'that collaboration is likely to undertaken to extend the scope of a project or to complement firms' competences more than to save on costs'. It adds that in 'most countries, collaboration with foreign innovation partners is at least as important as domestic co-operation'. It is noteworthy, that the organisation considers collaboration as significant irrespective of the amount innovation a firm carries out. As such, it holds the view that 'policies that stimulate collaboration and network initiatives will have an impact on the entire spectrum of innovative firms'.
- Convergence of scientific and multidisciplinary/interdisciplinary research: the OECD notes a trend towards multidisciplinary/interdisciplinary research. It states 'using 'science maps', there is evidence that increasingly, innovations are achieved through the convergence of scientific fields and technologies'. Adding, 'for example, nanoscience has arisen from the integration of physics with chemistry and is interdisciplinary in character'. Successful multi-disciplinary research 'requires creating spaces for interaction and cross-fertilisation of different knowledge domains'.³

This is not to suggest that the OECD no longer views traditional measures, such as business R&D expenditure, as important – to the contrary, they note that the '27 "big hub" regions outperform other regions, especially with respect to innovation indicators such as business expenditures on R&D, patenting and collaborative arrangements for innovation'.⁴ Rather it is to emphasise the OECD argument that:

*... a new generation of innovation policies will need to supplement the traditional emphasis on inputs (such as R&D as a share of policy targets) with broader kinds of intervention. The more comprehensive policy approach considers supporting human resources and talent, creating demand for innovative product through public procurement, offering advanced innovation services for SMEs, and promoting novel forms of support for innovation networks and collaborative arrangements. Such new areas in national policies have been vital in the agendas of regional governments that have successfully mobilised innovation and production capacities for regional development. Interaction between regional and national strategies is crucial.*⁵

For this reason, whilst recognising that the 'growth performance of leading regions is highly associated with investments in R&D and technological development', the OECD tends to favour the Regional Innovation System (RIS) concept as it expresses the totality of what makes up the 'multiple development patterns and growth models for success' employed by OECD regions.

The RIS concept defines innovation as 'a cumulative and non-linear systemic process' (note: non-linear is used here in contrast to a linear model of innovation, which suggests that innovation progresses in a line – from invention to innovation: basic research — applied research — innovation/diffusion⁶). It is a system that relies on interactions (both formal and informal) between stakeholders. Businesses play a central role in the system; they are the primary recipients of technical knowledge and know-how and the prime agents in the search for innovation'. Businesses do not, however, operate in isolation and are reliant upon the performance of other agencies (universities and research centres), regional frameworks (standards and regulations) and forces influencing demand. Such interactions can, according to the OECD, be of variable value with the 'intensity and quality of interactions' between agents being a key determinant of performance'.⁷

3 Ibid p36

4 Ibid p37

5 Ibid p30

6 NESTA Five ways universities drive innovation (2007) <http://www.nesta.org.uk/library/documents/Measuring-Innovation-v3.pdf>

7 Ibid p38

It is notable that this broad concept, as used by the OECD, is viewed as a policy tool and a mechanism for measuring progress.

The OECD's emphasis on the RIS concept finds support from other policy makers. European Commission Directorate for Enterprise and Industry comments on role of regional growth places a similar emphasis on the interaction of a variety of actors within a sub-national context:

Growth is increasingly related to the capacity of regional economies to change and innovate. Regions and cities have become the primary spatial units where knowledge is transferred, innovation systems are built and competition to attract investments and talents takes place.

Regions are an appropriate level for stimulating innovation: Many regional governments have important competences and budgets in the field of innovation. Their geographical proximity facilitates the acquisition, accumulation and use of knowledge. Regions' performance depends not only on that of enterprises and research institutes but also on interactions between different stakeholders, enterprises and organisations, whose knowledge and know-how build up over time.

EU innovation policy has placed a strong emphasis on networks which link the business to the surrounding environment (other firms, universities, research institutes, etc.) and are active mostly at regional level, e.g. in the field of cluster initiatives.⁸

The Department for Business Innovation and Skills' (BIS) recent economics paper 'Innovation and research strategy for growth' also recognises this systematic, multi-actor approach, whilst noting the possible role of both national and regional specialisation (this study has underpinned the current BIS strategy Innovation and Research Strategy for Growth):

What does modern research teach us about innovation? Some central robust conclusions are that innovation activity is pervasive across industries, collective in character (involving interactions of many actors), cumulative over time, risky and uncertain, and often rests on national and regional specialisations. Clusters of knowledge and innovation hotspots have emerged in a wide variety of studies as a prevalent feature of competitive advantage. Above all, innovation performance rests not simply on entrepreneurial actors but is powerfully shaped by the innovation system, which is the connected set of organisations (firms, universities, financial actors) and institutions (such as laws, regulations, and infrastructures) that shape the environment within which firms and other actors innovate and produce. The structure and functioning of the innovation system is a central challenge for policymakers.⁹

In a similar vein the BIS strategy Innovation and Research Strategy for Growth states:

Strong connections between key actors in the innovation system are instrumental to create and disseminate knowledge, and improve our success rate in building high-growth businesses. How businesses access the UK's research and information infrastructure – its facilities and knowledge base – is paramount. We will encourage stronger links through network initiatives between entrepreneurs, researchers and experts in design, intellectual property, measurement and standards.¹⁰

Within the strategy, interaction between actors is seen to be paramount to the development of innovation networks which may in turn lead to the 'clusters of innovative, high productivity

8 European Commission Directorate for Enterprise and Industry Regional Innovation http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/index_en.htm

9 The Department for Business Innovation and Skills (BIS) Economic paper 15: Innovation and research strategy for growth (December 2011) <http://www.bis.gov.uk/assets/biscore/innovation/docs/e/11-1386-economics-innovation-and-research-strategy-for-growth.pdf>

10 The Department for Business Innovation and Skills Innovation and research strategy for growth (December 2011) <http://www.bis.gov.uk/assets/biscore/innovation/docs/i/11-1387-innovation-and-research-strategy-for-growth.pdf>

businesses which drive economic growth'. The definition of clusters used within the strategy emphasises their sub-national nature:

Clusters are geographic concentrations of interconnected businesses, knowledge base organisations and suppliers. They exhibit high levels of innovation and collaboration, often involving direct business interactions with the local research base and the application and commercial exploitation of knowledge and Intellectual Property it has generated. Clusters reduce the risks associated with developing and commercialising new and emerging technologies, and supporting wider adoption and diffusion.¹¹

The strategy also notes that European Commission research has 'identified that clusters and regional specialisation are associated with higher levels of innovation and prosperity'¹²

2.3 What makes a successful regional innovation system?

Whilst there may be significant value in developing a multi-actor, collaborative innovation system at a regional level (along the lines outline above), OECD literature does not support a 'standardised "one-size-fits-all" approach around a single model'. The group argues instead that adopting an approach that utilises the policy levers available to a specific region and aiming toward a fixed objective – i.e. developing a contextual and targeted strategic framework – is desirable.

The trajectory of a region's innovation system will be largely defined by the policy tools available to it. For example, the extent to which public revenue, spending and investment is decentralised. Similarly, the extent to which decision making power is decentralised will also impact a region's ability implement a successful strategy. Regional policy must also work within the confines of national policy. The latter may set limits on: 'the type and role of agencies responsible for policy design and implementation; their articulation with representatives from different levels of governments; and the mechanisms for co-ordination between different actions'. Furthermore:

These elements shape the intensity and direction of the national innovation strategy, the extent to which the national vision is an expression of regional priorities and, thus, influences the margin of manoeuvre for regions. Ideally, a high degree of complementarity and coherence would need to be achieved between the two levels of policies.¹³

The above is referred to by the OECD as a region's institutional arrangements.

Other influencing factors include the 'quality of the policy process, the availability of evidence to inform the choice of priorities, and the participation of regional stakeholders'¹⁴. In addition, recognising regional challenges and socio-economic opportunities may enable policy makers to prioritise measures that can influence these.

The strategic choices a region will make will depend upon their specific context and stage of development:

- Building on current advantages – certain regions may benefit from existing knowledge and technological advantages. For these regions, the key policy question is how to build on these advantages whilst leaving room for future experimentation. Examples of these regions include: Fukuoka, Japan; Noord Brabant, Netherlands; Baden-Württemberg, Germany; and Quebec, Canada.
- Supporting socio-economic transition - regions with previously successful development models may require to transition to new pathways when the older models show signs of

11 Ibid

12 Ibid

13 OECD (2011), Regions and Innovation Policy, OECD Reviews of regional innovation – regions and innovation policy , OECD Publishing <http://dx.doi.org/10.1787/97892640970803-en> p72

14 Ibid p75

failing. Examples may include regions like Detroit in the US which had previously been reliant on the car industry but was negatively affected by changes to that industry. A first step for these regions is identifying a new development direction. A second step is to identify 'possible transformation vectors: attracting human capital; fostering productive use of regional traditions and knowledge; identifying potential partnerships in national strategies, etc.'. Examples of these regions include: The Basque Country, Spain; Shinshu, Japan; and Nuevo León, Mexico.

- **Catching up** – applicable to regions that lag behind in income per capita, productivity growth and employment generation. Such regions often lack in high value-added economic activities, infrastructure and high-quality services. A key strategic aim for such regions is the 'need for knowledge absorption capacities and skills in the targeted region'. A difficulty facing such regions is the danger of creating dual economies, in which one part of an economy is develop, whilst another remains underdeveloped.

A range of policy instruments available to regions are outlined in Table 1. Policy instruments are divided according to the area they are intended to impact – knowledge generation, knowledge diffusion or knowledge exploitation. They are also divided into traditional, emergent and experimental instruments. How these instruments are used and their value to a region will depend upon that region's institutional arrangements, the stage they are in the development cycle (building, transforming, or catching-up), a region's goal, as well as the input from stakeholders. Regions generally employ a combination of policy instruments according to their needs, goals and the evidence gathered – often referred to as a policy mix. Policy instruments can be directed a specific sectors (SMEs for example, see Annex 1 for details). Policy mixes may also incorporate policy from a range of policy fields:

- Regional development policy;
- Science and technology policy;
- Industrial and enterprise policy, including SME policy; and
- Higher education policy.

Table 1: Regional innovation policy instruments

	Knowledge Generation	Knowledge Diffusion	Knowledge Exploitation
Traditional Instruments	Technology funds, R&D incentives/supports/grants	Science parks	Incubators
	Support for scientific research and technology centres	Technology transfer offices and programmes	Start-up support
	Support for scientific research and technology centres	Technology brokers	Innovation services (business support and coaching)
	Support for Infrastructure development	Mobility schemes, talent attraction schemes	
	Human capital for science and technology	Innovation Awards	Training and raising awareness for innovation

	Knowledge Generation	Knowledge Diffusion	Knowledge Exploitation
Emerging Instruments	Public-private partnerships for innovation	Innovation Vouchers	Industrial PhDs
	Research networks/poles	Certifications/ accreditations	Support for creativity & design
			Innovation benchmarking
	Competitiveness poles Competence centres New generation of scientific and technological parks and clusters Venture and seed capital Guarantee Schemes for financing innovation		
Experimental Instruments	Cross-border research centres	Open source-open science markets for knowledge	Regional industrial policy
			Innovation-orientated public procurement

The OECD has set out a series of guidelines for regions developing policy mixes:

- ‘...avoid negative interactions among various policy instruments and fostering positive ones is the principle challenge’ – policy makers should consider the scope and impact of the instruments they employ. In other words policy makers should monitor to the interaction and outcomes of concurrent policy instruments to ensure they are working together in a way the aids rather than hinders progress;
- ‘...finding the right balance between instruments acting on various aspects of a regional innovation system depends on a good understanding of the system’ - one method of enabling this is to identify bottlenecks in the existing system.
- ‘...the process of refining policy mixes will be greatly facilitated if all policy instruments benefit from a clear definition of objective and target groups and are evaluated properly’ - the OECD recommends that policy makers steer away from ‘generic mission definitions of innovation agency or programmes’ and that they assess the actual impact of the measures they introduce;
- ‘... policy mixes should focus on outcomes’ – the OECD recommends that policy makers should begin with ‘expected results’ and tailor the policy instruments to those results. For example, labour market and migration policies could be tailored towards the attraction and retention of talent.

3 Northern Ireland's Regional Innovation Strategy Action Plan

Northern Ireland has followed a Regional Innovation Strategy since 2003. The strategy, Think/Create/Innovate, was supplemented by two action plans, published for the periods 2004-2006 and from 2008-2011. This section will examine the latter of those two plans through the prism of OECD's guidance as outlined above.

The 2008-2011 plan utilises the concept of a multidimensional, interconnected regional innovation system as put forward by the OECD. The action plan states, for example:

Building an effective regional system depends not only on the actions of each stakeholder, but on the connectivity and flow information between stakeholders to achieve something greater than the sum of its parts.

It puts forward a systematic approach in innovation. Within this R&D development and expenditure is viewed as an integral but not exclusive part of a wider system.

The action plan presents a clear vision of what it wants to achieve, recognising opportunities to build upon:

- The previous phase of research and innovation policy (the 2003 to 2006);
- Existing knowledge and talent;
- Expertise from the business community and representative bodies through stakeholder engagement; and
- Economic growth and job creation in the years leading up to 2008.

But also recognises the challenges faced:

- Closing the productivity gap with the rest of the UK;
- Promoting higher-value added activity through innovation and the commercial exploitation of R&D;
- Increasing business expenditure on R&D;
- Competing in a global economy;
- Reversing economic underachievement; and,
- Creating jobs and wealth.

The action plan outlines a range of policy imperatives and sub-objectives within those imperatives, as outlined in Table 2.

Table 2: The Northern Ireland Regional Innovation Strategy Action Plan 2008-2011 – Imperatives and objectives

Imperative	Strategic Objective
1 To establish Northern Ireland as an outward-focused & competitive region in the global knowledge economy - with an international reputation for innovation excellence.	1.1 Ensure that Northern Ireland is playing its full role in the UK, all-island, European and global innovation arenas; 1.2 Enhance and promote the development of an innovation culture in Northern Ireland (across all sectors of business, government & academia/education); 1.3 Encourage Northern Ireland business and universities to be more outward focused and raise their profiles internationally.
2 To encourage Northern Ireland's businesses to become more innovative and creative in order to compete in the global market.	2.1 Ensure that Northern Ireland business (and the business representative organisations) become more proactive in leading and informing the innovation agenda; 2.2 Promote an increased level of innovation and R&D activity within Northern Ireland businesses (including encouraging businesses to invest more in innovation and R&D); 2.3 Encourage and support Northern Ireland businesses in building the capacity to take forward innovative ideas into new products, services and processes; 2.4 Create the context in which Northern Ireland businesses become more independent of public sector support.
3 To encourage Northern Ireland Government and the wider Northern Ireland Public Sector to lead by example in championing and exploiting Innovation and R&D.	3.1 Ensure that the public sector realises the (commercial) value of its R&D for the wealth of the region; 3.2 Encourage the public sector to lead the adoption of best practice in innovation and R&D and to champion the use of innovation and creativity as business critical in service delivery and process development; 3.3 Use the Northern Ireland Sustainable Development Strategy as a mechanism by which the public sector can drive the innovation, creativity and design agenda; 3.4 Ensure Northern Ireland Government addresses risk management issues and adopts an appropriate outcome-based approach to procurement; 3.5 Ensure that Government interventions to promote and support Innovation and R&D exploitation become more streamlined and targeted in order to assist innovation and R&D practitioners.
4 To ensure that the Northern Ireland education system adopts an enhanced role in developing a culture of innovation and creativity and enables people to recognise opportunities in the knowledge economy.	4.1 Encourage the tertiary education sector to take appropriate steps to realise the commercial opportunities of its research to enhance the wealth of the region; 4.2 Create the circumstances in which industry can take more responsibility for informing and supporting the education sector in preparing people for work in the knowledge economy; 4.3 Ensure that more people are encouraged to recognise career opportunities through science, technology, engineering and mathematics (STEM).

The strategy also contained an extensive series of policy instruments for achieving these imperatives and objectives. Each action was ascribed to a lead department or agency, with target dates and levels of investment clearly defined. These actions are included in Annex 2. The policy instruments employed show a mixture of actions which fall into categories outlined in Table 1. Examples of this include (not exclusive, please see Annex 4 for a full range of actions):

- Knowledge generation – the strategy included actions intended to: provide access to R&D funding and support (from DARD and Invest NI, for example); offer support for scientific research and technology centres (for example, a target to establish seven Science and Technology Exploitation centres was included); and develop human capital development for science (actions to increase STEM uptake among students);
- Knowledge diffusions – the strategy contained actions which sought to exploit the NI Science Park; introduce a scheme of Innovation Vouchers (via Invest NI); utilise technology and knowledge transfer offices (through Queen's University Belfast and the University of Ulster); and to develop clusters (through the Further Education sector) and,

- Knowledge exploitation – the strategy included actions intended to: increase the number of economically relevant PhDs (with collaboration of business and academia); offer support and coaching to business (through Invest NI's Business Improvement Service); introduce a venture capital initiative; and encourage innovation-orientated public procurement.

The actions also contained a range of traditional (e.g. R&D funding and support), emerging (e.g. venture capital) and experimental (innovation-led public procurement) policy instruments.

Collaboration is a key element of the strategy with actions designed to encourage cooperation between businesses, businesses and academia, and on a cross-border basis.

The 2008 to 2011 plan was based upon an 'evaluation of the Regional Innovation Strategy'. It recognises that progress 'is an iterative process' and includes mechanisms to establish and monitor 'indicators against which performance will be benchmarked on an annual basis', through a review process.

In summary, an analysis of the 2008 to 2011 action plan shows it to contain many elements of OECD theory and guidance. It puts forward a contextual, multi-dimensional, systemic approach to innovation, in which R&D is an integral feature but not the exclusive measure of development. It sets out a clear vision, based on opportunities and challenges, and was developed with stakeholder impact. The policy mix reflects the identified challenges and opportunities, and also Northern Ireland's institutional arrangements. The policy mix also contains instruments from the OECD three policy areas – knowledge generation, diffusion and exploitation. The policy mix contains actions to encourage collaboration at a number of levels. Mechanism for review and benchmarking were included in the policy. Significantly, it also took a long-term view of innovation policy, leaving room for flexibility and incremental progress.

The Department's own assessment of the plan demonstrates that it was successfully delivered. A summary of the assessment's findings is as follows:

- Imperative One: "To establish Northern Ireland as an outward-focused & competitive region in the global knowledge economy – with an international reputation for innovation excellence" - All 17 actions falling under Imperative One have been progressed with many targets achieving positive results;
- Imperative Two: "To encourage Northern Ireland's businesses to become more innovative and creative in order to compete in the global market" - 37 of the 38 actions are well on target with many already achieving positive results;
- Imperative three: "To encourage Northern Ireland Government & the wider NI Public Sector to lead by example in championing and exploiting Innovation and R&D" - The majority of the 19 actions met their targets.
- Imperative four: "To ensure that the Northern Ireland education system adopts an enhanced role in developing a culture of innovation and creativity and enables people to recognise opportunities in the knowledge economy" - Progress on the 28 actions was very positive.

It is also worth noting that the Northern Ireland Research and Development (R&D) Statistics 2010 show that, coinciding with the period covered by the plan:

- There was an increase of £38.6m (8%) in cash terms in Northern Ireland total R&D expenditure between 2009 and 2010, driven almost equally by Businesses and the Higher Education sector;
- Total business R&D expenditure in 2010 was £344.0m, up £20.3m (6%) in cash terms on the previous year; and,

- Between 2005 and 2010, overall Business R&D expenditure increased by 123% in cash terms (from £154.3m).

Whilst the above certainly points to success, it should be borne in mind that in the same period:

Companies with 250 or more employees accounted for 61% of business R&D expenditure in 2010, although they represented only 10% of R&D performing companies. Small firms (i.e. those with less than 50 employees) represented some 69% of R&D performing companies and accounted for just under a fifth (17%) of total business R&D expenditure while R&D expenditure by Small and Medium-sized companies (SMEs) accounted for 39% of the total business expenditure. Total SME expenditure fell by £10.9m (-8%) from 2009 to 2010, in cash terms. However, since 2005 SME expenditure has increased by 78% to £133.4m.*

Between 2001 and 2008 the proportion of R&D expenditure attributed to large companies fell, although it has increased in the last two measure years (59% in 2010, 57% in 2009, 41% in 2008, 49% in 2007, 44% in 2006, 47% in 2005, 44% in 2004, 46% in 2003, 60% in 2002 and 69% in 2001).

Also in 2010:

- The majority (71%) of R&D expenditure was from within the manufacturing sector;
- 68% of Business R&D expenditure was carried out externally owned companies, representing 13% of all R&D performing companies;
- 54% of SME expenditure on R&D came from their own funds, 17% from government funding;
- 50% of Business (non-capital) expenditure on R&D was on experimental development, 42% on applied research and 8% on basic research; and
- 94% of expenditure was on in-house R&D, 6% was on purchased R&D (71% of in-house expenditure was non-capital);
- The number of companies receiving R&D tax credits increased for the fourth year in the row (52 in 2007, 57 in 2008, 77 in 2009 and 80 in 2010);
- Collaborations between business and academia fell slightly from 50 in 2009 to 46 in 2010 (of which 11 were with Higher Education, 21 with other businesses, and 14 with both).

Furthermore employment in R&D has increased over recent years, in 2010 3,950 employees (on a Full-time Equivalent (FTE) basis) were engaged in R&D work – 8.2% of all employees of companies involved in R&D. Comparable figures for 2009 were 3,520 employees or 5.8% of all employees of R&D companies (2008: 5.7% 2007: 5.7%, 2006: 5.9%, 2005: 5.2%, 2004: 5.2% and 2003: 6.3%). In 2010, salaries and wages per R&D FTE was £35,000, a decrease of 1.7% from £35,600 in the previous year.

The data presented in the Northern Ireland Research and Development (R&D) Statistics 2010 retains a focus on R&D expenditure as primary measure of progress. Although other measures are included – measures of human capital and collaboration – there may be scope to provide a more holistic approach. As recommended by the OECD the following measures may aid a better understanding of Northern Ireland's innovation landscape:

- Tertiary educational attainment;
- Students in tertiary education;
- Patents per x inhabitants;
- High-technology and knowledge intensive service employment as a percentage of total employment;

- Co-inventions within region, co-inventions within country, and co-inventions with foreign regions.

Whilst such statistics are available in other Northern Ireland publications, collecting this data together could benefit the quantitative understanding of the region's innovation landscape. One possible suggestion would be the development of a data series that is similar to the EU's Innovation Score Board (see Box 1).

Box 1: European Innovation Scoreboard

The EU Innovation Scoreboard examines 25 innovation indicators to rank country performance. Indicators are divided into three categories:

- "Enablers", i.e. the basic building blocks which allow innovation to take place (human resources, finance and support, open, excellent and attractive research systems)
- "Firm activities" which show how innovative Europe's firms are (firm investments, linkages & entrepreneurship, intellectual assets); and
- "Outputs" which show how this translates into benefits for the economy as a whole (innovators, economic effects).

NESTA's assessment of the action plan (2009) noted that the plan 'demonstrates the commitment of a wide range of Northern Ireland organisations to improving innovation performance' and that this 'broad-based commitment to an innovation agenda provides a strong basis for future development'. The also concluded that the plan exhibited 'a very significant level of support' and, in doing so, created 'opportunities to change behaviours and to encourage firms to undertake more R&D and innovation'.

In a more general sense NESTA noted:

Institutional structures in Northern Ireland also mean that policy co-ordination for innovation in Northern Ireland is limited with responsibility for delivering on Northern Ireland's regional innovation strategy residing within a single department (DETI). Albeit supported by an inter-departmental working group, this structure limits the group's influence over other departments' and agencies' policies which might influence Northern Ireland's innovation capability. Finally, with the Northern Ireland system no-one currently has responsibility for 'innovation-proofing' proposed policy developments, again weakening the challenge function. In the area of Science and Technology MATRIX is a notable exception but this addresses only an element of the broader innovation agenda.

Concluding:

In terms of innovation, Northern Ireland therefore currently has something of an institutional deficit compared to its leading international competitors.

A key recommendation from the paper was that Northern Ireland establish an innovation council with capabilities to 'analyse, challenge and support developments in innovation capability'. One suggestion was extending MATRIX 'towards a more holistic and system-wide innovation agenda and combining it with the existing Inter-departmental Working Group on Innovation within a single non-departmental government body'.

The belief being that such a body would improve Northern Ireland's monitoring, analysis and challenge functions, enabling 'systematic or regular monitoring of Northern Ireland's innovation capabilities'.

Other recommendations arising out of NESTA's assessment of Northern Ireland's Regional Innovation System included:

- A Service Innovation Grant Scheme to support non-technical innovation – to directly benefit innovation in the service sector;

- A requirement for collaboration to encourage co-operation on innovation and R&D; and
- Northern Ireland Government should work to implement a two-tier funding system to encourage stronger regional alignment of the universities. This funding system would be based on the Scottish two-tier model outlined in Box 2.¹⁵

Box 2: New Horizons – The Scottish Approach

The Scottish approach to university funding comprises of two funding streams. The General Fund for Universities (GFU) provides formula-based, mainstream funding for universities with fewer restrictions and more flexibility on how this money can be spent. The Horizon Fund for Universities (HFU) will provide additional funding but this will be linked to outputs or outcomes related to key government strategies and priorities. The overarching aim is to ensure that public funding for universities is supporting “activities which are well aligned with the Scottish Government’s Purpose, its economic and skills strategies and its other policy frameworks”.

4 Case studies

The following section provides four case studies of regional innovation strategies, on from each of the OECD groupings - building on current advantages, supporting socio-economic transition, and catching up.

4.1 Baden-Württemberg, Germany – building from current advantages

Baden-Württemberg's regional economy based upon its automotive, mechanical and pharmaceutical industries.

Statistically, the region is one Europe leading sub-national areas for R&D and innovation:

- In 2007 the region's R&D expenditure was €15.7bn, equivalent to 4.38% of national GDP;
- In excess of 80% of R&D activities are accounted for by business sector, with 10% emanating from the University Sector and 9% from the non-university research institutes;
- In 2009, 32% of patents applications submitted to the German patent office (total applications 15,532) came from Baden-Württemberg; and
- In 2007, 116,234 personnel (full-time employed) were engaged in R&D in the Baden-Württemberg region, 23% of the national total.¹⁶

The region is a Federal state and has legal and economic power to 'run a comprehensive and ambitious research and innovation policy'. The Ministry for Science, Research and the Arts has responsibility for research policy and support, focussing on higher education institutes non-university research institutions. The Ministry for Economic affairs is responsible for the business-orientated technology policy and support.¹⁷

In addition to teaching and research, Baden-Württemberg's universities also take part in technology transfer, and offer training and qualifications. The universities have a considerable level of autonomy and are responsible for their own profiles and areas of focus.

Baden-Württemberg's higher education research infrastructure includes:

- nine universities;
- 23 state universities of applied sciences, six colleges of education;
- 10 colleges of art and music;
- eight professional academies; and,
- numerous state-accredited private higher education institutions.¹⁸

In addition, the non-higher education sector comprises a large number of research institutions that are active in the areas of basic and application-oriented research.

Technology transfer is supported by a decentralised network of Steinbeis Foundation transfer centres. The region also has technology-specific and sector-specific institutions which coordinated networks, including: BIOPRO Baden-Württemberg GmbH, Photonics BW e.V., Baden-Württemberg: Connected (bwcon) and Medien- und Filmgesellschaft Baden-Württemberg (MFG), a media and film company.

Baden-Württemberg research and technology policy is characterised by cooperation between people and institutions in the science, business and political sectors. The government's

16 European Commission Research Monitor Baden-Württemberg – regional profile <http://www.rim-europa.eu/index.cfm?q=p.regionalProfile&r=DE1#policy>

17 Ibid

18 Ibid

research policy prioritises innovation support, education and further training. Policy priorities include:

- Scientific excellence – which seeks to maintain the region's international position in this area. Policy instruments include:
 - profile formation via local setting of priorities and inter-location competition;
 - creation of performance incentives for top research;
 - promotion of framework conditions conducive to research; and.
 - intensification of quality assurance measures for public research, taking account of international standards.¹⁹
- Enhancing science-industry cooperation through partnership. Policy instruments include:
 - promotion of technology transfer and science-industry networking; and,
 - ensuring that industry-oriented non-university research institutions can provide the performance they need to provide in order to serve as innovation drivers for industry.²⁰
- Targeted support for young researchers – which seeks to ensure future staffing needs at research institutes and innovative companies can be met. Policy instruments include:
 - young researchers' opportunities for independent research are being enhanced; and,
 - a broad spectrum of programmes is being offered for promoting doctoral-degree projects, especially within the framework of structured doctoral research groups and graduate schools, as well as for promoting post-doctoral work and junior professorships.²¹

Support measures offered within the region include:

- Innovation vouchers ;
- Patent application support;
- Innovation assistance;
- Funding of joint research projects;
- Young innovators (funding science-based start-ups from universities)
- Cluster policy providing financial support and assistance to those wishing to create clusters;
- Technology funding programme – provides R&D grants and loans to business and supports the creation of an 'innovation climate'; and,
- Innovation coaching – programme aiming to foster innovation amongst SMEs.²²

4.2 The Basque Country – socio-economic transformation

The Basque Country successfully repackaged a former industrial manufacturing area. New technologies and R&D are rising in prominence, with government promoting bioscience, nanoscience, alternative energy and electronic transport in particular.

- R&D expenditure is equivalent to 1.96% of GDP, just below Spain's leading region Madrid (which spends the equivalent of 2% of GDP on R&D);
- Basque companies have financed almost 59% of the total expenditure and have executed 81.1%;

19 Ibid

20 Ibid

21 Ibid

22 Ibid

- Today, seven Basque companies are placed among the 1,000 European companies with the highest investment in R&D;
- 30.5% of SMEs have developed technological innovation;
- Medium and high-tech exports represent 51.5% of total exports;
- In 2009, 16,684 people were working in R&D and 10,374 were working as researchers;
- In 2009, 190 Patents and 107 Utility Models were published; and,
- 42% of the population aged between 25 and 64 are graduates of higher education.²³

The Basque government Department for Industry, Trade, and Tourism, is responsible for regional innovation policies, alongside its agency the Society for Industrial Promotion (SPRI). The SPRI's work covers a number of areas:

- Grants and services;
- Infrastructure solutions;
- Financial solutions;
- Entrepreneurs;
- Internationalisation;
- Innovation and technology; and,
- Training and awareness.²⁴

In 2009 the agency has a budget of €137m to support innovation activities.

Current policy instruments fall under five headings:

- Innovation and Competitiveness Support, which includes:
 - Encouraging the improvement of companies competitiveness, facilitating partnerships and networks.
 - Itinerary of innovation and competitiveness. To support the development of competitiveness and Innovation routes in companies based on developing strategic analysis for the future.
 - Developing innovation projects in the areas of: Rethinking the Strategy of the Organisation; Market Innovation and Organisation; Development of Innovation Capacity.
- ICTs for competitiveness, which includes:
 - Promoting the digitisation of the internal processes of SMEs and the relationships with customers, suppliers and governments.
 - Encouraging the incorporation of ICT through the support of collaborative projects developed by a group of companies, promoted by associations of companies and lead by SMEs which innovate in the use of ICTs.
- R&D Support, which includes:
 - Improving the competitiveness of enterprises through the promotion of R&D projects to develop new products.
 - Supporting integrated industrial research projects in strategic sectors and promoting public-private partnerships in research and technological development and innovation.
 - Promoting R&D actions oriented to the use or generation of marketable knowledge to create new businesses in new scientific and technological based companies.

23 European Commission Research and Innovation Monitor – The Basque Country <http://www.rim-europa.eu/index.cfm?q=p.baseline&r=ES21>

24 Ibid

- Technical reports qualifying for tax purposes.
- Supporting the noneconomic activity of Technology Centres and Technology Corporations.
- Supporting Science, Technology and Innovation Dissemination projects.
- Modernisation and renovation of manufacturing equipment, which includes:
 - Achieving a high degree of modernisation of production equipment for small and medium industrial enterprises.
- Entrepreneurship, which includes
 - Supporting new innovative industrial projects, protected by a Business Innovation Centre (BIC), in the maturation of the idea and the starting up stages.²⁵

The Basque Country government has promoted the Basque Science, Technology and Innovation Network to develop markets, build smart technology infrastructure, coordinate networking.

This Network is divided into three sub-systems:

- Scientific and University Sub-system: Universities, Cooperative Research Centres (CIC) and Fundamental and Excellent Research Centres (BERC);
- Technological Development and Innovation: Sub-system: Technology and Sectoral Centres, International Centres for Technological Development and Transfer, Certification Authorities and Laboratories, Public Research Organisations, Business and Health R&D Units; and
- Innovation Support Sub-system: Technology Parks, Business and Innovation Centres, Intermediate Organisations for Innovation.²⁶

Financial support measures include:

- GAITEK: aims to improve the competitiveness of business through R&D. The initiative supports R&D actions, such as studies of technical viability prior to the starting-up of the project or other actions taken within the project. In 2011, €37.3m was made available through the fund;
- ETORGAI: supports the implementation of integrated industrial research projects in strategic sectors and promotes public-private partnerships in Research and Development. It is also intended to strengthen SMEs and facilitate application to Framework Programme 7. In 2011, €10m was available through the fund.
- Innovación Excelente Aldatu: aims at encouraging businesses to develop the ability to innovate systematically, by way of innovation in marketing and organisation. Projects focus on key areas, such as Market Innovation, Rethinking the Strategy of the Organisation and Organisation and Development of Innovativeness among Businesses. In 2011, €6m was made available through the fund.
- IKERTU: aimed at strengthen the competitiveness of scientific and economic sectors. The fund supports training and the enhancement of human capital. In 2011, €1.1m was available through the fund.
- ETORTEK: fund supporting regional technology centres. In 2011, €9m was available through the fund (falling form an initial €26.6m); and,
- SAIOTEKL: aimed at supporting members of Basque Science, Technology and Innovation Network to carry out their fundamental research activities. In 2011, €9m was available through the fund (falling form an initial €33.38m in 2006).²⁷

25 Ibid

26 Ibid

27 Ibid

4.3 Wielkopolska, Poland – Catching up

Wielkopolska is of Poland's most important industrial centres, accounting for one tenth of Polish GVA. The region is home to large investors in the automotive industry. It produces 7.3% of the domestic car output, 40% of the domestic output of public transport vehicles and 80% of the domestic output of trucks and tractors. The region is known for business process outsourcing and logistics sectors. It is also the destination for a considerable amount of foreign direct investment, estimated at €4.7bn. In 2009, there were 5,713 foreign firms operating in Wielkopolska, 8.7% of all foreign firms in Poland.²⁸

Despite this inter-regional disparities remain: Pozan, the region's capital, is the most vibrant area, whereas the northern and southern areas have not been able to exploit their geographic advantages to the same extent as the central areas.

The region faces three major challenges:

- Embedding FDI into the innovation system: improving cooperation between regional public research institutions;
- Supporting the development and emergence of innovative companies – in 2005 approximately one third of companies in the region engaged in innovation. Between 2003 and 2005 innovation expenditure fell by 40%. The OECD has recommended that innovation support should be tailored to specific sub-regional contexts. In Poznan, support for high-tech companies is applicable, but in other regions incremental innovations may be more appropriate; and,
- Establishing a modern educational and training system: the lack of a modern education and training system has ensured that arresting high unemployment difficult. The OECD suggest that the supply of specialised human resources, such as science and engineering graduates, is insufficient to meet the needs of the region.²⁹

Wielkopolska's regional innovation system is governed by a regional parliament, a Board of the Region and the Marshalls Office. The regional parliament is responsible for the adoption of local legislative acts, regional development strategy and regional programmes, election and dismissal of members of the board as well as adoption of the regional budget. The Board of the Regions, with the assistance of the Department of Regional Policy and Department of Implementation of Regional Programme is the managing authority of the Wielkopolska Regional Operational Programme 2007-2013 (WROP).

The budget for developing a regional innovation system in the period 2007 to 2013 is €508m (the average annual funding of innovation support measures is approximately about €72m during the seven-year programming period). The main objective of development policy is to improve the organisation and coordination of business intermediary organisations, improve the quality and facilitate the access to innovation advisory services and training, as well as tailor the services to the company needs through continuous skills development and exchange of experts. Specific objectives contained in the WROP include:

- Improving investment conditions
- Increasing the 'professional activity' of inhabitants; and,
- Knowledge and innovation transfer.³⁰

In addition WROP Competiveness of Enterprises priority includes measures to finance:

- The building of an entrepreneurship incubator to ensure provision of systemic business advisory services

28 European Commission Regional Innovation Monitor Region Wielkopolska <http://www.rim-europa.eu/index.cfm?q=p.baseline&r=PL41>

29 Ibid

30 Ibid

- The purchase of research equipment to increase the Wielkopolska innovation;
- Investment in projects for micro- and small-medium size enterprises; and,
- Cluster initiatives.³¹

Specific support measures include:

- Development of the system of financial instruments in support of entrepreneurship: intended to improve access to finance for micro-businesses and SMEs. The funding is made available to businesses in the form loans, guarantees and other financial instruments. Fund stability is encouraged by ensuring that repayments from business are invested in other firms. In 2011, approximately €17.1m was made available through the fund (made up €4.3m of national funding and €12.8m from EU structural funds).
- Innovative for Wielkopolska: awards funding to projects which improve innovation, competitiveness, the flexibility of the labour market and create jobs. €50,000 of regional funding was been available annually.
- Support to linked to the Regional Innovation Strategy: Three funding stream are available, for the creation and development of businesses and intermediary organisations, for the construction of new buildings or the development of existing ones, and the Joint European Support for Sustainable Investment in City Areas. A total of €10.1m was made available through these streams in 2011 (comprising of €1.8m National funding, €6.7m EU structural funds, and €1.6m private funding).
- Science-Industry collaboration: three funding streams are in operation to promote science-industry collaboration – those aimed developing regional strategies, for the development of networks, and for supporting PhDs. In 2011, €3.9m was made available through these streams (comprising €0.6m National funding and €3.9m EU structural funds).
- Development of networks and co-operation: funding is available for the projects aimed at the promotion of clusters/networks, purchase of specialised advisory services, technology/knowledge transfer and infrastructure investments. In 2011 approximately €7m was made available through this stream (comprising of €6m EU structural funds and €1m private funding).
- Support to SMEs development: aims at the socio-economic development of the region through the support for the SME sector with the view to increasing the innovativeness of enterprises, extending their activities, and creating new work places. In 2011 approximately €42m was made available through this stream (consisting of €22m EU structural funds, €18m private funding, and €1m National funding).³²

31 Ibid

32 Ibid

Annex 1: Innovation policy instruments targeting SMEs³³

Target of support	Reactive tools providing inputs for innovation	Pro-active tools focusing on learning to innovate
Global Connections	Experience poles Cross-border technology centres Funding for international R&D	International technology transfer scheme Mobility schemes Support for global networking of firms Cross-border innovation vouchers Lead market initiatives
Regional System	Collective technology or innovation centres	Cluster policies Ro-active brokers, matchmakers Innovation Vouchers Support for regional networking of firms Schemes for acting on the culture of innovation
Individual firms	Incubators with 'hard' support Traditional 'reactive' technology centres Seed and venture capital funds R&D subsidies or tax incentives	Management advice Incubators with 'soft' support Pro-active technology centres Audits, monitoring of needs Innovation coaches Techno-economic intelligence schemes

33

OECD (2011), Regions and Innovation Policy, OECD Reviews of regional innovation – regions and innovation policy , OECD Publishing <http://dx.doi.org/10.1787/97892640970803-en>

Annex 2: NI Regional Innovation Action Plan 2008-11³⁴

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 1				
Key Objectives	Actions	Lead	Target Date	Investment
1.1 Ensure that Northern Ireland is playing its full role in the UK, all-island, European, and global innovation arenas.	1.1.1 DETI and Invest NI will continue to work with DETE to explore areas of North/South co-operation in Innovation and R&D including, for instance, building our R&D infrastructure by increasing the number of commercially focused Science and Technology Exploitation Centres of Excellence including the development of industry led Competence Centres. The opportunity for all-island centres will be considered where there is potential to be realised.	DETI/Invest NI in partnership with DETE & InterTradeIreland	7 New Centres established 2008-2011	£21m over 2008-2011
	1.1.2 Through the US-Ireland R&D Partnership, the DHSSPS, Invest NI and DEL will work with the US Department of Health and Human Services, the National Institutes of Health (US and RoI), the National Science Foundation (US) and Science Foundation Ireland (RoI) to support world class collaborations with potential to deliver new discovery or the creation of sustainable business ventures and/or improved health care provision.	DHSSPS/DEL/ Invest NI	Ongoing throughout 2008-2011	£3m from DHSSPS under the new funding for innovation budget; £3m from DEL/ Invest NI
	1.1.3 DHSSPS will develop a Telehealth Hospital Links scheme to provide for the use of telehealth technology to monitor remotely, on a daily basis, the vital signs of those patients with long-term conditions who are most at risk of hospital admission. Thus enabling more effective management of disease, maintaining patients' independence at home, maximising the use of healthcare professionals' time and reducing the use of hospital capacity. By 2011, 5000 people will have access to a remote monitoring service for their condition.	DHSSPS	Ongoing throughout 2008-2011	£10m over the period 2008-2011 under the new funding for innovation budget

34

DETI Regional Innovation Strategy Action Plan 2008-2011 http://www.dctini.gov.uk/regional_innovation_strategic_action_plan_2008-2011.pdf

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 1				
Key Objectives	Actions	Lead	Target Date	Investment
1.1 Ensure that Northern Ireland is playing its full role in the UK, all-island, European, and global innovation arenas.	1.1.4 A new programme of investment support will be developed for the Creative Industries under the EU INTERREG IVA Programme Priority 1: Regional Co-operation for Enterprise to support Creative Industries in NI, the Six Border Counties of the RoI and Western Scotland.	SEUPB and stakeholders including Invest NI in partnership with DETI and DCAL	Programme to go to tender May 2008	The Enterprise Theme of the EU INTERREG IVA Programme has an initial allocation of €70m
	1.1.5 DETI/Invest NI will work with counterparts in the RoI to establish an all-island approach to promote and support SMEs for the mutual enhancement of 7 th EU Framework Programme funds. For Northern Ireland, this will be delivered through an enhanced Invest NI RTD R&D directorate.	DETI/Invest NI, in partnership with DETE & InterTradeIreland	Ongoing throughout 2008-2011	£1.3m over the period 2008-2011 under the new funding for innovation budget
	1.1.6 DETI will work with its counterparts in the RoI to establish collaborative & strategic arrangements between MATRIX (the NI Science-Industry Panel) and the Irish Advisory Science Council (ASC) for optimising the commercial exploitation of science, technology and innovation across both jurisdictions of the island.	DETI	Commencing April 2008	Resource Neutral
	1.1.7 DETI will work with its counterparts in the RoI to establish collaborative arrangements between the RoI's Inter-Departmental Committee Science, Technology and Innovation (IDC) and the NI Inter-Departmental Working Group on Innovation (IDWG).	DETI	Commencing April 2008	Resource Neutral

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 1				
Key Objectives	Actions	Lead	Target Date	Investment
1.1 Ensure that Northern Ireland is playing its full role in the UK, all-island, European, and global innovation arenas.	1.1.8 DARD and AFBI will work with appropriate science institutions locally, nationally and internationally to develop collaborative research, including: (i) increasing the range, number and extent of MoUs; (ii) organising and managing an international conference on Renewables; (iii) seeking to secure EU Framework 7 funding annually; and (iv) meeting with DEFRA and RoI counterparts as and when beneficial.	DARD/AFBI	2008-2011	Resource Neutral
	1.1.9 In developing applied research proposals for external funding from the EU's Seventh Framework Programme (FP7), the UK Collaborative Technology Programme and similar national and international initiatives Queen's University will be proactive in encouraging participation by local companies and supporting them within the QUB Partnership by: (i) considering the potential for a university-based advisory and support service; (ii) ensuring university participation in more than 12 FP7 contracts; (iii) ensuring that 8 local companies are participating in FP7 contracts.	QUB in partnership with the University of Ulster During 2008 By 2010 By 2010	2008-2011	£250k per annum
	1.1.10 The universities will develop and promote participation in collaborative R&D and innovation in national, all-island and international initiatives, programmes and networks with the aim of establishing up to 10 major research infrastructure investments.	QUB in partnership with the University of Ulster	By 2009	Resource Neutral
	1.1.11 DEL, working with counterparts in the RoI, will establish a focused funding stream to support cross-border university research with the overall aim of strengthening the all-island research base.	DEL	To commence 2008-2009	£10.5m for period 2008-2011 under the new funding for innovation budget

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 1				
Key Objectives	Actions	Lead	Target Date	Investment
1.1 Ensure that Northern Ireland is playing its full role in the UK, all-island, European, and global innovation arenas.	1.1.12 Working with Invest NI, DETI and the Universities, DHSSPS's European Centre for Connected Health will develop by March 2009 an agreed strategy for the introduction of new technologies to health and social care to 2012.	DHSSPS	2007-2009	Resource Neutral
1.2 Enhance and promote the development of an innovation culture in Northern Ireland (across all sectors of business, government & academia/education).	1.2.1 HSC R&D Office, with support from Invest NI, will support the development of HSC Innovations to raise awareness, provide incentives for innovation and, to pursue the potential of intellectual property assets to generate revenue streams that will ultimately benefit services users in the HSC and beyond.	DHSSPS, Invest NI	Ongoing over period 2008-2011	£1.6m for period 2008-2011
	1.2.2 The NI Science Park, through its tenant businesses and extensive network of contacts, will continue to facilitate and run workshops to highlight innovation best practice and encourage the NI business and academic communities to collaborate and participate in UK, all-island and wider European research initiatives to mutual economic benefit.	NISP with sponsorship from the private sector and through the CONNECT programme	At least 6 workshops each year will be organised directly by NISP throughout 2008-2011	Resource neutral
1.3 Encourage Northern Ireland business and universities to be more outward focused and raise their profiles internationally.	1.3.1 Invest NI will continue to promote NI research by means of outward and inward technology missions.	Invest NI	2 Technology Missions Per Annum	£50k per annum for period 2008-2011

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 1				
Key Objectives	Actions	Lead	Target Date	Investment
1.3 Encourage Northern Ireland business and universities to be more outward focused and raise their profiles internationally.	1.3.2 Queen's University, as a Russell Group member, will establish strategic relationships with the UK Research Councils, major charities, Science Foundation Ireland and the Higher Education Authority in Ireland to ensure that Northern Ireland is linked closely with key national and all-island research and innovation initiatives. This will include: (i) agreement of strategic partnerships between QUB & MRC and QUB & CRUK; (ii) development of strategic partnerships with SFI and HEA.	QUB	During 2007-2008 Academic Year	£25k per annum
			During 2008-2009 Academic Year	£25k per annum
	1.3.3 Queen's University will develop further its high quality international R&D and innovation partnerships that complement the outward looking priorities of business and government e.g. US (in particular Georgetown University, Washington), India (in particular the National Institute of Immunology), China (in particular the QUB/BP Ionic Liquids Laboratory at Dalian) and SE Asia (particularly the link with Petronas in Malaysia). This will include: (i) establishing a pilot initiative with research partners in India to promote technology transfer collaboration in ICT and electronics (ii) extending the Strategic Institutional Partnership network to include China.	QUB	During 2008-2009 Academic Year	£200k per annum
			During 2008-2009 Academic Year	£50k per annum

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 2				
Key Objectives	Actions	Lead	Target Date	Investment
2.1 Ensure that Northern Ireland business (and the business representative organisations) become more proactive in leading and informing the innovation agenda.	2.1.1 MATRIX - The Northern Ireland Science Industry Panel (and its related Horizon Scanning Programme) to obtain Executive agreement on the priorities for commercial exploitation of R&D for greatest benefit to the NI economy.	DETI/MATRIX	December 2008	£0.5m over the period 2008-2011 (including £0.1m under the new funding for innovation budget)
	2.1.2 MATRIX will publish at least 5 Horizon Panel reports on NI's opportunities for the commercialisation and exploitation of key strategic technologies.	DETI/MATRIX/Horizon	December 2008	£0.7m over the period 2008-2011 (including £0.2m under the new fund for innovation budget)
	2.1.3 The Federation of Small Businesses will explore with the Further Education (FE) sector the potential for a joint project to promote innovation to small businesses while also increasing awareness of how FE can work with the business community.	FSB in partnership with the FE Sector	1 event per month	Resource Neutral
	2.1.4 The NI Skills Expert Group will work with MATRIX to address common issues around R&D and science & technology skills.	DEL/DETI/MATRIX	Ongoing throughout 2008-2011	Resource Neutral
	2.1.5 Centre for Competitiveness will design and launch a company innovation process standard based on the EU model of Best Practice with the aim of targeting 500 companies over 2008-2011. Open to all sectors. Process will use an industry-led forum, with representatives from NI Government.	Centre for Competitiveness	Ongoing throughout 2008 2011	2008 - £100K 2009 - £125K 2010 - £175K 2011 - £225K
2.2 Promote an increased level of innovation and R&D activity within Northern Ireland businesses (including encouraging businesses to invest more in innovation and R&D).	2.2.1 By December 2008 DETI working with DFR, Invest NI, DIUS, HM Treasury and HM Revenue and Customs will consider how to more actively promote the take-up of the R&D Tax Credit Scheme by Northern Ireland businesses.	DETI/DFP/Invest NI/DIUS/HMT/HMRC	December 2008	Resource Neutral

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 2				
Key Objectives	Actions	Lead	Target Date	Investment
2.2 Promote an increased level of innovation and R&D activity within Northern Ireland businesses (including encouraging businesses to invest more in innovation and R&D).	2.2.2 DARD will establish a fund to stimulate private sector investment in R&D by seeking proposals from agri-food and rural enterprises for relevant, innovative R&D work. A minimum of 20 proposals will be funded by the end of the period.	DARD in partnership with industry	Ongoing throughout 2008-2011	£2.46m over the period 2008-2011 from the new funding for innovation budget
	2.2.3 Invest NI will establish an initiative to increase demand for innovation through awareness raising and promotion on an all-island basis and, through the recruitment of a range of Innovation Advisors to provide increased levels of hands on professional support and assist companies identify priority areas and develop implementation strategies for innovation that can be supported through a range of innovation programmes. The aim is to attract 300 companies new to R&D.	Invest NI	Ongoing throughout 2008-2011	£4.5m under the new funding for innovation budget
	2.2.4 Invest NI will launch an enhanced innovation vouchers scheme modelled on the Enterprise Ireland Pilot Scheme, to provide SMEs with access to technical support from publicly funded research institutions throughout the island of Ireland.	Invest NI	2008-2011	£0.9m under the new funding for innovation budget
	2.2.5 The Further Education (FE) sector will work with local companies, through workforce development forums and other networks, to develop and facilitate clusters which enhance innovation activities within the local economy.	FE Sector	Core activities ongoing from September 2007-2010	Resource neutral
	2.2.6 Centre for Competitiveness will develop a process for identifying NI Innovation Champions & related Case Studies with the aim of developing over 150 case studies over 2008-2011.	Centre for Competitiveness	Ongoing throughout 2008-2011	2008 - £50K 2009 - £80K 2010 - £100K 2011 - £150K

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 2				
Key Objectives	Actions	Lead	Target Date	Investment
2.2 Promote an increased level of innovation and R&D activity within Northern Ireland businesses (including encouraging businesses to invest more in innovation and R&D).	2.2.7 Centre for Competitiveness will run Quarterly Innovation Seminars - aimed to keep innovation to forefront of business thinking with the goal of addressing over 400 businesses over 2008-2011.	Centre for Competitiveness	Ongoing throughout 2008-2011	2008 - £30K 2009 - £35K 2010 - £40K 2011 - £45K
	2.2.8 The NI Science Park will continue to invest in the innovation infrastructure by increasing the availability of agile, high capacity, fibre networked workspace to circa 270,000 sqft by March 2011 (current baseline 150,000 sqft (gross)) with a view to accommodating knowledge-based, high-technology businesses employing circa 1500 staff, 50% of which will be graduates primarily engaged in R&D.	NISP	Additional 60,000 sqft of workspace by March 2009 270,000 sqft (gross) of workspace by end 2011	£4.25m (Government) and £2m (Private Sector) £6m (Private Sector)
	2.2.9 By April 2009, the NI Science Park, working with Invest NI, Belfast City Council and other stakeholders, will examine the development of a programme that will, through mentoring, networking and business planning support, assist in the creation of new micro-based business starts in the knowledge sector, with a particular emphasis on the young entrepreneur.	NISP in partnership with QUB, UU, Invest NI, BCC and other stakeholders	Annual £25k Awards throughout 2008-2011 Establish NISP-CONNECT by April 2009 Establish panel of 500 mentors by April 2009 Establish programme of 40 school visits to Thompson Dock at NISP	£300k over three years £200k per annum Investment of £1.1m by NITB BCC, EHS and Better Belfast
	2.2.10 The Institute of Directors, working with Business Alliance colleagues and other agencies, will deliver 2-3 events aimed at raising awareness and increasing the application of innovative practices within NI firms.	IoD/Centre for Competitiveness	2008-2011	Resource neutral with sponsorship to cover costs of events and their promotion

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 2				
Key Objectives	Actions	Lead	Target Date	Investment
2.3 Encourage and support Northern Ireland businesses in building the capacity to take forward innovative ideas into new products, services and processes.	2.3.4 DEL, under "Success through Skills", will lead a 'Skills for Innovation' project aimed at increasing the capacity for more innovation in NI businesses. By November 2008 carry out a literature review on the human facilitators/inhibitors to innovation in N.I. businesses. By February 2009 develop interventions to address recommendations of literature review.	DEL	2008-2009	£20k
	2.3.5 Through the revision of the interdepartmental Unlocking Creativity Strategy DCAL will take the lead in developing support mechanisms for the creative industries commencing with the establishment of a Creative Industries Seed Fund.	DCAL	Commencing 2008-2009	£5m under the new funding for innovation budget over the period 2008-2011
	2.3.6 Building on the Higher Education Innovation Fund 1 (HEIF 1) Programme, DETI/Invest NI and DEL will support the universities' core Knowledge Transfer activities through the second round of HEIF, a permanent "third stream" fund.	DETI in partnership with DEL & Invest NI, and also QUB & University of Ulster	DEL formula allocations commenced Academic Year 2007-2008. Invest NI funding to commence 2008-2009	£3m per year over the period 2008-2011
	2.3.7 Centre for Competitiveness will run an annual innovation conference attracting over 150 delegates per annum.	Centre for Competitiveness	Ongoing throughout 2008-2011	2008 - £50K 2009 - £60K 2010 - £65K 2011 - £75K
	2.3.8 University of Ulster will work with QUB, DEL, Invest NI, and local councils' economic development functions to deliver seminars, workshops and other events aimed at enhancing the absorptive capacity of NI businesses for innovation. This includes: (i) 14 events with FE and QUB; (ii) 30 events under UU Knowledge Club (with average business attendance of 40).	University of Ulster	Over period 2007-2010 During period 2007-2010	£50k per annum 2007-2010

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 2				
Key Objectives	Actions	Lead	Target Date	Investment
2.3 Encourage and support Northern Ireland businesses in building the capacity to take forward innovative ideas into new products, services and processes.	2.3.9 University of Ulster will engage on an ongoing basis with industry representatives to understand and capture its requirements for developing an innovative ambition and to support knowledge-based investment. Opportunities for jointly funded projects will be exploited.	University of Ulster	During 2008-2010, 200 requirement sets captured per annum, leading to 50 unique proposals	£1m over 2008-2011
	2.3.10 The Further Education (FE) Sector) with other relevant partners will work with UU and QUB to ensure the successful delivery of the HE-FE Collaboration Fund (Connected) in supporting businesses, especially SMEs, to undertake research and innovation activities. The six colleges and two universities will make 100 added value engagements, deliver 24 projects and 3 joint KTPs per annum.	FE Sector	Over the period 2007-2010	£3m
	2.3.11 University of Ulster - in partnership with DETI & DSD - will develop a strategic framework and supporting programmes to enable the application of knowledge and innovation to the benefit of social enterprises and the community.	University of Ulster	Ongoing over the period 2008-2011	£100k commitment by the University of Ulster
	2.3.12 University of Ulster, as a leading provider of consultancy from academia into industry, will develop clusters of competence to further meet the needs of priority industrial sectors in Northern Ireland.	University of Ulster	Ongoing over the period 2008-2011	£200k over the period 2008-2011
	2.3.13 University of Ulster will deliver an Innovation Promoters Programme (IPP) to encourage and support investment in innovation.	University of Ulster	Ongoing over the period 2008-2011	£250k per annum

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 2				
Key Objectives	Actions	Lead	Target Date	Investment
2.3 Encourage and support Northern Ireland businesses in building the capacity to take forward innovative ideas into new products, services and processes.	2.3.14 QUB will build on its position as the most successful Knowledge Transfer Centre in the UK and seek to develop further mechanisms for increasing the number of graduates and postgraduates employed in NI businesses. This includes expanding KTP schemes to an average of 30 per year employing at least 40 graduates and postgraduates.	QUB	During 2008-2009 Academic Year	To lever £1.8m per annum
	2.3.15 InterTradeIreland's FUSION programme will deliver 180 all-island projects, with a focus on first-time innovators.	InterTradeIreland with Invest NI and Enterprise Ireland	2008-2011	Up to £2m per annum
	2.3.16 Invest NI's Collaborative Networking Programme will support companies working together for a common business benefit with the aim of establishing 18 collaborative networks.	Invest NI	2008-2011	£3m
	2.3.17 Invest NI Business Improvement Services will encourage and support client companies through innovation, to differentiate from their competitors, improve their competitiveness and increase their profitability. 400 companies to be supported over 2008-2011.	Invest NI	2008-2011	£5m
2.4 Create the context in which Northern Ireland businesses become more independent of public sector support.	2.4.1 Invest NI will introduce a new Venture Capital initiative - NISPO - incorporating a follow on to NITECH and including seed funding to support business and university based Spin Out companies.	Invest NI in partnership with private sector and universities	2008-2009	£10m across the 5-year investment period.
	2.4.2 The Institute of Directors will work with the District Councils and the local business angel networks to deliver a series of events aimed at helping NI businesses to better understand private equity finance and to work more effectively with private sector investors.	IoD	2-3 events per year over 2008-2011	Resource neutral

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 2				
Key Objectives	Actions	Lead	Target Date	Investment
2.4 Create the context in which Northern Ireland businesses become more independent of public sector support.	2.4.3 By September 2008 NISIP working with Invest NI and InterTradeIreland, will establish mechanisms to deliver "halo", the business angel network which matches angel funding and support with early stage knowledge based ventures, with the target of an eight-fold return on cost of programme with angel and geared funding.	NISIP, Invest NI and InterTradeIreland	Develop and maintain a register of 25 active business angels by April 2009	£520k over 2008-2011

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 3				
Key Objectives	Actions	Lead	Target Date	Investment
3.1 Ensure that the public sector realises the (commercial) value of its R&D for the wealth of the region.	3.1.1 DETI, through Invest NI will provide advice and guidance to Public Sector Research Establishments in developing mechanisms for the commercialisation of public research e.g. the establishment of equivalent schemes such as KTP and Proof of Concept.	DETI, Invest NI	2008-2009	Resource Neutral
	3.1.2 HSC R&D Office, through HSC Innovations, will support the identification, assessment and management of intellectual property with the aim of generating improved technologies and treatments for the benefit of health and social care users and the wider economy.	DHSSPS	Ongoing over period 2008-2011	£1.6m for period 2008-2011 (as at 1.2.1 above)

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 3				
Key Objectives	Actions	Lead	Target Date	Investment
3.1 Ensure that the public sector realises the (commercial) value of its R&D for the wealth of the region.	3.1.3 GSNI will undertake advanced and innovative analysis of the information gathered through the TELLUS project and promote that information locally and internationally with a view to licensing data to, and working with, local and international players in the natural resources exploration, renewables and geothermal energy sectors; and, collaborate with government and industrial partners in the RoI in extending the TELLUS project into the RoI.	GSNI	Ongoing throughout 2008-2011	£1.9m for period 2008-2011 under the new funding for innovation budget
3.2 Encourage the public sector to lead the adoption of best practice in innovation and R&D and to champion the use of innovation and creativity as business critical in service delivery and process development.	3.2.1 DSD will promote innovative solutions within the construction sector through the development of affordable and sustainable housing.	DSD	Ongoing throughout 2008-2011	Resource Neutral
	3.2.2 The Government's Policy 'Toolkit' will promote the inclusion of innovation considerations in policy making.	OFMDFM	Ongoing for period 2008-2011	Resource Neutral
	3.2.3 DRD Roads Service will work closely with private and public sector research bodies (including Northern Ireland Universities) to identify innovative techniques and solutions to engineering and transport challenges.	DRD	Commencing 2008 and on-going during 2008-2009	Resource neutral
	3.2.4 DRD will work with the Achieving Excellence Initiative to promote innovation through public procurement.	DRD	Commencing 2008 and on-going during 2008-2011	Resource neutral
	3.2.5 DHSSPS will produce a strategy to develop N.I. as a connected health economy which will set out its objectives and priorities for the application of new technologies and communication systems over the next 5-7 years.	DHSSPS	December 2008	Resource neutral

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 3				
Key Objectives	Actions	Lead	Target Date	Investment
3.3 Use the Northern Ireland Sustainable Development Strategy as a mechanism by which the public sector can drive the innovation, creativity and design agenda.	3.3.1 The Central Procurement Directorate of DFP will introduce an innovation sub-strand to the NI Sustainable Procurement Action Plan.	DFP	March 2008	Resource Neutral
	3.3.2 Building on the DARD Renewable Energy Action Plan, DARD, DETI, Invest NI and others will underpin knowledge and support exploitation of renewable energy technologies in the rural economy. The Renewable Energy knowledge transfer programme will provide 1000 demonstration places and construct 3 renewable energy infrastructure items.	DARD in partnership with DETI and DOE	Action Plan published January 2007 and target date for review initiation April 2008	£2.55m under the new funding for innovation budget
	3.3.3 DARD will introduce an initiative to exploit natural products e.g. grass silage to produce novel products such as fibre insulation material, biocompounds and biopolymers.	DARD	Ongoing throughout 2008-2011	£1.08m over the period 2008-2009 to 2010-2011 under the new funding for innovation budget
	3.3.4 DARD will establish an initiative to enable CAFRE to deliver demonstrations to food companies around technological developments in food packaging.	DARD	Ongoing throughout 2008-2011	£650k over the period 2008-2011 under the new funding for innovation budget
	3.3.5 DETI will identify and support NI energy research and innovation and contribute to its commercial exploitation, pursue economic growth in the sustainable/renewable energy sector in NI, and support research into geological formations to facilitate innovative energy storage provision. Novel geological modelling techniques will also be considered.	DETI	Ongoing throughout 2008-2011	£3.75m over the period 2008-2011 under the new funding for innovation budget

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 3				
Key Objectives	Actions	Lead	Target Date	Investment
3.3 Use the Northern Ireland Sustainable Development Strategy as a mechanism by which the public sector can drive the innovation, creativity and design agenda.	3.3.6 DETI will establish a range of initiatives to support and promote research into emerging renewables technologies such as Hydro Power, Household Wind Power and Biofuels.	DETI	Ongoing throughout 2008-2011	£1.5m over the period 2008-2011 under the new funding for innovation budget
	3.3.7 DoE will contribute to the delivery of the QUB-led OMNIVORE project to develop a prototype engine that will optimise the combustion of a range of biofuels and fossil fuels.	DoE	Ongoing throughout 2008-2011	£103k over the period 2008-2011 the new funding for innovation budget
3.4 Ensure Northern Ireland Government addresses risk management issues and adopts an appropriate outcome-based approach to procurement.	3.4.1 In taking forward it's policy and legislative work DoE will use innovation and research to guide evidence based policy development and where possible maximise opportunities within the public and private sectors to deliver effective implementation solutions.	DoE	Proposed start mid-2008 with completion by December 2010	Subject to a bid of €12.24m to INTERREG IV
	3.4.2 The Central Procurement Directorate of DFP will produce guidance on procuring innovative solutions and work with Departments to ensure that procurement contracts, where appropriate, are structured in such a way as to allow for innovative tendering.	DFP	March 2008	Resource Neutral
3.5 Ensure that Government interventions to promote and support Innovation and R&D exploitation become more streamlined and targeted in order to assist innovation and R&D practitioners.	3.5.1 Invest NI will streamline and increase the effectiveness of its R&D and innovation support with the aim of engaging 300 companies in R&D for the first time.	Invest NI	2008-2009	Annual Programme budget for innovation, research and technology is currently £43m rising to £48m in 2010-2011
	3.5.2 HSC R&D office, working with Invest NI, will examine the potential for the application of the Proof of Concept programme to the HSC.	DHSSPS in partnership with Invest NI	2008-2009	Resource Neutral

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 4				
Key Objectives	Actions	Lead	Target Date	Investment
4.1 Encourage the tertiary education sector to take appropriate steps to realise the commercial opportunities of its research to enhance the wealth of the region.	4.1.1 DARD, working with NI's Higher Education Institutions, AFB and other research providers, will establish a mechanism for a research digest and improved knowledge and technology transfer to rural businesses.	DARD	April 2010	£0.5m per annum
	4.1.2 DEL, working with the universities and industry, will support 3 additional cohorts of 100 DEL funded PhD studentships in areas of economic relevance to NI.	DEL in partnership with the universities and industry	First additional cohort to commence Academic Year 2008-2009	£12.2m over the period 2008-2011 (including £7.1m under the new funding for innovation budget)
	4.1.3 DEL will establish a permanent funding stream for collaboration between the universities and FE Colleges to increase the commercialisation of their research. This will build on the recently established "Connected" pilot initiative.	DEL	Pilot established 2007-2008. To be reviewed 2009 with view to making permanent from 2010-2011	£3m over period 2007-2008 to 2009-2010
	4.1.4 DEL will introduce a new permanent research capital fund, the Research Capital Investment Fund, co-funded by DIUS, to encourage institutions to take a longer-term, more strategic approach to research capital investment thereby promoting institutional financial sustainability.	DEL	Funding to be available from July 2008	£11.4m from DIUS; £15m from DEL (£7.5m over the period 2008-2011 under the new funding for innovation budget)
	4.1.5 University of Ulster's Technology & Knowledge Transfer offices (the Office of Innovation) will work with industry to identify and prioritise the investment opportunities of highest potential within their technology disclosure and research pipelines. This will entail 12 unique investments to encourage either spin-out, incorporation or joint ventures.	University of Ulster	Ongoing throughout period 2008-2011	£1m over the period 2008-2011

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 4				
Key Objectives	Actions	Lead	Target Date	Investment
4.1 Encourage the tertiary education sector to take appropriate steps to realise the commercial opportunities of its research to enhance the wealth of the region.	4.1.6 University of Ulster - with DEL & Invest NI - will hold regular events to highlight university knowledge and technology with commercial potential and showcase inspirational case studies from successful entrepreneurs. The target is 50 events with an average of 32 business attendees.	University of Ulster	Ongoing throughout period 2008-2011	To be supported under the ConnectED Programme, funded at £3m over 2008-2011
	4.1.7 University of Ulster - working with DCAL & Invest NI and with support from NESTA - will establish a facility to encourage knowledge and technology transfer between its School of Art & Design and SMEs, wherever possible, tailoring its support to the explicit needs of the creative industries sector, and to support new product development.	University of Ulster, DCAL/Invest NI, NESTA	2008-2010	£100k for Phase I, £500k for Phase II
	4.1.8 University of Ulster will establish a "Coordinator of Academic Enterprise" who will report to a newly created Innovation Committee. This committee will have responsibility for all policies, programmes, and actions relating to academic enterprise and innovation.	University of Ulster	2008-2010	£120k per annum
	4.1.9 Under the HEIF Programme, the universities will work with the Business Alliance, DEL, DETI, Invest NI and ANIC/FE colleges to develop an innovative and cost effective programme of business and community engagement that will more effectively transfer technology to local enterprises, secure increased BERD and promote innovation in business and industry. This will lead to the establishment of 5 pilot competence centres in Digital Engineering; Environmental Management; High-performance computing; Polymer Technologies; and, Creative Digital Industries.	QUB in partnership with the University of Ulster, DEL, DETI and Invest NI	2008-2009 and 2009-2010 Academic Year	£2.175m

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 4				
Key Objectives	Actions	Lead	Target Date	Investment
4.1 Encourage the tertiary education sector to take appropriate steps to realise the commercial opportunities of its research to enhance the wealth of the region.	4.1.10 The Knowledge Exploitation Unit at Queen's University will provide a 'one stop shop' for innovation support and will facilitate innovation in the business sector with a particular focus on the needs of SMEs and emerging knowledge based companies.	QUB	KEU to be established 2008-09 Academic Year	£1m per annum
	4.1.11 Queen's University will continue to be proactive in seeking opportunities to improve innovation and the exploitation of publicly funded research through enhanced structures and processes to increase consultancy, licensing and the establishment of 'spin out' companies, building upon the successes of QUBIS Ltd. This includes the establishment of 8 new spin-out companies and the negotiation of 20 licenses as a consequence of investments in the QUB research base.	QUB	Ongoing throughout the period 2008-2011	£500k over the period 2008-2011
	4.1.12 The NI Science Park, working with the universities and other public and private sector bodies, will facilitate events aimed at encouraging stronger university-industry research collaboration, with a focus on those sectors of most significance to the growth of the NI economy.	NISP in partnership with the universities	At least one major event each year to showcase a particular area of university-industry importance	£10k per annum plus contribution in kind by senior industrialists and academics
	4.1.13 The Institute of Directors will follow up on its 'Working Together for Profit' event run during Innovation Week 2007 in association with Invest NI, QUB, UU and ANIC to encourage firms to exploit to a much greater extent the resources of FE and HE to undertake R&D that will help grow their business.	IoD	2008-2009	Resource neutral with sponsorship for the production of materials in DVD and hard copy

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 4				
Key Objectives	Actions	Lead	Target Date	Investment
4.1 Encourage the tertiary education sector to take appropriate steps to realise the commercial opportunities of its research to enhance the wealth of the region.	4.1.14 DRD Roads Service will work with Queens University to assist in the development and approval of an innovative prefabricated concrete arch bridge, for use on civil engineering projects.	DRD	Prototype bridge to be built by March 2009	Up to £50k
	4.2.1 MATRIX will use its communications strategy to promote & enhance science and technology innovation and commercialisation not only to industry but also the education system through the production of 4 newsletters per year.	MATRIX/DETI	2007-2008 (2009-2011 pending review of MATRIX)	Resource Neutral
	4.2.2 DEL will establish a programme to ensure that the FE sector has the capacity and expertise to deliver the skilled workforce required by potential Northern Ireland FDI companies (this will include support for the development of 'clusters' in specific sectors identified by DETI and Invest NI as offering potential significant growth and investment).	DEL in partnership with DETI and Invest NI	Ongoing throughout 2008-2011	£9m over the period 2008-2011 under the new funding for innovation budget
	4.2.3 The Institute of Directors will, working with its membership and the two NI universities, explore the development of a number of bursary schemes aimed at encouraging students to enrol in courses that will service the R&D and innovation skills requirements of the local economy. This will involve: (i) discussions with QUB and UU re funding and logistics; (ii) hosting an event to discuss issues with IoD members; (iii) identification of companies to support 5 initial bursary schemes.	IoD/QUB/UU	By May 2008 By September 2008 During 2009-2010 academic year	IoD Resource neutral plus bursary contribution from companies of circa £1000 per student per company

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 4				
Key Objectives	Actions	Lead	Target Date	Investment
4.3 Ensure that more people are encouraged to recognise career opportunities through science, technology, engineering and mathematics (STEM).	4.3.1 DE and DEL, working with key industrial, educational and public sector stakeholders (including DETI), will complete a review of STEM in schools and Further Education with a view to producing a 10-year strategy for STEM development for the benefit of the economy.	DE in partnership with DEL	June 2008	Resource Neutral
	4.3.2 DE will develop curriculum resources to support growth of STEM take-up in schools including web-based and other links with national bodies for the promotion of STEM-based subjects in GB and the RoI; and a grant scheme to promote STEM curriculum development in the primary sector (within the revised NI Curriculum) via materials and equipment.	DE	Ongoing throughout 2008-2011	£1.9m over the period 2008-2011 under the new funding for innovation budget
	4.3.3 DE working with DEL will develop careers education, information, advice and guidance to improve young people's knowledge and understanding of the opportunity for entering well paid and challenging careers which require a background in STEM subjects.	DE in partnership with DEL	Ongoing throughout 2008-2011	£2.2m over the period 2008-2011 under the new funding for innovation budget
	4.3.4 DE will develop an initiative to promote STEM work in primary and post-primary schools through competitions and exhibitions, including a specialist science week involving the FE colleges and the universities.	DE in partnership with DEL, FE Colleges and the Universities	Ongoing throughout 2008-2011	£600k over the period 2008-2011 under the new funding for innovation budget
	4.3.5 DE will identify, through competition, specialist STEM schools in order to extend strengths in STEM subjects within their schools, collaboration schools and FE partners; build a collaborative network of primary and post-primary schools focusing on aspects of STEM; and disseminate best practice in respect to STEM areas of learning.	DE	10-12 schools over the period 2008-2011	£6m over the period 2008-2011 the new funding for innovation budget

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 4				
Key Objectives	Actions	Lead	Target Date	Investment
4.3 Ensure that more people are encouraged to recognise career opportunities through science and technology.	4.3.6 DEL will establish a Critical Sectors Initiative to increase the number of university level applications for STEM subjects with a view to addressing the lack of skilled individuals capable of taking up positions in high value employment in key sectors.	DEL	Ongoing throughout 2008-2011	£6m over the period 2008-2011 under the new funding for innovation budget
	4.3.7 DCAL will continue to work with DE to promote creativity in teaching and learning.	DCAL in partnership with DE	Commencing 2008	£500k per annum for creative Learning Centres mainstreamed for period 2008-2011
	4.3.8 DEL working with DE and Sector Skills Councils will provide young people with access to impartial careers information, advice and guidance, based on up to date labour market information.	DEL in partnership with DE	Ongoing throughout 2008-2011	To be supported through existing DEL/CEIAG budget
	4.3.9 Queen's University will promote and champion the development of an entrepreneurial culture among staff and students through the operation of NICENT, Roberts' Review, SET funding and HEIF, including the establishment of a Student Enterprise and Employability Unit within the Students' Union. This includes: (i) establishment of the Student Enterprise and Employment Centre; (ii) Commencement of an Enterprise Fellowship Scheme; (iii) Embedding of entrepreneurship in all Arts and Social Science Degree programmes.	QUB	2007-2008 Academic Year 2008-2009 Academic Year 2007-2010 Academic Year	£100k per annum £154k per annum £200k per annum

REGIONAL INNOVATION STRATEGY ACTION PLAN IMPERATIVE 4				
Key Objectives	Actions	Lead	Target Date	Investment
4.3 Ensure that more people are encouraged to recognise career opportunities through science and technology.	4.3.10 By 2009, the NI Science Park, working with DCAL, DE and DEL will develop a programme of activities aimed at educating young people regarding the career opportunities available through studying STEM subjects by showcasing science in action.	NISP in partnership with DCAL, DE and DEL	Ongoing throughout 2009-2012	Resource Neutral
	4.3.11 The Institute of Directors will draw on its membership to identify appropriate business people to work with schools in educating pupils to the career opportunities that are available through the study of STEM subjects. This will include the development of an annual 'IoD Schools Day' (when 100 IoD members go into 100 primary schools to talk to P7 pupils about careers in business) and engagement between IoD members and Sentinus/Young Enterprise.	IoD	During 2008, develop an 'IoD Schools Day' First 'Schools Day' to take place in 2009 50 IoD members per year to engage with Sentinus and Young Enterprise	IoD Resource neutral with sponsorship for promotional material



Northern Ireland
Assembly

Research and Library Service
Briefing Paper

Paper 921-11

30 January 2012

NIAR 921-11

Fergal Campbell and Aidan Stennett

**R&D and Innovation
funding available
in Northern Ireland
(summary)**

1 Introduction

The following paper provides a summary of funding available for R&D and innovation in Northern Ireland. Table 1 outlines the available funding. The paper focuses on businesses funding, although funding that encourages knowledge transfer between universities and business/other universities is also included.¹ Figures 1 and 2 provide a breakdown of the various Framework Seven streams. There are currently (as of 30 January 2012) 315 active calls, full details of all calls can be found here.

Table 1: R&D and Innovation Funding Streams available in Northern Ireland

Name	Where?	Available to?	Type of Financing	Amount
Enterprise Capital Funds	BIS/fund managers	SMEs	Venture capital (part government funded - up to £25m per fund)	Up to £2m per investment
Research Challenge Fund	DARD	SMEs in the agri-food and other rural sectors	Grant funding	maximum of 50% of total eligible project costs up to a ceiling of £250,000
Higher Education Innovation Fund (HEIF)	DEL/Invest NI	Higher Education Sector for knowledge transfer	80% delivered by DEL on a formula basis, 20% through Invest NI on a competitive basis. Funding available for knowledge transfer purposes	£3m per annum (total fund)
Connected/ Connected 2	DEL/QUB/UU/ Colleges NI	Higher education and Further Education for knowledge transfer	Grants for knowledge transfer	£1m per annum (total fund)
Framework Programme 7	EU	Range of stakeholders	Competitive collaborative grant funding	€50.5 Billion - Individual awards depend on stream - see figure 1 and 2 for details of stream breakdown
INTERREG	EU	Public Sector Bodies	EU State collaborative grant funding	Total fund worth €256 million, including innovation and knowledge economy fund stream

¹ Whilst every effort has been made to identify all funding streams available in Northern Ireland the information outlined in Table 1 should not be viewed as an exhaustive list

Name	Where?	Available to?	Type of Financing	Amount
EU sustainable Competitiveness Programme	EU & DETI	Range of stakeholders	Grant funding - co-financed by EU (50%) and DETI (50%). Competitiveness and Innovation funding available	Programme is worth €613 million
UK R&D tax credits	HMRC	SMEs and large companies liable for corporation tax	Tax relief	Tax Relief
Fusion	InterTrade Ireland	SMEs		Up to £29,500

Name	Where?	Available to?	Type of Financing	Amount
Innova	InterTrade Ireland	SMEs who have a partnership in ROI	Collaborative grant funding	Up to £250,000
Innovation Voucher scheme	Invest NI	Small enterprises which hold a current, valid Northern Ireland company registration number. Funding available to companies wishing to engage with local universities	Voucher for knowledge Transfer	Each voucher is worth £4,000 and small businesses can apply for up to three vouchers.
Invest NI Grants	Invest NI	<ul style="list-style-type: none"> total sales of over £100,000 per year; and sales outside Northern Ireland greater than 25% of turnover, or greater than £250,000 a year. Or if international tradable service have the potential to sustain salaries above the Northern Ireland private sector median; or show that they can achieve a minimum gross margin of 20% 	Grant funding	Case by case basis

Name	Where?	Available to?	Type of Financing	Amount
Investment Growth Fund	Northern Ireland Spin Out Fund	Start-up and early stage companies	Venture capital (5 year funding)	£50k to £250k per funding round (the funder can invest up to £500k in shares) (fund is 30% match fund - i.e. every £2 invested through the fund must be matched by £1 private investment. £5m fund)
Investment Growth Proof of Concept Fund	Northern Ireland Spin Out Fund/ Invest NI	Individuals, start-ups, micro-businesses and SMEs	Grant funding	Mini grant of £10k and standard grant of up to £40k. £3m fund
The Queen's University Belfast Innovation Fund	QUB	Pre-commercial proof of concept (must be linked to QUBs research base)	Venture capital	Funding rounds range from £50k to £200k. £1m fund

Name	Where?	Available to?	Type of Financing	Amount
Collaborative Grant	Technology Strategy Board	Collaborative research projects	Competitive Grant funding	Level of funding depends on specific competition
SMART Grant Programme - Development of Prototype	Technology Strategy Board	The area of science, technology or engineering	Grant funding	£250,000 or 35% of project costs for small business, and 45% for medium sized businesses.
SMART Grant Programme - Proof of Concept	Technology Strategy Board	The area of science, technology or engineering	Grant funding	£100,000 or 60% of total costs
SMART Grant Programme - Proof of Market	Technology Strategy Board	The area of science, technology or engineering	Grant funding	£25,000 or 60% of total costs
The Small Business Research Initiative funds	Technology Strategy Board	SMEs	Grant funding	Phase 1 - £50,000 and £100,000 Phase 2 - £250,000 and £1m

Name	Where?	Available to?	Type of Financing	Amount
Ulster Innovation Fund	University of Ulster	Pre-commercial proof of concept (must be linked to UUs research base)	Venture capital	Funding rounds range from £50k to £200k. £1m fund

Figure 1: FP7 funding breakdown by programme (€m)²

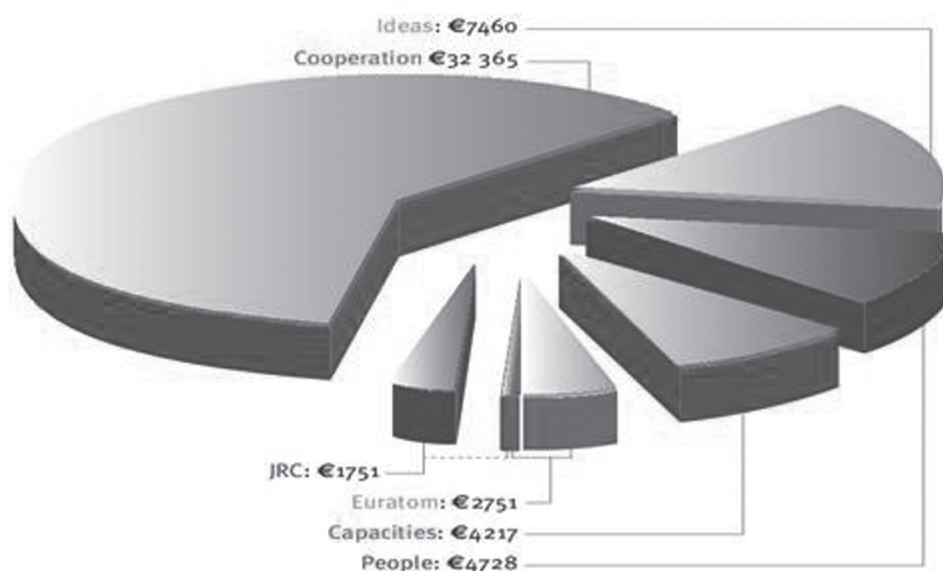
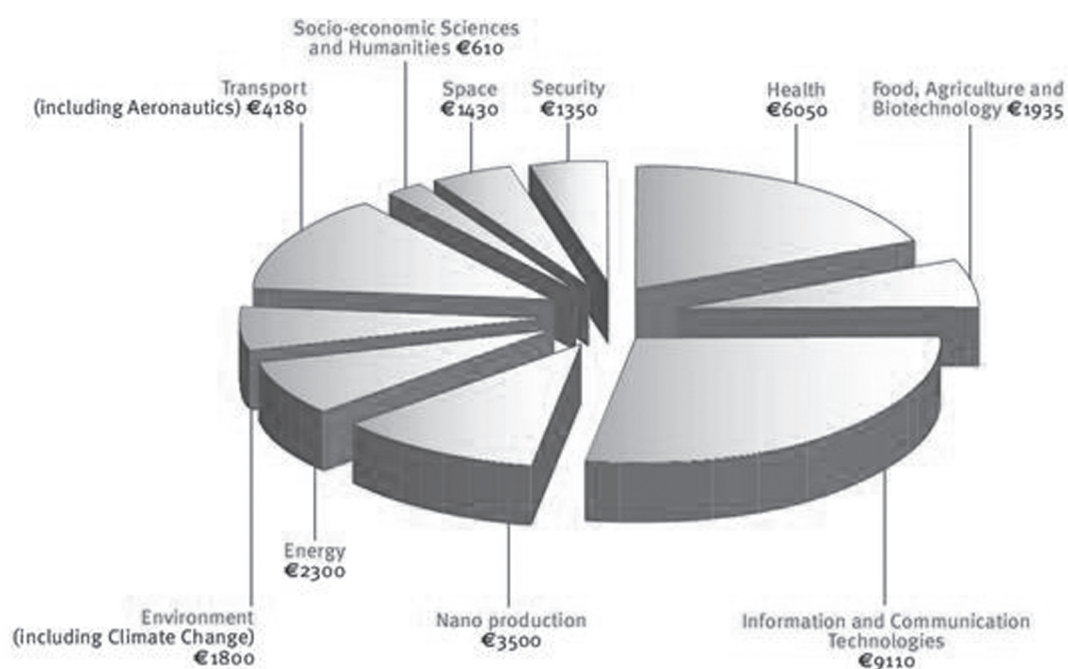


Figure 2: FP7 funding breakdown of Cooperation programme (€m)³



² European Commission, FP7 Tomorrow's answers start today http://ec.europa.eu/research/fp7/pdf/fp7-factsheets_en.pdf

³ Ibid



Published by Authority of the Northern Ireland Assembly,
Belfast: The Stationery Office

and available from:

Online

www.tsoshop.co.uk

Mail, Telephone, Fax & E-mail

TSO

PO Box 29, Norwich, NR3 1GN

Telephone orders/General enquiries: 0870 600 5522

Fax orders: 0870 600 5533

E-mail: customer.services@tso.co.uk

Textphone 0870 240 3701

TSO@Blackwell and other Accredited Agents