RSM McClure Watters (Consulting)
Connected for Success

Client

DEL

Project

Evaluation of Connected 2 Programme

Division

Consultancy

Final Appendices – PART 1 - December 2013

Table of Contents

1 STRATEGIC CONTEXT

1.1 Introduction

In this section we consider the original rationale and the current rationale / need for government support for the Connected 2 programme (Connected 2 commenced in April 2010 for a four-year period). We have examined policy information, statistics and research on local needs. This is examined under the following categories:

- UK Strategic and Policy context at the time that Connected 2 was launched;
- NI Strategic and Policy context at the time that Connected 2 was launched;
- EU Strategic and Policy context looking ahead – in particular Horizon2020;
- UK Strategic and Policy context looking ahead;
- NI Strategic and Policy context looking ahead;
- Universities' and FE colleges' Knowledge Transfer Strategies;
- Research on Good Practice and Reducing Barriers; and
- Statistics and Trends – Knowledge Transfer.

1.2 Context – at the time that Connected 2 was launched

1.2.1 UK Strategic and Policy Context

1.2.2 UK Ten Year Science and Innovation Investment Framework (2004 – 2014)

The framework sets out the Government's ambition for UK science and innovation during 2004-2014, in particular their contribution to economic growth and public services, and the attributes and funding arrangements of a research system capable of delivering this. It states that harnessing innovation in Britain is crucial to improving the country's future wealth creation prospects and for the UK economy to succeed in generating growth through productivity and employment in the coming decade it must invest strongly in its knowledge base.

Ambitions relating to research excellence and sustainability for UK science and innovation outlined in the ten-year framework include:

- Greater responsiveness of the publicly-funded research base to the needs of the economy and public services:

Continue to improve UK performance in knowledge transfer and commercialisation from universities and public labs towards world leading benchmarks

In relation to knowledge transfer it states that Universities will be incentivised to build on the progress made in commercialising their research and working collaboratively with business, through increased funding for the Higher Education Innovation Fund, which will rise to £110 million a year by 2007-08.

1.2.2.1 Sainsbury Review of Science and Innovation (2007)

This document reviews the UK Government's science and innovation policies with a focus on the role they play in increasing the country's competitiveness in the global economy, in particular against the emerging economies. The review states that science research and innovation are crucial to the UK's economy and there has been a dramatic increase in recent years in the amount of the knowledge transfer from British universities. It recommends that the UK build on its success in knowledge transfer and it outlines 4 main ways in which the UK can build on its knowledge transfer performance. These are:

- More support through HEIF to business-facing universities, incentivising them to perform more knowledge transfer with small and medium-sized enterprises;
- Drive up the knowledge transfer activities of Research Councils;
- Increase the number of Knowledge Transfer Partnerships; and
- Encourage further education colleges to undertake more knowledge transfer.

It notes that although research is of great importance to any innovation ecosystem, little is to be gained from research in universities, research institutes and further education (FE) colleges if there are not strong links between the researchers and industry, and that is why knowledge transfer, and incentives for it, are so important.

1.2.2.2 UK Science and Innovation ("Innovation Nation") White Paper (2008)

The White Paper sets out proposals for how the UK can promote research bases, presenting recommendations for increasing and supporting interactions between Higher/Further Education institutions.

It notes the importance of innovation for the UK's economic prosperity, and that "the UK's world-class research base is an important component of its innovation ecosystem". It states that alongside other sources of knowledge like large companies, Small and Medium Enterprises (SMEs) and users, it drives the creation of new ideas some of which have potential to deliver significant economic and social benefits.

It states that the Department for Innovation, Universities and Skills and the Technology Strategy Board working with partners will take forward the Sainsbury recommendation to double the number of Knowledge Transfer Partnerships, increasing their flexibility and applicability to a range of educational institutions including FE colleges.

1.2.2.3 Wellings Report on Intellectual Property and Research Benefits (2008)

This report examines how the issue of university Intellectual Property (IP) impacts on the success of collaborative research between universities and businesses. It notes how universities play a central role in innovation through the training of students and knowledge creation. The European Commission suggested the following measures in order for member states to strengthen their university sector:

- Ensure that knowledge transfer forms part of the strategic mission of the institution;
- Publish procedures for the management of IP;
- Promote the identification, exploitation and protection of IP with a view to maximising socio-economic benefits;
- Provide appropriate incentives to help staff play an active role; and
- Build critical mass in knowledge transfer by pooling resources at local or regional levels.

The report describes several barriers that exist in forming successful collaborative relationships between universities and businesses:

- An over-emphasis on IP when universities and businesses work together on collaborative research projects;
- A lack of clarity on the primary aims of collaborative research, allowing uncertainty as to whether the aim is to generate a direct income for the university or a wider benefit for the economy; and
- A rather variable implementation of aspects of good practice in the process of negotiation.

1.2.2.4 Standing Together: Universities Helping Business Through The Downturn (2008)

This document details the different ways for businesses to engage with HEIs that are mutually beneficial to both parties in the difficult economic climate. It describes the important role HEIs play in providing skilled graduates and provision of training for the existing workforce. It highlights the research expertise that is held within HEIs and the importance of knowledge transfer in contributing to the economy, stating that:

“Four in five universities and higher education colleges now see the exchange of knowledge and expertise with business and the wider community as a central part of their mission.”

It concludes that collaborative working leads to innovation which improves the company’s productivity and competitiveness, thereby contributing to the national economy.

1.2.2.5 Higher Ambitions: The Future of Universities in a Knowledge Economy (Department for Business Innovation and Skills, 2009)

This report sets out a course for universities to drive up excellence and build on their success in a time of rising competition and tighter public funding constraints. In a knowledge economy, the report states that universities are ‘the most important mechanism we have for generating and preserving, disseminating and transforming knowledge into wider social and economic benefits’. The report recommended actions

and support in six different areas. The table below presents the relevant ideas for this evaluation:

Table 1.1: Higher Ambitions – Recommendations relevant to the Connected 2 Evaluation

Area of Support	Recommendations
Support universities in making an even bigger contribution to economic recovery and future growth	7) Our expectations of business will continue to rise: they need to be **active partners** with universities, **not passive customers**. (This reflects the crucial role that businesses have to play in the funding and design of programmes, in the sponsorship of students, and in offering work placements and practical experience for students.)
Strengthen the research capacity of our universities, and its translation into economic impact	9) In a more challenging climate for research, with tighter fiscal constraints and increased competition from other countries, we will need to carefully protect the excellence of our research base. This will require a greater focus on world-class research and greater recognition of the potential benefits of research concentration in key areas. 10) We are establishing strong new incentives to increase the economic and social impact of research. 11) We will support stronger long term relationships between business and universities. (This recognises: • that interaction between universities and business has increased significantly over the last decade and the desire to build on this with continued investment in collaborative research via the Research Councils and the Technology Strategy Board; and • a desire to build on the success of the HEFCE **Higher Education Innovation Fund** which has supported the development of links between business and universities. The primary motivation for supporting this research commercialisation and knowledge exchange is to generate economic and social benefits for the nation, not simply to raise revenue for institutions. We will encourage universities to seek greater use of shared services for managing and commercialising their intellectual property.)

Area of Support	Recommendations
Strengthen the role of universities at the heart of our communities and shared intellectual life, and as one of the key ways in which we engage with the wider world	14) We will build on the contribution that universities have made, in partnership with Regional Development Agencies and local business, to regional economic development. To sustain the role of universities in urban renewal and regeneration, the Government will protect the freedoms that HEIs currently enjoy, within the framework of existing capital and investment approval processes, to devise their own business plans and borrow commercially to fund new developments. The Government supports the role that RDAs play to provide capital for university schemes that they judge to be of high economic value to the locality and region. The Government also believes that RDAs have a key role to play in working with business at local and regional level to support knowledge transfer activities and deepen university links with local and regional businesses: this is crucial to improving the quality of management in Britain and Britain's future success as an innovation economy.

Source: Higher Ambitions – The Future of Universities in Knowledge Transfer (DBIS, November 2009)

1.2.3 NI Strategic and Policy Context

1.2.3.1 Northern Ireland Executive's Programme for Government (2008 – 2011)

The Programme for Government sets out the priorities and budgets for the Executive. Each Department had targets and associated public service agreements under the Programme for Government. In total there were 23 Public Service Agreements (PSA).

PSA 1.5 relates to 'developing and sustaining 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'. Specific actions and targets are set out in the table below.

Table 1.2: Programme for Government 2008/11 – PSA 1 – Selected Objectives, Actions and Targets

PSA 1: PRODUCTIVITY GROWTH. Improve NI's manufacturing and private services productivity			
Objectives	**Actions**	**Targets**	**Department**
• 5. 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.	• Support MATRIX, which will co-ordinate business, Government and academia and develop a more effective relationship between industry and the R&D/science base. • DETI/DEL/Invest NI to work with Department of Finance and Personnel (DFP) to secure the necessary resources for permanent "Third Stream" funding in NI's universities to increase knowledge transfer and cooperation between the tertiary education sector and local industry	• Exercise (RAE) {DN: no direct comparison between 2001 and 2008 RAE will be possible due to changes in output, i.e. - the results being produced as a graded profile rather than a fixed seven point scale}. • Increase by 10% the key Knowledge Transfer indicators as measured by the Higher Education – Business and Community Interaction Survey (HE-BCI) for Academic Year (AY) 2010/11 (HEBCI 2011 survey published 2012). {DN: DEL's metrics based NI Higher Education Innovation Funding (HEIF) 3 allocations ran from AY10/11 to AY 12/13), commencing shortly after the start of Connected 2 (developed around the same time). The key HEBCI metrics inform these funding allocations}.	• DEL • DETI

Source: Programme for Government 2008/11

1.2.3.2 FE Means Business - Department for Employment and Learning (2004)

This strategy places an emphasis on ensuring that the curriculum delivered skills, employability and employment. It emphasises that further education should be at the heart of lifelong learning in order to strengthen economic development, enhance social cohesion, and advance the individual's skills and learning. It states that this aim should be supported by three strategic objectives - that the sector should be:

- a key driver of local, sub-regional and regional economic development;
- an active agent of social cohesion; and

- a major promoter of lifelong learning.

Moreover, the primary strategic objective of the sector will be to support economic development. The strategy articulates what this will include:

- a sharper and greater focus on the provision of skills for the economy, from basic literacy and numeracy to high level technical skills, with a particular focus on levels 2 to 4;
- provision of a qualifications based curriculum which is more clearly related to economic requirements;
- clear progression routes to higher level skills are provided for students;
- working more closely with schools to ensure that increasing numbers of school pupils, at ages 14-19, have access to vocational experience;
- ensuring that 16-19 year olds in further education have the skills, knowledge and understanding to enhance their employability and take their place in the world of work, either immediately or after further study;
- all full-time further education students will have essential skills including information and computer technology;
- enabling students to develop enterprise as a central element of further education;
- **working actively with other agencies and local employers, especially small employers, to offer technical support, business management support, assistance with product development, incubation and bespoke training**; and
- engaging with training and employability programmes to widen entry into employment.

1.2.3.3 FE Means Business Implementation Plan – Department for Employment and Learning (2006)

This strategy review identified that the FE sector supported the economy through a range of activities including the development of workforce skills, employability, enterprise. It also worked actively with other agencies and local employers to offer technical support, business management support, assistance with product development, incubation and bespoke training.

The objectives for the sector were to be delivered “through a new set of strategic partnerships involving Universities, schools, employers, trade unions, training organisations and the voluntary and community sectors”.

A programme of projects to implement the strategy include:

- FE Support for Economic Development; to determine the role that FE colleges can play in supporting employers in practical ways, beyond the provision of skilled individuals, for example, in areas such as enhancing productivity and competitiveness, business creation, incubation and product development; and

- Higher Education: an assessment of the contribution of the HE sector to meeting Northern Ireland's skills needs through the provision of Foundation Degrees, Honours Degrees and postgraduate courses. Specifically in relation to FE, the project will review and agree the approach to the future delivery of HE through FE colleges. In particular, FE colleges will develop partnerships with the local universities to ensure that the higher education provision delivered through colleges addresses the needs of the local economy.

The review also highlighted that the FE Centres of Excellence needed to become recognised hubs for applied technology and business support at the regional level, especially but not exclusively, for SMEs which lack their own research and product development capabilities.

1.2.3.4 Regional Innovation Strategy for Northern Ireland Action Plan (2008 – 2011) (Department of Enterprise, Trade and Investment, 2008)

The action plan is built upon an evaluation of the Regional Innovation Strategy that was published in 2003, consultations with stakeholders and benchmarking against UK, RoI and international best practice. It sets out a four-year plan to develop NI's innovation system and infrastructure based on four imperatives, each of which have associated output-driven strategic objectives and actions.

The four imperatives are:

1. To establish NI as an outward focused and competitive region in the global knowledge economy - with an international reputation for innovation excellence;
2. Encourage NI's businesses to become more innovative and creative in order to compete in the global market;
3. To encourage NI Government and the wider NI public sector to lead by example in championing and exploiting innovation and R&D; and
4. To ensure that the NI Education system adopts an enhanced role in developing a culture of innovation and creativity and enables people to recognise opportunities in the knowledge economy.

1.2.3.5 Review of the Competitiveness of Northern Ireland (Sir David Varney for HM Treasury, April 2008)

This review states that relationships between higher education and businesses are good in Northern Ireland and that higher education institutions assist in some form 90 per cent of the firms they cover (the number of businesses in their sub-region), compared with 70 per cent on average across the UK.[1] It also states that the number of Knowledge Transfer Partnerships[1] is higher than in many UK regions. Moreover, it suggests that that high levels of economic support have contributed to the level of

[1] Little, Arthur D, *Research and development business expenditure in Northern Ireland – a comparison with the UK and other international regions* (2004)

interaction between business and universities, including through university-supported incubators and research charged to companies at below market cost.[1] However, despite this positive evidence, submissions to the Review suggested that there may be potential to do more to improve these relationships even further.

Varney supports a commitment to an established "third stream" of funding for university knowledge transfer activities alongside core grants for teaching and basic research (the first and second streams). This has been implemented in full by DEL through the delivery of a fully formula driven Higher Education Innovation Fund for Northern Ireland, underpinning the business and community facing infrastructure in Queen's University Belfast and the University of Ulster.

1.2.3.6 MATRIX Reports (2008-2013)

Matrix is the NI science and industry panel which was formed in 2007 to advise the Government on the commercial exploitation of R&D and science and technology. Matrix is a business led organisation which identifies key areas of science, technology and innovation where NI has a competitive advantage and advises on the policy required to exploit these strengths and improve economic performance. It has advised government on the commercial exploitation of R&D and science and technology.

In the first report, MATRIX identifies four imperatives' for NI to maximise its potential to compete in the global technology and knowledge economy. The first imperative is:

"To compete more effectively as a modern knowledge and technology based economy Northern Ireland must develop a more innovative culture of collaboration across industry, government and academia."

In order to achieve this, the Panel made several recommendations. The first is the creation of 'industry-led' communities formed by the businesses, academia and government interacting around a specific market theme. These communities will work together to aggregate their innovation resources. The second recommendation is that communities create road maps that clearly outline the outputs required from each member and therefore increase the transfer of knowledge in both directions.

A review of the work completed by the MATRIX Horizon Foresight Programme has provided more detail on the opportunities with highest economic significance to Northern Ireland.

Table 1.3: MATRIX – Opportunities with Highest Economic Significance to Northern Ireland

Sector	Examples of Market Opportunities - Medium Term
1. Life & Health Sciences	• Personalised Medicine; and • Home Based care.

Sector	Examples of Market Opportunities - Medium Term
2. ICT	• Packaged Product Software; • Nearshoring of outsourcing services to Financial Services, Telecommunications, HR and ICT; and • Research aimed at Financial Services and Telecommunications.
3. Agri-Food	• Differentiated Foods; • Developing Innovative Processes and Packaging; • Enhancing Customer Knowledge; • Leveraging Computational Science; and • Energy.
4. Advanced Materials	• Application of biomaterials / nano-structured materials and multi functional materials; and • Computational science.
5. Advanced Engineering (Transport Sector)	• Environmentally optimal products; • Design for passenger safety and security; • Use of lighter, stronger and more affordable materials; and • Efficient supply of more complex, customised and innovative solutions combining products and services.

Source: http://www.matrix-ni.org/

The MATRIX Horizon reports also have identified future world market opportunities:

- Clean and Green Future World Markets;
- Health, Well Being and Vitality;
- Joined Up and Connected World Marketing; and
- Safe / Protected and Secure Future World Markets.

MATRIX provides a clear steer on the areas that are most relevant to the Northern Ireland economy. In an ideal world, we would expect to find that companies were pursuing these opportunities and were seeking to work with HE and FE in this regard.

Eleven reports have been published by Matrix to date. This includes the first MATRIX Report (First Report of MATRIX: The Northern Ireland Science Industry Panel (2008)) and the Government Response to this document. Matrix reports have been produced on the following sectors:

- Life and Health Sciences (Matrix Report Vol. 2: 2008);
- ICT (Matrix Report Vol. 3: 2008);
- Agri-food (Matrix Report Vol. 4: 2008);
- Advanced Materials (Matrix Report Vol. 5: 2008);
- Advanced Engineering (Transport) (Matrix Report Vol. 6: 2008);
- Telecoms;
- Technical Capability;
- Public Procurement of Innovative Science and Technology Solutions; and
- Sustainable Energy (2013).

Connected has been acknowledged by MATRIX (the NI Science/Industry Panel) as playing a key role in linking the HE and FE sectors with SMEs. Indeed, Connected focuses on the five priority sectors for Northern Ireland as identified by MATRIX, namely:

- Advanced Engineering;
- Advanced Materials;
- Agri Food;
- ICT; and
- Life and Health Sciences.

1.2.3.7 The Social Economy Enterprise Strategy 2011

The NI Executive has identified "growing a dynamic, innovative economy" as the top priority over the next 3 years, with DETI having lead responsibility in delivering on this aim. It due to this and in recognition of the potential of the social economy to make a significant contribution to both the social and economic growth of Northern Ireland, that DETI has developed its Social Economy Enterprise Strategy.

The overall vision of the Strategy is to achieve "an enterprise environment which encourages greater social entrepreneurial activity and is supportive of SEEs that want to grow'. To achieve this DETI has set out 3 strategic aims. These are to:

- Increase awareness of the sector and establish its value to the local economy;
- Develop the sector and increase its business strength; and
- Create a supportive and enabling environment.

In addition to this the strategy notes that it will include actions which are designed to:

- Increase knowledge and understanding;
- Provide support for business growth;
- Build business skills;
- Foster a SEE culture;
- Build the evidence base; and
- Measure the impact of SEEs.

The Strategy's aims and objectives have been developed in partnership with the social economy sector and have been widely circulated both within Government and social economy sector to identify and address the priority needs of the sector.

1.3 Context – Forward Looking

1.3.1 EU Strategic and Policy Context

1.3.1.1 Europe 2020 Strategy: A Strategy for Smart, Sustainable, and Inclusive Growth (European Commission, 2010)

Europe 2020 sets out a vision of Europe's social market economy for the 21st Century. The strategy has three core principles:

- **Smart Growth -** developing the economy based on knowledge and innovation;
- **Sustainable Growth** - promoting a more resource efficient, greener and more competitive economy; and
- **Inclusive Growth** - fostering a high employment economy delivering economic, social and territorial cohesion.

These three priorities are mutually reinforcing. To guide the achievement of these core principles the EU has agreed on a limited number of headline targets for 2020. It is agreed that these targets should be representative of the themes of smart, sustainable and inclusive growth and that they must be measurable, capable of reflecting the diversity of all Member States and based on sufficiently reliable data for purposes of comparison. Given these criteria the following targets have been selected:

- The employment rate of the population aged 20-64 should increase from the current 69% to at least 75%, including through the greater involvement of woman, older workers and the better integration of migrants in the work force;
- The EU currently has a target of investing 3% of GDP in R&D. The target has succeeded in focusing attention on the need for both the public and private sectors to invest in R&D but it focuses on input rather than impact. There is a clear need to improve the conditions for private R&D in the EU and many measures proposed in this strategy will help to achieve this. It is also clear that by looking at R&D and innovation together we would get a broader range of expenditure which would be more relevant for business operations and for productivity drivers. The Commission proposed to keep the 3% target while developing an indicator which would reflect R&D and innovation intensity;
- Reduce greenhouse gas emissions by at least 20% compared to 1999 levels or by 30% if the conditions are right[2]; increase the share of renewable energy sources in the final energy consumption to 20%; and a 20% increase in energy efficiency;

[2] The European Council of 10-11 December 2009 concluded that as part of the global and comprehensive agreement for the period beyond 2012, the EU reiterates its conditional offer to move to a 30% reduction by 2020ompared to 1990 levels, provided that other developed countries commit themselves to comparable emission reductions and that developing countries contribute adequately according to their responsibilities and respective capabilities.

- A target on educational attainment which tackles the problem of early school leavers by reducing the dropout rate to 10% from the current 15%, whilst increasing the share of the population aged 30-34 have completed tertiary education from 31% to at least 40% in 2020; and
- The number of Europeans living below the national poverty lines should be reduced by 25% lifting over 20 million people out of poverty.

These targets are representative, not exhaustive. They represent an overall view of where the Commission would like to see the EU on key parameters by 2020.

Smart Growth – an economy based on knowledge an innovation

Smart growth means strengthening knowledge and innovation as drivers of future growth. This requires improving the quality of our education, strengthening the research performance, promoting innovation and knowledge transfer throughout the EU, making full use of information and communication technologies and ensuring that innovative ideas can be turned into new products and services to create growth, quality jobs and help address European and global societal challenges. But, to succeed, this must be combined with entrepreneurship, finance and a focus on user needs and market opportunities.

Sustainable Growth – promoting a more resource efficient, greener and more competitive economy

Sustainable growth means building a resource efficient, sustainable and competitive economy, exploiting Europe's leadership in the race to develop new processes and technologies, including green technologies, accelerating the roll out of smart grids using ICTs, exploiting EU-scale networks and reinforcing the competitive advantages of business, particularly in manufacturing and within SMEs, as well as assisting consumers to value resource efficiency. Such an approach will help the EU to prosper in a low-carbon, resource constrained world while preventing environmental degradation, biodiversity loss and unsustainable use of resources. It will also underpin economic, social and territorial cohesion.

Inclusive Growth – a high employment economy delivering economic, social and territorial cohesion

Inclusive growth means empowering people through high levels of employment, investing in skills, fighting poverty and modernising labour markets, training and social protection systems so as to help people anticipate and manage change and build a cohesive society. It is also essential that the benefits of economic growth spread to all parts of the EU, including opportunities for all throughout the lifecycle. Europe needs to

make full use of its labour potential to face the challenges of an ageing population and rising global competition.

Each of these 3 principles includes flagship initiatives as follows:

- EU 2020 Flagship Initiatives: Smart Growth – Digital Agenda for Europe, Innovation Union, Youth on the Move;
- EU 2020 Flagship Initiatives: Sustainable Growth – A Resource Efficient Europe, Integrated Industrial Policy for the Global Era; and
- EU 2020 Flagship Initiatives: Inclusive Growth – Agenda for New Skills and Jobs, European Platform against Poverty and Social Inclusion.

Of most relevance to this evaluation is the first principle: Smart Growth – an economy based on knowledge and innovation. The most relevant of the EU2020 Flagship Initiatives relating to Smart Growth (Innovation Union) is discussed in the following sections.

Reference is also made to Youth on the Move, Integrated Industrial Policy for the Global Era and Agenda for New Skills and Jobs which also promote the notion of knowledge partnerships and business and education links.

1.3.1.2 EU 2020 Flagship Initiatives: Smart Growth – Digital Agenda for Europe, Innovation Union, Youth on the Move - Summary

The smart growth priority aims to promote knowledge and innovation as drivers of future growth. For this to be achieved commission believes that there is a necessity to improve education, strengthen the research performance, promote knowledge transfer and innovation and make full use of all information and communication technologies. Within this priority there are three main strategies:

- The Digital Agenda for Europe;
- The Innovation Union Strategy (including Horizon 2020); and
- The Youth on the Move Strategy.

The overarching objectives of these strategies are as follows:

- **To increase innovation spending**: R&D spending in Europe is below 2%, compared to 2.6%in the USA and 3.4% in Japan, mainly as a result of lower levels of private investment. The priority states that the focus must be on the impact and composition of research spending and to improve the conditions for private sector R&D in the EU;
- **To increase levels of education**: A quarter of all pupils have poor reading competences, one in seven young people leave education and training too early. Around 50% reach medium qualifications level but this often fails to match labour market needs. Less than one person in three aged between 25-34 has a university degree compared to 40% in the USA and over 50% in Japan; and

- **To improve Europe's digital infrastructure**: The global demand for information and communication technologies is a market worth nearly €2,000 billion, but only a quarter of this come from European firms. Europe is also falling behind in high speed internet, which affects its ability to innovate, including in rural areas, as well as on the on-line dissemination of knowledge and on-line distribution of goods and services.

1.3.1.3 Innovation Union (European Commission, Oct 2010)

The Innovation Union Strategy sets out an integrated and strategic approach, exploiting and leveraging the strengths of the Union in new and productive ways and thereby maintains the economic foundation that supports our quality of life and our social model as our population ages. To achieve the Innovation Union, the following is required:

- In times of fiscal constraints, the EU and Member States need to continue to invest in education, R&D, innovation and ICTs. Such investments should where possible not only be protected from budget cuts, but should be stepped up;
- This should go hand in hand with reforms to get more value for money and tackle fragmentation. EU and national research & innovation systems need to be better linked up with each other and their performance improved;
- Our education systems at all levels need to be modernised. Excellence must even more become the guiding principle. We need more world-class universities, raise skill levels and attract top talent from abroad;
- Researchers and innovators must be able to work and cooperate across the EU as easily as within national borders. The European Research Area must be completed within four years – putting in place the frameworks for a truly free movement of knowledge;
- Access to EU programmes must be simplified and their leverage effect on private sector investment enhanced, with the support of the European Investment Bank. The role of the European Research Council should be reinforced. The framework programme's contribution to nurturing fast-growing SMEs must be boosted. The European Regional Development Fund should be fully exploited to develop research and innovation capacities across Europe, based on smart regional specialisation strategies;
- We need to get more innovation out of our research. Cooperation between the worlds of science and the world of business must be enhanced, obstacles removed and incentives put in place;
- Remaining barriers for entrepreneurs to bring "ideas to market" must be removed: better access to finance, particularly for SMEs, affordable Intellectual Property Rights, smarter and more ambitious regulation and targets, faster setting of interoperable standards and strategic use of our massive procurement budgets. As an immediate step, agreement should be reached on the EU patent before the end of the year;

- European Innovation Partnerships should be launched to accelerate research, development and market deployment of innovations to tackle major societal challenges, pool expertise and resources and boost the competitiveness of EU industry, starting with the area of healthy ageing;
- Strengths in design and creativity must be better exploited. We must champion social innovation. We must develop a better understanding of public sector innovation, identify and give visibility to successful initiatives, and benchmark progress; and
- Need to work better with our international partners. That means opening access to our R&D programmes, while ensuring comparable conditions abroad. That also means adopting a common EU front where needed to protect our interests.

1.3.1.4 Horizon 2020: The Framework Programme for Research and Innovation (European Commission, 2013)

Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Running from 2014 to 2020 with a €70 billion budget, the EU's new programme for research and innovation is part of the drive to create new growth and jobs in Europe.

It will combine all research and innovation funding currently provided through the Framework Programmes for Research and Technical Development, the innovation related activities of the Competitiveness and Innovation Framework Programme (CIP) and the European Institute of Innovation and Technology (EIT).

Horizon 2020 has three main strands with a suite of objectives under each. They are as follows:

Excellent Science

Horizon 2020 will raise the level of excellence in Europe's science base and ensure a steady stream of world-class research to secure Europe's long-term competitiveness. It will support the best ideas, develop talent within Europe, provide researchers with access to priority research infrastructure, and make Europe an attractive location for the world's best researchers.

Horizon 2020 will:

- Support the most talented and creative individuals and their teams to carry out frontier research of the highest quality by building on the success of the European Research Council (ERC);
- Fund collaborative research to open up new and promising fields of research and innovation through support for Future and Emerging Technologies (FET);
- Provide researchers with excellent training and career development opportunities through the Marie Curie Actions; and

- Ensure Europe has world-class research infrastructures (including e-infrastructures) accessible to all researchers in Europe and beyond.

Competitive Industries

The Competitive Industries objective aims at making Europe a more attractive location to invest in research and innovation, by promoting activities where businesses set the agenda. It will provide major investment in key industrial technologies, maximise the growth potential of European companies by providing them with adequate levels of finance and help innovative SMEs to grow into world-leading companies.

Horizon 2020 will:

- Build leadership in enabling and industrial technologies, with dedicated support for ICT, nanotechnologies, advanced materials, biotechnology, advanced manufacturing and processing, and space, while also providing support for cross-cutting actions to capture the accumulated benefits from combining several Key Enabling Technologies;
- Facilitate access to risk finance; and
- Provide Union wide support for innovation in SMEs.

Leadership in enabling and industrial technologies: will support the development of technologies underpinning innovation across a range of sectors, including ICT and space. Horizon 2020 will have a strong focus on developing European industrial capabilities in *Key Enabling Technologies* (KETs) with a budget of €5894 million in constant 2011 prices. These include:

- Micro- and nano-electronics; photonics;
- Nanotechnologies;
- Advanced materials;
- Biotechnology;
- Advanced manufacturing and processing; and
- Development of these technologies requires a multi-disciplinary, knowledge and capital-intensive approach.

Tackling Societal Challenges

Horizon 2020 reflects the policy priorities of the Europe 2020 strategy and addresses major concerns shared by citizens in Europe and elsewhere. A challenge-based approach will bring together resources and knowledge across different fields, technologies and disciplines, including social sciences and the humanities. This will cover activities from research to market with a new focus on innovation-related activities, such as piloting, demonstration, test-beds, and support for public

procurement and market uptake. It will include establishing links with the activities of the European Innovation Partnerships (EIP).

Funding will be focused on the following challenges:

- Health, demographic change and wellbeing;
- Food security, sustainable agriculture, marine and maritime research, and the bio-economy;
- Secure, clean and efficient energy;
- Smart, green and integrated transport;
- Inclusive, innovative and secure societies; and
- Climate action, resource efficiency and raw materials.

1.3.1.5 Youth on the Move Strategy – An initiative to unleash the potential of young people to achieve smart, sustainable and inclusive growth in the European Union (European Commission, September 2010)

Youth on the Move is the EU's flagship initiative to respond to the challenges young people face and to help them succeed in the knowledge economy. It is a framework agenda announcing key new actions, reinforcing existing activities and ensuring the implementation of others at EU and national level while respecting the subsidiary principle. Youth on the Move will focus on four main lines of action:

- Developing modern education and training to deliver key competences and excellence;
- Promoting the attractiveness of higher education for the knowledge economy;
- Supporting a strong development of transnational learning and employment mobility for young people; and
- A framework for youth employment.

It notes that Europe's innovation capacity will require knowledge partnerships and stronger links between education, research and innovation (the 'knowledge triangle'). This includes fully exploiting the role of the European Institute of Innovation and Technology (EIT) and the Marie Curie Actions, while drawing out the lessons learned in both. In this context, the Commission will reinforce and extend the activities of the European platform for dialogue between universities and business (EU Forum for University Business Dialogue), with a view to increasing the employability of students and to developing the role of education in the 'knowledge triangle'.

1.3.1.6 An Integrated Industrial Policy for the Globalisation Era putting Competitiveness and Sustainability at Centre Stage (European Commission, 2010)

This Communication proposes a fresh approach to industrial policy that will put the EU economy on a dynamic growth path strengthening EU competitiveness, providing growth and jobs, and enabling the transition to a low-carbon and resource-efficient

economy. It highlights that European industry must also strengthen its knowledge base to remain competitive, investing in research and innovation for a smart, sustainable and inclusive economy. Moreover, since 2004 the Commission has supported the creation of European Technology Platforms to bring industry stakeholders together at EU level, develop a shared vision on R&D, and encourage feedback on EU policies. Joint Technology Initiatives have been set-up to further research at a European level in areas with high innovation potential. The Commission also launched three Public-Private Partnerships as part of the European Economic Recovery Package: 'Factories of the future', 'Energy-efficient buildings' and 'Green cars', to support medium and long-term research and development to respond to the urgent competitiveness and sustainability challenges in major industrial sectors. The Knowledge and Innovation Communities of the European Institute of Innovation and Technology integrate at EU level the entire innovation chain from education and research to commercialisation, with a focus on strong governance, and provide role models for stimulating innovation.

It states that the Commission will:

- promote initiatives bringing together higher education and businesses to improve Europe's highly skilled workforce, such as an e-skills initiative focused on advanced ICT users in industry, and the Universities-Business Forum pilot action funding Knowledge Alliances between universities and businesses.

It also notes that while the economic and financial crisis shifted the focus of industrial competitiveness policies towards short-term rescue and recovery actions, in the future the attention of policy makers has to focus on long-term structural challenges, in particular maintaining global competitiveness, climate change, energy, population ageing, skills and knowledge.

1.3.1.7 An Agenda for New Skills and Jobs- A European Contribution towards Full Employment (European Commission, 2010)

This initiative is the main policy instrument created to help the EU reach its employment target for 2020: 75% of the working-age population (20-64 years) in work. Launched in 2010, it is part of the EU's overall strategy Europe 2020 promoting smart, sustainable and inclusive growth in the next 10 years and beyond. The Agenda presents a set four key priorities to meet these challenges which are:

- Stepping up reforms to improve flexibility and security in the labour market ('flexicurity');
- Equipping people with the right skills for the jobs of today and tomorrow;
- Improving the quality of jobs and ensuring better working conditions; and
- Improving the conditions for job creation.

Under the second priority this includes investment in education and training systems, anticipation of skills needs, matching and guidance services to raise productivity, competitiveness, economic growth and ultimately employment.

It states that the Commission, in cooperation with Member States, will:

- As of 2011, support '**knowledge alliances'**, i.e. ventures bringing together business and education/training institutions to develop new curricula addressing innovation skills gaps and matching labour market needs. The EU Industrial PhDs in the framework of Marie Curie actions and the Erasmus placement in companies will also be developed.

1.3.2 UK Strategic and Policy Context

1.3.2.1 Independent Review of Universities and Growth: Preliminary Findings report (Sir Andrew Witty, 2013)

This review explores how universities can support growth by working with organisations such as Local Enterprise Partnerships (LEPs), as the local bodies responsible for setting strategies to drive economic growth across the country. The key emerging themes are:

- Sectoral strengths and clusters are a sound starting point for creating regional growth, and this implies collaboration between LEPS and Universities across the country;
- Universities can play a stronger role in realising the economic benefits of research insights for localities and the Industrial Strategy;
- There is room to improve SME benefit from universities in terms of talent and know how; and
- Incentives, and national organisations supporting research, innovation and growth, can be better aligned to deliver to their full potential for the Industrial Strategy and for local growth.

This report is not directly relevant to NI as it focuses on English HEIs' relationships with Local Enterprise Partnerships (an England only phenomenon). However, there is some relevance to the work of Connected and in respect of the universities' wider involvement in strategic policy development in Northern Ireland. The findings are broadly consistent with DEL's policies on university engagement with business and the wider community.

Although the report is very much focused on the universities' interaction with, and influence on, Local Enterprise Partnerships which are not part of the landscape in Northern Ireland, there is some resonance with DEL's overall direction. Specifically:

- **"Making sector or cluster strengths the starting point for developing plans for regional growth".**

- By identifying key areas of science, technology and innovation in which Northern Ireland has a lead over it competitors, and advising on the policy required to exploit these strengths and deliver economic success, MATRIX is helping to ensure the sustainability of Northern Ireland's economic growth in the face of increasing competition in high value global markets.
- (See also comments below on DEL's "Connected" programme which are relevant to the sectoral clustering approach favoured by Witty).

- **"Making sure universities play a stronger role in economic development".** The two universities in NI play a clear role in the strategic direction of innovation policy being represented on both the Board of Invest Northern Ireland (the region's economic development agency) and also on Northern Ireland's Science and Industry Panel - "MATRIX".

- The structure of the Northern Ireland economy (i.e. the preponderance of SMEs, predominance of low value activities and the fact that business R&D is focused in a small cadre of businesses) leads to a lack of absorptive capacity for R&D in the NI business base.
- The challenge for Northern Ireland is therefore to develop an innovation ecosystem that has clarity of vision and roles for all stakeholders. This requires more joined up and synergistic support (passing the baton from concept to commercialisation) and it is imperative that we continue to develop a dynamic and flexible interface between businesses and the HE sector and Government (a triple helix), through initiatives such as MATRIX. The MATRIX Vision is therefore:

  > Led by Business
  > Inspired by Academia
  > Facilitated by Government

- **"Improving SME access to universities, including a stronger role for university business schools to provide support to SMEs".**

- This is something on which this Department (DEL) in particular has a strong focus, having introduced the "Connected" programme back in 2007 to address the very issue of easy access by SMEs to the research and technology base, as represented by the two universities and six regional colleges of further education.
- DEL believes the "Connected" programme to be a ground-breaking initiative enabling the two universities and the six colleges to come together to provide a highly effective "one-stop-shop" for companies wishing to access the technology and knowledge capital within the local research base, critically taking them right through the whole process from problem definition through to solution identification and implementation.
- Through Connected (currently funded by DEL at £1m per annum), businesses have coordinated access to the full range of services including research,

product development, knowledge transfer, skills development, innovation and training. The current (second) round of Connected also incorporates additional strategic links with the Agri-Food and Biosciences Institute (AFBI) and the College of Agriculture, Food and Rural Enterprise (CAFRE).

- This initiative, which is understood to be the first of its kind in the UK, has been acknowledged by MATRIX (the NI Science/Industry Panel) as playing a key role in linking the HE and FE sectors with SMEs. Indeed, Connected focuses on the five priority sectors for Northern Ireland as identified by MATRIX, namely:

  - Advanced Engineering
  - Advanced Materials
  - Agri Food
  - ICT
  - Life and Health Sciences

- However, as well as facilitating specific projects for individual companies, Connected has also established a range of "sectoral projects" which are effectively clusters led by at least one HE or FE institution and involving groups of local companies and addressing common issues of interest or opportunities through knowledge transfer, product development, training and also by developing international linkages.

- **"Reducing the complexity of funding streams that support research and innovation"**

- Invest Northern Ireland and its legacy agencies, in the past, had a suite of R&D programmes covering everything from near market product development to pre-competitive R&D. Nowadays these have been replaced by a single "Programme for R&D" to make the entry point for all sizes of businesses much more straightforward.

- **"Ensuring national organisations support innovation and regional growth"**

- DEL's full engagement with, and financial support for, the UK's new National Centre for Universities and Business has been endorsed at Ministerial level and both universities here are keen to be involved. The NI universities are also well linked into the UK Research Councils and Universities UK.

1.3.3 NI Strategic and Policy Context

1.3.3.1 Programme for Government 2011-15 (Northern Ireland Executive, 2011)

The Programme for Government sets out the priorities and budgets for the Executive. It specifically set targets for Growing a Sustainable Economy and Investing in the

Future, which aims to specifically encourage R&D. The most relevant priority is Priority 1: Growing a Sustainable Economy and Investing in the Future which includes encouraging innovation and R&D.

In addition, DETI has published an Innovation Strategy for consultation in September 2013 which is consistent with the Economic Strategy and continue to prioritise innovation and R&D as a key driver of the economy.

1.3.3.2 Northern Ireland Economic Strategy - Department of Enterprise, Trade and Investment (2012)

The NI Economic Strategy states that it will work to rebalance the Northern Ireland economy during the current budget period, and to stimulate Innovation, R&D and Creativity by supporting NI Universities and FE colleges to undertake 155 knowledge transfer projects on behalf of local businesses by 2014. It also notes that given the importance of innovation and R&D it has identified a number of complementary actions to pursue over the medium to longer term to build a more knowledge based NI economy. These include:

- Exploring how the NI Science Park can further evolve into an Open Innovation Centre that could create the environment where partnerships and collaboration can flourish across sectors;
- Progressing the alignment of publically funded research with our economic priorities in order to increase the potential for greater knowledge transfer between business and academia;
- Examining ways to increase the rate of commercialisation of publically funded research and public sector Intellectual Property;
- Fostering the degree of innovation through increased use of innovative forms of public procurement;
- Enhancing the support to companies and research organisations who wish to participate in EU R&D and Innovation funding programmes such as Framework 7 and its proposed successor Horizon 2020;
- Working to identify areas where there can be greater collaboration between the health sector and business in order to improve patient care and develop economic development opportunities; and
- Examining 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.

1.3.3.3 Innovation Strategy for Northern Ireland 2013-2025 – Consultation Document (DETI, Sept 2013)

The Innovation Strategy for Northern Ireland (2013-2025) identifies the key actions necessary to support Northern Ireland companies to become more innovative. For Northern Ireland, with a relatively small business base engaging in Innovation and

R&D, it is of paramount importance that our firms, across all sectors embrace innovation in all its forms. However, while many of our companies are innovative and compete on a global basis, **we need more companies across all sectors engaged in innovation** because Northern Ireland firms have the lowest level of innovation activity amongst the UK regions[3].

The focus of this Strategy is on companies and how they can be better supported to engage in innovation in order to achieve the wider economic objectives for Northern Ireland. Within the innovation ecosystem, knowledge is **generated** in the form of ideas and **exchanged** through various interactions between individuals, companies, academics, government agencies and so forth. By definition, however, innovation does not occur until this knowledge has been **exploited** to add value, which is ultimately the key objective for Northern Ireland's economy.

The draft Strategy identifies actions under four themes. These are:

- Knowledge Generation;
- Knowledge Exchange;
- Knowledge Exploitation; and
- Cultural Change.

Knowledge Generation

Knowledge Generation is the catalyst for growth. Focus needs to be on creating an environment which encourages research and creativity. In doing so we must provide our young people and workforce with the skills and attitudes to succeed – across the public and private sector. The outcomes of this theme will include:

- More firms engaging in innovation;
- More companies, particularly local SMEs, investing in R&D;
- Our resources focussing on areas of greatest opportunity;
- Universities generating more world class research;
- Our health and social care (HSC) organisations as magnets for R&D investment;
- Enhancing creativity and design in everything we do; and
- Our education system providing the skills needed by innovative companies.

Proposed actions to encourage this activity include:

- Encourage more businesses to innovate and carry out R&D;
- Increase focus on companies who are not innovation active;
- Prioritise support in areas ensuring the greatest potential economic impact for NI;

[3] Community Innovation Survey 2012

- Use foresight activity to inform government of emerging technologies and future markets ensuring the necessary skills base is in place to exploit opportunities;
- Continue to embed ICT as a cross-curricular skill in schools and colleges;
- Continue to promote research excellence and meet the needs of industry;
- Promote the benefits of design;
- Develop and hone the skills to support innovation; and
- Support R&D and innovation infrastructure in HSC organisations.

Knowledge Exchange

Knowledge exchange is about facilitating the exchange and access to quality information across all sectors in order to support economic growth. The outcomes of this theme will include:

- More firms engaging in open innovation;
- Increase business to business collaboration;
- Increase business to academia collaboration;
- More international partnerships and collaborations; and
- Greater funding success for EU collaborative R&D funding.

Proposed actions to encourage this activity include:

- Increase focus and support for open innovation activities;
- Support the creation of new networks, such as European Connected Health Alliance, which have the potential to exploit global market opportunities;
- Improve facilitation of knowledge exchange through teaching, consultancy and community based activities;
- Forge and strengthen strategic partnerships with emerging and high growth economies;
- Strengthen engagement with EU and secure greater success in Horizon 2020;
- Increase core investment in the universities' knowledge exchange infrastructure (Higher Education Innovation Fund - HEIF);
- Complement HEIF with a new round of the 'Connected' programme to support more open innovation projects; and
- Develop further the innovation capacity of HSC organisations.

Knowledge Exploitation

Knowledge Exploitation is the transformation of knowledge into products and services which can add value and preferably be exported. The outcomes of this theme will include:

- More companies accessing finance to exploit their knowledge and IP;
- Supporting businesses with high growth and export potential;
- Easy access to public sector data that can be commercially exploited;

- Public procurement being used to drive innovation; and
- Our innovation infrastructure being exploited to its full potential.

Proposed actions to encourage this activity include:

- Support and increase Access to Finance for companies;
- Fund a world-class Business Accelerator;
- Support open data as a means of sharing knowledge;
- Become a strategic partner of the UK Open Data Institute;
- Exploit the potential for big data/data analytics; and
- Promote the Small Business Research Initiative (SBRI) to drive innovation through pre-commercial procurement of R&D.

Cultural Change

Cultural change is focused upon changed attitudes and behaviour towards collaboration, and the openness towards and use of new ideas, innovation and risk taking. The outcomes of this theme will include:

- Visibly drive forward, from the top, on the importance of innovation for growth;
- Promote a coordinated approach to science across government;
- Improve the culture of leadership within organisations;
- Promote a more balanced approach to regulation and oversight that encourages more risk-taking;
- A more innovative and open public sector;
- Stimulate social innovation to drive the third-sector; and
- Improved communication.

Proposed actions to encourage this activity include:

- Look to establish an Innovation Council;
- Appoint a Chief Scientific Advisor for Northern Ireland;
- Support innovation by managing higher levels of risk in return for higher returns for NI economy;
- Seek to appoint 'Innovation Champions' within all government departments;
- Increase focus in investing in leadership training for SMEs;
- Remove unnecessary regulatory burden for business;
- Develop a public sector innovation programme with NESTA; and
- Promote innovation and creativity as core competences for Civil Servant managers.

1.3.3.4 Preparing for a Lower Corporation Tax Environment (Department for Employment and Learning, 2012)

This report looks at the future demand for skills, employability and R&D capacity in NI under a 12.5% Corporation Tax rate scenario, and identifying implications for policy, drawing on international best practice.

A reduction in NI's Corporation Tax rate is expected to:

- Improve substantively the economic competitiveness of the region;
- Lead to more inward investment;
- Strengthen local companies via building supply chain linkages and wider relationships with larger multinational companies;
- Boost profits of existing firms and encourage reinvestment of profits and job hiring;
- Rebalance the economy to become more private sector and export orientated;
- Improve social well-being by creating jobs across the entire skills spectrum;

- Increase wage levels;
- In the long-run generate additional net tax revenue which can eventually fund higher public spending; and
- Reduce fiscal dependence on the GB taxpayer.

Jobs

A reduction in NI's Corporation Tax rate to 12.5% is expected to bring a range of economic and social benefits. In job terms, the EAG-Oxford Economics research estimates an impact of58k jobs above baseline employment levels by 2030. New FDI jobs (25k), indirect supply chain jobs (12k), induced consumer spending jobs (10k) and expansion of existing indigenous firms (9k) account for the majority of the overall 58k net job impact. The remainder of the impact is made up of expansion of existing foreign-owned firms (1k) and following initial job losses, 2k net additional public sector jobs by 2030.

Sectors

Software & IT (10k); management consultancy (3.5k); health & life sciences (3.5k); creative industries (3.4k); accounting & legal services (3.2k); financial services (2.3k); R&D (2.1k) and advanced manufacturing (2k) are the main sectoral sources generating the 58k job impact by 2030. Employment in the software & IT sector alone is forecast to almost double in size by 2030 from its current level. These sources of sectoral growth are also broadly consistent with priority skill areas identified in a recent report by NI Advisor for Employment & Skills. Given many of the above sectors are tradable or at least have export potential, and jobs in other non-exporting sectors are linked to demand from direct exporting sectors, the sectoral mix of jobs under a low tax scenario should be considered to be more sustainable than elements of recent debt-led employment growth in NI prerecession.

Skill levels

On the basis of sectoral and occupational employment forecasts, and the changing skills structure within individual sectors and occupations, over the next two decades in the low tax scenario the stock of jobs requiring postgraduate qualifications is forecast to rise fastest in relative terms. The stock of jobs requiring no qualifications is forecast to fall most. For new FDI, the share of jobs requiring NQF level 4+ qualifications by 2025-2030 is forecast to be as high as three-fifths. This is driven by the distribution of FDI jobs across sectors, including the importance of software & IT jobs, and the specific skill requirements of these sectors. New FDI jobs have a noticeably higher level skills demand structure compared to economy-wide skills demand in the baseline scenario.

In the low tax scenario, the NI economy will require, annually, the following skills breakdown and volume of education leavers and migrants by 2025-2030: 2,600 persons with postgraduate qualifications; 9,000 persons with NQF 4+ qualifications;

6,300 persons with NQF level 3 qualifications; 2,100 persons with NQF level 2 qualifications; and 7,600 persons with NQF level 1 qualifications and below (of which 3,500 is for persons no qualifications).

Higher level skills by subject

In the low tax scenario, there is forecast to be an increase in demand across all higher level skill subject areas, although the distribution of demand shifts somewhat compared to the baseline scenario. By 2025-2030, compared to the baseline scenario, higher level skill subject demand shares (as a per cent of total demand) are forecast to rise for computer science, creative arts & design, biological sciences and physical science subjects; and decrease significantly for medicine & dentistry, subjects allied to medicine and education. STEM subjects, excluding medical subjects, are forecast to account for 28% of total higher level skill demand in the low tax scenario, compared to 24% in the baseline.

For new FDI jobs, over half of higher level skill demand is for STEM degrees, even after excluding medical degrees. Computer science's share of total higher level skill demand is forecast to rise from 5% in baseline to 8-9% in the low tax scenario.

Employability

Boosted by the 58k job impact above the baseline scenario, total employment is forecast to increase by more than NI's working age population growth in the low tax scenario over the next two decades. As a result the economy's employment rate would rise from 67% to around 71% in 2030. This would represent a solid achievement although NI would still have a lower employment rate in future than several other UK regions and international comparators have today, even given the effects of the recession.

The future quantum and structure of labour and skill demands in the low tax scenario – and in the baseline scenario also - present both a major opportunity and challenge for employability. This is in terms of getting people that are out of work into jobs and lowering the otherwise high fiscal welfare costs of non-employment. The key metrics for considering the scale of the opportunity and challenge are comparing the volume and structure of future skill demand, against the volume and skill structure of the non-employed, and against the volume and proportion of the unemployed and inactive who 'want to work', and also considering how the latter might be impacted in future by welfare reform.

The low skills structure of the non-employed is a significant and persistent problem of the NI labour market. Of today's 370k non-employed working age persons, almost half are qualified to only NQF level 1 and below, with an estimated 125k having no qualifications. In addition only 15% of NI's current economically inactive state that they want a job compared to 1 in 5 across the EU and 1 in 4 in the UK. Welfare reform, via medical reassessments and changes in eligibility, is likely to require a significant proportion of the economically inactive to start to look for work.

R&D and innovation capacity

There is likely to be an increase in demand for R&D capacity if the rate of Corporation Tax is lowered. But a rapid escalation in R&D and innovation capacity demand would be likelier if the sector mix of additional jobs was much more biased towards high-tech manufacturing (where the majority of NI's business R&D spend currently originates), as opposed to professional services.

A low Corporation Tax rate alone does not automatically lead to high demand for R&D and innovation capacity. Some of the world's most R&D intensive economies, such as Finland, do not have low rates of Corporation Tax or high FDI. Instead their large R&D base and high demands for innovation is built around a domestic innovation 'ecosystem' culture. Further the R&D tax regime matters much more than the Corporation Tax regime to attract and develop R&D activities. Lastly R&D is extremely skills intensive and this 'pull' factor is well ahead of the Corporation Tax rate in terms of its importance as a driver of R&D locational decisions. As a result for NI in a low tax scenario, R&D capacity is likely to be a more long-term issue and initially rank third in importance behind skills and employability in terms of needs of employers. It is skills and availability of a suitable supply of labour that will be key to securing the benefits of a lower Corporation Tax rate in the initial FDI phases.

R&D is already a central focus alongside skills and exports in the new Economic Strategy any reduction in SFA spend may be part transferred to higher R&D spend, and learning from Ireland's experience, in reality NI will be likely to pursue not only a low tax strategy, but at the same a higher R&D spend strategy also. This would place additional demands on R&D capacity, on top of the impact of a reduction in the rate of Corporation Tax, which needs to be examined separately from this study.

1.3.3.5 NI Framework Steering Group – final report with recommendations for increased participation in FP7 and Horizon 2020

DETI has established a Steering Group to support increased participation in FP7 and Horizon 2020. This group has produced 14 recommendations to help to achieve this as outlined below:

- Appoint a) A NICS representative for Europe2020; and b) A Horizon 2020 champion;
- Consideration to be given to the appointment of Horizon 2020 thematic leads;
- The current DETI led Framework Steering Group should be widened to include representation from Local Government;
- 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;
- Increase NI research groups participation in National, All-Island, and European wide research and interest groups;

- Explore new methods of marketing to increase engagement with industry and research organisations on Framework, potentially reaching outside NI to include All-island events;
- Create a specific Horizon 2020 website as the single point for which all information necessary in relation to Framework (gradually changing to Horizon 2020) could be hosted;
- (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 Colleges NI to fulfil Framework application mentoring role;
- Consider additional support that could be provided to academics participating in Framework applications;
- Increase number of NI evaluators for Framework;
- DETI to set a target for Horizon 2020 drawdown;
- Promote the assistance available to post-application staged support and connections available for project delivery;
- Offer an alternative source of funding support to finance application writing for Framework participation for non-Invest NI Clients and third party organisations; and
- QUB and UU to engage with RoI based research institutions to establish how they maximise support from Enterprise Ireland and other economic development agencies.

1.3.3.6 Horizon 2020: Northern Ireland Action Plan (Department of Enterprise, Trade and Investment)

This Action Plan details a series of key actions to be undertaken during 2013 that will ensure that Northern Ireland researchers across academia, industry and the public sector have the necessary levels of support to be successful in Horizon 2020. It notes that Horizon 2020 will focus on three key priorities:

- ***Excellent Science*** **(**€24.6 billion) will support World class science by developing, retaining and attracting leading research talent;
- ***Industrial Leadership*** (€17.9 billion) will see strategic investments into key technologies and seek to stimulate increased innovation in Small and Medium sized Enterprises (SME) to create growth and jobs; and
- ***Societal Challenges*** (€31.7 billion) will seek to address the concerns of citizens and society which form EU policy objectives, through breakthrough solutions resulting from multi-disciplinary collaborations.

The figures in brackets are the indicative budget for each priority.

It outlines 11 key actions for 2013 as follows:

- Creation of an NI Horizon 2020 Contact Point (NICP) network;

- Development of a Horizon 2020 communications strategy;
- Development of an NI Horizon 2020 website;
- Development of an NI specific guide to Horizon 2020;
- Appointment of an NICP with specific responsibility for SMEs;
- Organise at least 10 Horizon 2020 workshops;
- Increase the number of Horizon 2020 evaluators from NI;
- Examine the feasibility of establishing an alternative funding mechanism(s) for organisations not currently eligible for application support;
- Increase NI representation on EU groups/committees;
- Development of strategies to increase European Research Council (ERC) and Marie Curie funding; and
- Production of a report on FP7 performance to date.

1.3.3.7 Graduating to Success: A Higher Education Strategy for Northern Ireland (Department for Employment and Learning, 2012)

The Higher Education Strategy sets out the direction of higher education in Northern Ireland to 2020. The vision for higher education is one of a sector which is vibrant and of international calibre; which pursues excellence in teaching and research; which plays a pivotal role in the development of a modern, sustainable, knowledge-based economy; which supports a confident, shared society; and which recognises and values diversity. The Strategy's four guiding principles are responsiveness, quality, accessibility and flexibility.

- More responsive to the needs of the economy;
- A higher quality learning experience;
- A more accessible higher education sector; and
- A more flexible lifelong learning environment.

Under the first of these, the strategy recognises that "Higher education must be responsive to the needs of the economy, with an emphasis on meeting the skills needs of industry; maximising the potential of research and development (R&D); and promoting knowledge transfer." It notes that Innovation is a key element of the Economic Strategy, and the Higher Education Strategy will support innovation through the pursuit of research and development excellence, overseas institutional research partnerships, knowledge transfer and university-business collaboration.

The strategy includes a commitment that mainstream research funding at the very least will be maintained during the current Comprehensive Spending Review (CSR) period to 2015. The Department will work with the sector to seek additional outside investment to promote world-leading R&D in Northern Ireland. Knowledge transfer will continue to be supported by Departmental core funding through NI HEIF and supplemented by "Connected", a programme which enables Higher Education Institutions (HEIs) and Further Education Colleges (FECs) to identify and meet the knowledge transfer needs of businesses. The Department encourages closer

collaboration between the higher education and business sectors to exploit the commercial potential of new ideas.

Knowledge transfer and innovation is highlighted as an area for development, and the strategy includes a commitment to increase knowledge transfer activity and improve links with small and medium enterprises (SMEs).

This strategy also encourages collaborative approaches that exploit NI's geographical position within Europe and internationally, in particular cross-border research partnerships with the Republic of Ireland and new and existing links with the United States.

In addition, it states that enhanced collaboration and co-operation on an international and cross-border basis would also stimulate the proposed establishment of a European Research Area Framework by 2014. This should facilitate enhanced collaboration under FP7 and its successor, Horizon 2020. Therefore it claims that a significant increase in R&D funding over the period 2014-2020 should be possible.

1.3.3.8 NI Agri-Food Strategy (Going for Growth: A Strategic Action Plan in Support of the Northern Ireland Agri-Food Industry (Agri-Food Strategy Board, April 2013)

The importance of the Agri-Food industry to the Northern Ireland economy is recognised in both the Programme for Government 2011-15 and Economic Strategy 2011-15. This is in line with the Government's aim to rebalance the economy through increasing economic competitiveness and building a larger and more export-driven private sector.

The Ministers of Enterprise, Trade and Investment (DETI) and Agriculture and Rural Development (DARD) appointed the industry-led Agri-Food Strategy Board (the Board) to develop a Strategic Action Plan for the industry. This action plan sets out the following strategic priorities:

- Grow sales by 60% to £7bn;
- Grow employment by 15% to 115,000;
- Grow sales outside Northern Ireland by 75% to £4.5bn; and
- Grow by 60% to £1bn the total added value of products and services from local companies.

To achieve these priorities the following objectives have been set:

- Transformation of the industry into an ambitious, outward looking and globally competitive sector, at the core of this transformation will be a world-class supply chain focused on exploiting the global opportunities that we have identified in the Going for Growth Strategic Action Plan;
- The development of an integrated customer-led industry focused on global market growth, supported by a single marketing organisation; and

- Increased priority given to research and innovation and to harnessing the collective potential of people will be seen in products, services, greater employment and support for the environment. These will be the benefits from a fully integrated supply chain and from a closer partnership between industry, Government and academia.

It is noted that these outcomes will not be achieved unless the appropriate platforms and infrastructures are put in place to facilitate the achievement of these goals. Key recommendations are that:

- There are changes of behaviours by Government, industry and academia to reflect the fact that there is only one supply chain;
- The Government invests £400m over three years in the industry to unlock and leverage investment of over £1.3bn from the industry itself;
- Industry works with Government to determine the best model for efficient businesses across all relevant sectors and to develop policy that will facilitate more rapid consolidation of resources into effective and efficient businesses with the economic scale which permits effective competition at a global level;
- There is a reinvigoration of the industry from an increased intake of younger people right across the supply chain, by developing entrepreneurship through the adoption of a more business focused approach and a fostering of artisan creativity that reflects our provenance; and
- The many and varied organisations and interest groups representing the industry are collapsed on a phased basis over an agreed timescale to form only four organisations, each representing the following areas:

Marketing	Innovation	Funding Skills	Entrepreneurship Industry
A single Agri-Food Marketing Organisation to consolidate all marketing and promotional activities with a clear food promotions strategy	A single organisation with responsibility for innovation funding under the control of one dedicated executive and board which works closely with Matrix to ensure consistent approach across the industry	A single organisation dedicated to the development of all Agri-Food skills and entrepreneurship	A single organisation that is truly co-ordinated and an effective voice of the interests of the industry

1.3.3.9 2014-2020 ERDF Investment for Growth and Jobs Programme[4]

This consultation document details proposals for the European Regional Development Fund (ERDF) Investment for Growth & Jobs Programme which is due to run from 2014-2020. It proposes to focus the ERDF Investment for Growth and Jobs Programme on three priority areas:

- Strengthening Research, Technological Development and Innovation;
- Enhancing the Competitiveness of SMEs (including through improved access to finance measures and Tourism development); and
- Supporting the shift towards a Low-Carbon Economy.

Priority 1 will focus on innovation as a key driver for economic development, as innovation has been identified by the Commission as central to the Europe 2020 strategy for smart, sustainable and inclusive growth. This will be achieved through:

- enhancing research and innovation (R&I) infrastructure and capacities to develop R&I excellence and promoting centres of competence, in particular those of European interest;
- promoting business R&I investment product and service development, technology transfer, social innovation and public service applications, demand stimulation, networking, clusters and open innovation through smart specialisation; and
- supporting technological and applied research, pilot lines, early product validation actions, advanced manufacturing capabilities and first production in Key Enabling Technologies and diffusion of general purpose technologies.

Activities under Priority 2 will include three main aspects where SMEs are at a disadvantage when compared to larger firms:

- Access to Finance – Credit and Capital;
- Access to business-relevant know-how, information & contacts; and
- Market access and entrepreneurial risk.

Achievement of the second priority relating to the competitiveness of SMEs will be achieved through:

- promoting entrepreneurship, in particular by facilitating the economic exploitation of new ideas and fostering the creation of new firms; and
- developing new business models for SMEs in particular for internationalisation.

Proposed activities under Priority 2 are as follows:

[4] Consultation on the Northern Ireland 2014 – 2020 ERDF Investment for Growth & Jobs Programme (Department of Enterprise Trade and Investment, (2013) accessed from Chapter 6 which provides details of proposed activities within the new Programme: http://www.detini.gov.uk/consultation-on-ni-2014-2020-erdf-programme

- Financial Engineering Instruments;
- Financial assistance for the Creative Industries sector;
- Building the Capacity and Capability of Tourism industry SMEs in Northern Ireland;
- Provision of Tourism Innovative Fund for Private Sector SMEs in Northern Ireland;
- Provision of a suite of Marketing Activities in Northern Ireland and the Republic of Ireland to grow the customer base for SMEs in Northern Ireland; and
- Local Economic Development.

1.4 Universities and FE Colleges' Knowledge Transfer Strategies

Both QUB and UU are required to produce a Knowledge Transfer Strategy as a condition of NI HEIF funding. NI HEIF 3 Strategies were produced to cover the period from AY 10/11 to AY 12/13, reflecting the context around the time Connected 2 was launched. NI HEIF 4 Strategies covering the period from AY 13/14 to AY 15/16 reflect the context looking ahead.

1.4.1 Knowledge Transfer Strategies (NI HEIF 3 – AY 10/11 to AY 12/13)

1.4.1.1 QUB Knowledge Transfer Strategy (NI HEIF 3)

A QUB KT Strategy was produced for NI HEIF 3 (AY10/11 to AY 12/13). The principal aims for NI HEIF 3 were as follows:

- In cooperation with partners and stakeholders, building further a culture and infrastructure of collaborative knowledge creation, transfer and exploitation within Northern Ireland from the foundation within Queen's University that maintains the University as a leading and valued partner for industry, commerce and business; as well as the wider community; locally, regionally, nationally and internationally;
- Embracing its leadership role in Northern Ireland, enabling and inspiring staff and students to enhance the global standing of the University, City and Region through strong partnerships with local stakeholders, SMEs with expert potential, multi-national enterprises (MNEs) and international research partners that support the delivery of economic, social and cultural benefits in Northern Ireland through direct contribution to wealth creation and the development of a sustainable, globally connected, knowledge-driven Northern Ireland economy; and
- Promoting, realising and communicating the impact that the University has upon society and the economy regionally, nationally and internationally. Key to achieving this is the effective coordination of a proactive programme to increase interaction and engagement (regionally and internationally), to build partnerships that enhance the effectiveness of scarce resources and utilise the

University as a public space for dissemination of knowledge, networking and for debate on key issues of significance to the future of the Region.

Anticipated outcomes from the three principal aims of NI HEIF 3 were as follows:

The strengthening of the entrepreneurial ethos of the University with a focus on promoting change and delivering economic benefit through:

- The provision of a stream of highly trained and innovative graduates and postgraduates with the skills, aptitudes and attitudes essential for a successful knowledge based economy. Delivery would seek to embed entrepreneurship and innovation at the heart of University students;
- The effective transfer of the University's research strengths to support local economic development directly through "spin out" companies and indirectly through enhanced research and innovation links with local SMEs and action by the University to broker relationships with potential MNE partners;
- An enhanced emphasis on delivering economic, social and cultural impact from the University's research through closer engagement with all sectors and communities; capitalising on the University's strengths in both STEM and the humanities and social sciences;
- The delivery of an increased income stream from diversified resources to provide leverage from government funding; reducing the reliance on public sector funds and ensuring the University and the Region remained competitive nationally and internationally. An increased focus upon European funding sources was to form a key component of the University's strategy to diversify sources of research income; and
- Establishing stronger partnerships with the City, Government Departments and Regional Agencies to ensure that the global standing of the University, City and Region would be recognised and that there would be a better integration of activity to realise fully the economic and social benefits of that global standing. A strengthening of relationships across the island of Ireland to increase opportunities for research and knowledge exchange activities was also a key element of the University's strategy for developing strategic partnerships and leveraging additional income.

The University's KT Strategy had at its root the concept of partnership working. Indeed, the successful development of a knowledge economy was seen as necessitating a joined up approach between all economic actors. Examples of effective collaboration between the NI universities were the long standing joint initiatives linked to the operation of the KTP scheme and the Science Shop. The latter was also seen as demonstrating collaboration at both national and European level. These were to continue along with the "Connected" related partnership. Additionally the partnership between HE & FE in the **"Connected" programme** was considered unique within the UK region and the "social networking" opportunities through the NI Science Park

Connect programme were also seen as leveraging the unique strengths of NI as a region.

1.4.1.2 UU Knowledge Transfer Strategy (NI HEIF 3)

A UU KT Strategy was produced for NI HEIF 3 (AY10/11 to AY 12/13).

The University's aim was to continue to develop innovation, in its broadest sense, to the benefit of the University and the wider Region. Ulster's Knowledge Transfer Strategy built on the University's significant innovation performance and would continue to support a broad commercial agenda through engagement with staff within the University, external agencies and collaborators who could add value to Ulster's innovative practice.

The strategy aimed to support an environment in which Ulster's high-quality, progressive innovation would continue to develop and be effectively disseminated and applied. It was to support the training of staff and students in accordance with national guidelines; the development of effective working collaborations with other relevant bodies, and ensure the University was very well placed to fully exploit the benefits of this growing enterprise.

The strategy indicated that the structures which supported the exchange of knowledge between the University and the wider community were being reviewed within the University of Ulster. (This restructuring is now complete).

The main activities within Ulster's Knowledge Transfer Strategy were:

- Business Outreach: The focus of the Business Outreach team would be on developing commercial relationships with those businesses and community groups where greatest potential impact existed. The team would capture business requirements, diagnose solutions and broker links with the University.

- The Business Outreach team would 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 would ensure greater involvement in student entrepreneurship and raise the profile of Ulster as an entrepreneurial University;
- It would play a key role in increasing engagement of academics in knowledge transfer activity;
- It would implement an agreed marketing strategy to encourage increased levels of engagement with the University; and
- It would provide a sectoral focus to augment the business outreach activities in the following areas – Life & Health Sciences, Enterprise, Sustainable Development and Creative Enterprise. This sectoral focus was to be achieved through the (then) recently appointed team of Connected staff.

- Knowledge Transfer: The Knowledge Transfer Team would develop and apply knowledge transfer products to ensure the University's knowledge satisfied the requirements of clients. The team was to be 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.

A key focus of the team would be on converting current customers of the University's KT products, i.e. Innovation Vouchers, KTP, FUSION, Consultancy, to other forms of innovation support.

- Technology Commercialisation:

- The Technology Commercialisation team would focus on the creation of market-orientated Intellectual Capital and increasing its rate of commercialisation. The team would be responsible for increasing the numbers of spin out companies from Ulster and increasing the number of license agreements. The Technology Commercialisation team would introduce an Open Innovation Programme to increase the accessibility of Ulster's Intellectual Capital amongst the business community. This programme would also add value and support the wider activities of the Office of Innovation.
- The team would continue to manage the Proof of Principle and Proof of Concept funds within the University. This team would also provide incentives to academics wishing to undertake applied research on behalf of companies and would manage the delivery of Ulster's Research Impact Awards and other Research Collaboration incentive programmes including the (then) newly established Research Collaboration fund aimed at increasing Ulster's level of research collaboration with local SMEs with a view of increasing engagement with the European Framework Programme and subsequent applications for funding.

Ulster's Knowledge Transfer Strategy would target businesses, public services and the third sector. Resources were allocated to enable more focused targeting of a number of business sectors and the Third Sector. The recently appointed Connected staff would have an integral role in the delivery of Ulster's Knowledge Transfer Strategy. The activity of the Connected staff was to be sectorally focused on the following areas - Life and Health Sciences, Enterprise, Sustainable Development and Creative Enterprise. The development of sectoral initiatives through the Connected programme would lead to the development of more cluster type activity which would result in wider sectoral initiatives with the University playing a lead role. The Connected staff sat within the Business Outreach team, however, their sectoral expertise was to be used to support the activity of the Knowledge Transfer, and Technology Commercialisation teams.

Community Organisations across Northern Ireland were to be supported through the activity of Ulster's Science Shop. Through the Science Shop, Ulster students across all Faculties would undertake scoped research projects for community organisations as part of their degree programme. Social Enterprises would continue to be supported by the University through the existing portfolio of Knowledge Transfer Programmes and at a policy level through the University's representation on the Social Economy Network Board.

The University of Ulster had dedicated Knowledge Transfer staff based at each of the four University of Ulster Campuses, i.e., Belfast, Coleraine, Londonderry and Jordanstown. This enabled Knowledge Transfer support to be delivered at a local level to organisations across the region. The Knowledge Transfer programmes delivered by the University were considered as having a focus which extended beyond Northern Ireland. Ulster would continue to build on its valuable contribution to business development within the Republic of Ireland through Enterprise Ireland's Innovation Voucher Scheme and InterTradeIreland's FUSION scheme. At a national level the University would continue to maximize the opportunities provided by the UK wide KTP programme.

At a European level, Ulster would continue to pursue opportunities to engage with partners outside Northern Ireland through programmes such as Enterprise Europe, Interreg or other European funding sources. The Office of Innovation is certain that further internationalisation of its innovation endeavours would result in enhanced commercial impact. During NI HEIF 3 Ulster was to continue its engagement with two US organisations, the US Association of University Technology Managers (AUTM) and Irish Technology Leadership Group (ITLG).

Ulster would continue to focus its Knowledge Transfer efforts on those businesses where the greatest potential impact existed. With support from the Connected 2 Fund, Ulster would develop advanced propositions in the following areas:

- Sustainable Enterprise;
- Digital Enterprise;
- Health Enterprise; and
- Enterprise Development.

1.4.2 Knowledge Transfer Strategies (NI HEIF 4 – AY 12/13 to AY 15/16)

1.4.2.1 QUB Knowledge Transfer Strategy (NI HEIF 4)

The most recent QUB KT Strategy was produced for NI HEIF 4, detailing priorities and objectives for the future.

The principal aims in the QUB KT Strategy for NI HEIF 4 are as follows:

- Play a leading role in the creation of a sustainable, globally-connected, knowledge-driven Northern Ireland economy, with mutual benefits for the HE and business sectors and the wider community;
- Accelerate the realisation of positive impact of research at Queen's on economy and society locally, nationally and internationally;
- Promote and communicate that impact to encourage future business partnerships, enhance public understanding of the benefits of high quality research, and inspire the next generation of innovators;
- Stimulate increased business investment in research and development, particularly amongst SMEs, to support the continued expansion and diversification of Queen's income base, and support local business growth;
- Deliver a transformational learning experience for our students which leads to excellent graduate career opportunities and enables them to contribute fully to the local and global community; and
- Respond to research needs expressed by civil society to produce outcomes which contribute to both student learning and wider knowledge.

The key areas of KT activity within the NI HEIF 4 period will be as follows:

- **Research commercialisation and spin-outs:** provision of expertise and guidance in the commercialisation of research, including support for invention disclosure and management of IP, and investment in, and support of, spin-out companies;
- **Consultancy and technical services:** promotion and support of academic relationships and engagement with the SME community in Northern Ireland through Innovation Vouchers and similar schemes;
- **Knowledge Transfer Partnerships and FUSION:** development and management of the University's KTP and FUSION portfolios, ensuring successful promotion, uptake, lifecycle support and achievement of intended outcomes;
- **Business alliance:** professional support for the development of long-term, strategic alliances between researchers at Queen's and regional, national and international partners;
- **Business networking:** encouraging and facilitating business engagement between the research base at Queen's and UK/Republic of Ireland companies through the provision of networking events, including the Chief Executive's Club, and sharing of key client information across the University;
- **Impact management:** professional support for the identification, development and communication of social, economic and cultural impact, and to deliver positive relationships with end users of research;
- **The Science Shop:** access to research resources for community and voluntary sector organisations through student project work, which in turn provides opportunities for students to learn and to experience the impact of research on society, and develops the skills of the workforce of tomorrow; and

- **Support for Student Enterprise:** activities to support enterprise and employability skills development for students, working closely with employers and alumni.

Additionally, the co-location of teams leading on KT activities with the EU research funding team (underpinned by the DEL/DETI HE-EU Support Fund) has created an optimal environment for the identification of opportunities for collaboration between academics and business which target the draw-down of competitive EU funding, particularly during the upcoming Horizon 2020 period.

The following areas of focus will be common across many of QUB KT activities during this period, linking the various areas of activity in service to QUB high-level goals:

- **Optimising existing business relationships**, and leveraging opportunities for increased engagement at higher stages on the "innovation ladder", particularly in relation to SMEs;
- **Creating new relationships and partnerships** at all levels in the innovation ecosystem;
- **Increasing academic engagement in knowledge exchange and impact realisation**, and creating more porous boundaries between academia and organisations in the private and public sectors to maximise the potential for the achievement of impact; and
- **Increasing public engagement with research and enterprise activities** and developing awareness of Queen's impact on the economy and society.

1.4.2.2 UU Knowledge Transfer Strategy (NI HEIF 4)

The most recent UU KT Strategy was produced for NI HEIF 4 (AY 13/14 to AY 15/16), detailing priorities and objectives for the future.

It states that the university is "*about the creation of knowledge through research and its dissemination through teaching and innovation"*. Its goal is: '*To advance knowledge by achieving international excellence in our chosen areas of research and to transfer knowledge in support of economic, social and cultural development through the achievement of high quality research outputs in our chosen areas of research and by developing further both interdisciplinary and collaborative research and the translation of knowledge into intellectual assets*.

The principal aims in the UU KT Strategy for NI HEIF 4 are as follows:

- To establish Ulster as the knowledge provider of choice for SMEs across the island of Ireland;
- To be a sector leader in support of creative, digital and social enterprises;
- To be the lead provider of academic consultancy services across Ireland;
- To be a UK top 3 provider of Knowledge Transfer Partnership (KTP) programmes;

- To establish Ulster's leadership in academic Open Innovation;
- To partner with business to increase and expedite the commercialisation of Ulster's Intellectual Assets;
- To extend Ulster's innovation functions to support student and graduate entrepreneurship; and
- Through our innovation activities to support the research impact agenda of the University of Ulster.

The key areas of KT activity within the NI HEIF 4 period will be as follows:

- **Business Engagement:** The main activities will be: Marketing, communication & event management; Business development for KTP and consultancy products; Client Relationship Management, across industry, academia and government; and Programme management, including of DEL's Connected programme, and the INTERREG-funded Creative Futures, STS and ICE programmes.
- **Research Collaboration:** The Office of Innovation will develop a proactive policy on seeking European funding and partnerships that will result in significant income generation for the University and a contribution to REF research impact.
- **Technology Commercialisation:** The priorities of the Technology Commercialisation team will be:

- To focus on a smaller number of high quality projects to maximise the support available from the Technology Commercialisation team to increase each project's chances of success;
- To be a leader in open innovation in the University sector;
- To bring entrepreneurship into technology development; and
- To expedite the process of technology commercialisation.

- **Investment and Enterprise:** The priorities of the Investment and Enterprise team, working closely with the Board of Innovation Ulster Ltd, will be:

- To refine Innovation Ulster Ltd's investment strategy to ensure its funds are used optimally in support of rapid company growth;
- To achieve Innovation Ulster Ltd's first significant >£1m exit;
- To increase the value of IP licensing returns; and
- To support student entrepreneurship.

1.5 Research on Good Practice and Reducing Barriers

1.5.1 Summary

In this section we provide an analysis of the barriers and good practice learning from a number of key reports and papers. The structure of this section is as follow:

For every report or paper analysed we present:

- An overview of the Report;
- Information on the barriers to innovative practices that is described in the reports; and
- Information on the good practice learning that is described in the reports.

Please note: Not every report contains information on barriers and good practice so the headings only appear where relevant.

1.5.2 UK: A Review of Business–University Collaboration: Professor Sir Tim Wilson DL February 2012

1.5.2.1 Introduction

This report ('A Review of Business – University Collaboration' Report by Sir Tim Wilson DL) outlines the importance of collaboration between the University Sector in the UK and Businesses. There are significant challenges faced by UK businesses including:

- Constantly increasing global competition;
- The impacts of the financial crisis; and
- International instability.

Universities are an integral part of the supply chain to business, a supply chain that has the capability to support business health and therefore economic prosperity. A thriving knowledge economy depends upon its universities in three critical dimensions: the application and exploitation of research capability; the enterprise and entrepreneurial culture that is developed amongst its students; and the applicability of the knowledge and skills of all its graduates.

1.5.2.2 Barriers to Innovation

The report highlights a number of key challenges faced in expanding and improving the quantity and quality of knowledge transfers between HEIs and Businesses. These Include:

- Business R&D in the UK is concentrated in relatively few large companies and a small number of industrial sectors; the ten largest investors account for 34 %

of all business R&D and the top 50 account for 56 %; independent SMEs account for only 3.5 % of expenditure;

- Global competition in the corporate R&D market provides both threats and opportunities. The UK university sector is acknowledged for its excellence and is able to attract investment from international companies and their subsidiaries to support its research. However, for the UK to obtain the full benefit from its university system, the country needs to attract international business to locate or expand in the UK and create employment. There needs to be some 'stickiness' in this inward investment in R&D if the country is to fully benefit from the capabilities of its university sector;
- There is a lack of awareness, especially among SMEs, to the benefits of collaboration with HEIs. Universities should publicise the wider benefits of their activity on a wider scale than hitherto and several adopted that recommendation through both traditional publication and in the wider media. Networking is also fundamental to business university collaboration. This concept goes well beyond the traditional models of IP exploitation, achieved through a transactional process involving intermediaries; and
- Disputes over the ownership of intellectual property is also a key barrier to collaboration, the Lambert Intellectual Property agreements[5] have gone some to remedy this but it is still reported as a significant issue in some negotiations.

1.5.2.3 Good Practice Lessons

World-leading business–university collaboration is dynamic and interactive, leading to:

- The design and delivery of programmes that are relevant to current and future business needs, ensuring progression opportunities at every level of achievement and a smooth transition between the different environments of universities and business;
- Graduates who seek knowledge and skills that are relevant to their future careers and who are confident in their ability;
- Opportunities for students to integrate work experience and study, ensuring connectivity between academic study and the world of employment;
- An enterprising and entrepreneurial culture amongst university students and staff, where success in enterprise and entrepreneurship is celebrated, rewarded and promoted;
- Businesses effectively and efficiently updating employee skills and seeing universities as a natural source of the expertise to do so;
- Graduate recruitment that matches business need with graduate skills, meets the diversity objectives of employers, is seen to be fair by the student population and provides performance feedback to universities and students;

[5] http://www.ipo.gov.uk/whyuse/research/lambert/lambert-mrc/lambert-mrc-outline.htm

- Sustaining world-class research within our universities, attracting the best talent to the UK, developing research informed leaders in both universities and business, and ensuring that there is a constant exchange between academe and business of research ideas and people;
- A culture of pursuing the application of university-based research excellence, ensuring that university research capabilities are fully exploited in generating economic wealth, optimising the use of government support in research, innovation and development;
- Collaboration with government agencies to undertake regular forward looks to co-identify areas of future knowledge and capability creation, where research investment should be allocated and, wherever possible, collaboratively developed and resourced;
- Recognition that the university sector represents a diverse set of institutions, each with its own portfolio of business support capabilities, leading to an optimal matching of business need with university strength;
- The creation of economic growth through partnership with government agencies and LEPs, leveraging each university's capabilities to support indigenous companies and to attract inward investment;
- UK universities being championed by business leaders and government agencies as being world class in business support and a primary reason for investing in the UK.

1.5.3 Department for Business Innovation and Skills: Dual Funding Structure for Research in the UK: Research Council and Funding Council Allocation Methods, and Impact Pathways. April 2013

1.5.3.1 Summary

This report analyses the links between research performance, research funding models and the knowledge exchange activities, motives and constraints of academics in the UK. It focuses in particular on the characteristics of the UK system of Dual Funding Support in which University research funding is provided by the twin routes of institutional block grants from the Funding Councils based on periodic quality assessment exercises and funding won in peer reviewed competition from the Research Councils.

1.5.3.2 Barriers to Innovation

The statistical analyses are based on several sources of data. First, detailed data on the interaction pathways of individuals contained in the CBR Survey of 22,000 UK academics (Hughes et al. 2010). Second, research council data on individual grants awarded over the period covered by the CBR survey (roughly 2006-9). Each of the academics in the CBR survey has been classifiable as the holder or non-holder of a research council award and is also assigned to a unit of assessment at their university

classified in terms of the proportion of its research classified as of the highest quality (4*) as the result of the Research Assessment Exercise (RAE) 2008. This allows us to compare the pathway characteristics of academics cross classified by whether or not they held a grant and also by the quality profile of their unit of assessment in the RAE of 2008. In addition we collated annual data for 2002/3 to 2010/11 based on the Quality Related (mainstream QR) allocation of research funds arising from the Research Assessment Exercises (RAEs) of 2001 and 2008. This data is at the unit of assessment level for each UK university. Finally we collated data from the Higher Education Statistics Agency (HESA) on the total research income of UK universities disaggregated by source. We then created a panel database linking the HESA and mainstream QR assessment data for the period 2002/3 to 2010/11. We use this to chart the evolution of the dual funding structure over that period.

As part of this research, respondents were asked to indicate whether their interactions with external organisations were constrained. The results indicated that that although there is a high degree of interaction between academics and external organisations there was also a range of factors that were perceived to constrain such interactions. Of these for the sample as a whole the most frequently cited are a lack of time (66%) and bureaucracy and lack of flexibility in university administration (31%).

In the majority of cases academics with grants were more likely to report constraints. Thus, a lack of time, is higher for academics with a grant (69%) compared to those without a grant (65%) as is external organisation unwilling to meet the cost (33%) compared to those without a grant (24%); difficulty in reaching agreement over IP (17%) compared to those without a grant (9%); external body unwilling to meet the cost (33%) compared to those without a grant (24%); in terms of lack of external resources (29%) compared to those without a grant (23%); difficulty in identifying partners (26%) compared to those without a grant (23%); differences in timescales (27%) compared to those without a grant (21%); lack of interest by external organisations (26%) compared to those without a grant (19%); lack of experience in the external organisation, slightly higher for academics with a grant (18%) compared to those without a grant (17%); cultural differences, which is slightly higher for academics with a grant (9%) compared to those without a grant (7%).

1.5.3.3 Good Practice Lessons

Public funding for research in the university sector in the UK is provided through two main routes. The first part of the Dual Support System is the allocation of funds through the Funding Councils for England, Scotland and Wales and the Department for Employment and Learning in Northern Ireland based upon periodic Research Assessment Exercises (RAEs). This is the mainstream QR or quality related component of research funding. The Funding Councils have also in recent years allocated further sums based not on research quality assessment but on the attraction of business or charity funding and the scale of PhD training provision. The second

element of the dual support system is research funding allocated through the research councils and which covers the whole of the UK.

The Dual Support System therefore combines forward and backward looking allocation methods. The research council element is in principle an essentially forward looking exercise since funding is based on proposed research activities. Awards will however inevitably reflect research reputation and be based to some degree on past work. In contrast the mainstream QR element is based on a periodic backward assessment of research performance.

Regarding academic involvement in impact pathways and academics' motivation for and conduct of research activity a microeconomic analysis found that a number of differences emerged between highly rated and less highly RAE rated departments.

- Academics in highly rated RAE departments are more likely to report that they are motivated to carry out basic or user inspired basic research than academics in lower ranked departments;
- Despite these differences in motivation there is, however, very little difference in the extent to which the research which is carried out by academics in differently rated departments has been applied in a private, commercial or public context or is perceived to be of commercial relevance. Academics in highly rated and less highly rated departments are equally likely to report these outcomes;
- However, if attention is focused on patenting, licensing and spin outs, then in the Sciences, where these activities are most prevalent, academics in higher rated departments are more likely to be involved than those in lower rated departments; and
- Higher proportions of academics are involved in a wider range of people based, problem solving and community based interactions with external organisations. In relation to this wide range of pathways academics in highly rated departments tend to be more focused on a somewhat narrower range of research related problem solving and people based activities.

Furthermore variations were noted in the report across academics when they are classified as to whether or not they hold grants. It was noted that grant holders in the matched sample emerge as more likely to:

- Be carrying out research than non-grant holders;
- Have had their research applied in a commercial context;
- Have interactions with private and public sector external organisations;
- Be involved in patenting, licensing and spin outs;
- Be more focused on a range of research and problem solving pathways. They are less concerned than non-grant holders with teaching and student related pathways; and

- Grant holders are also more likely to report a variety of possible beneficial impacts on teaching arising from their external relationships.

Finally, grant holders were noted to be more likely than non-grant holders to report constraints arising from: a lack of resources to support their research in external organisations; differences in perceptions of appropriate timescales compared to external organisations; difficulties in identifying partners; and a lack of interest amongst external partners.

1.5.4 Barriers in Knowledge Transfer: Selected Findings of an International Study about barriers in Knowledge Transfer between SMEs and HEIs. June 2011

1.5.4.1 Summary

The report highlights how knowledge and technology transfer has been rising distinctively over the past years.

1.5.4.2 Barriers to Innovation

The report states that global competitiveness requires new ideas which then can be turned into new cutting-edge products. In order for this process to take place it is considered essential for researchers and the industry to work closely together. Innovative products will maintain and enhance Europe's competitiveness in the global market.

However, the report states that knowledge and technology transfer and the resulting product development are complex processes. Companies, especially small and medium enterprises (SME), and higher education institutions (HEI) frequently experience barriers to their effectively engaging in and benefitting from in transfer projects. Partners involved often get discouraged by the complexity of the steps involved. The creation of a framework is necessary to facilitate knowledge and technology transfer. Ultimately, barriers need to be understood in order to be abolished, not just at an individual regional level, but for Europe as a whole so it can continue to grow up to its full potential as a unified market.

This is supported through survey results conducted with SMEs. It was evident that a lot of the barriers SME and HEI face result from fears, lack of knowledge and miscommunication, not just actually physical obstacles like funding and resources.

The different findings in the surveys show different training needs and areas that should be targeted in order to improve the transfer environment for HEI and SME. First and foremost, SME and HEI both need to be educated about each other's typical structures. SME need to learn about their (regional) HEI research capabilities. The institutions need to know and understand each other's expectations and interests. Generally speaking HEI and SME need to be brought on the same page about

opportunities and challenges of successful transfer activity projects. While SME need to respect that a clear definition of project goals is in HEI's interest, HEI need to accept the importance of business and project management skills. Advantages of transfer activities with SME have to be promoted while disadvantages need to be discussed and resolved by introducing the appropriate solutions.

Furthermore it was noted that both parties have different interests and only by knowing those it will be possible for them to find a solution that they can accept. Further it will be necessary for HEI to grow more aware to SME expectations in order to become more market oriented. Starting from the earliest planning phase of a transfer project, HEI and SME representatives have to clearly know each other's motivations and adopt frequent communication schemes throughout the course of the entire process. Not less important, it will be a focal point to stress the importance of the innovation culture and management within SME.

1.5.5 CIHE: Key Attributes for Successful Knowledge Transfer Partnerships: August 2012 - Commissioned by the Technology Strategy Board and Research Councils and completed by Philip Ternouth, Cathy Garner, Laurie Wood and Peter Forbes

1.5.5.1 Summary

This study was commissioned by the Technology Strategy Board and the Research Councils. Its aim is to clarify how the various players, mechanisms, underpinning systems and processes within the Knowledge Transfer Partnership (KTP) programme, contribute to the success of individual KTP partnerships and projects.

1.5.5.2 Barriers to Innovation

The report provides an overview of the barriers which beset knowledge transfer from the research base. These include:

Business Opportunity Recognition:

- Lack of awareness of the relevance of new knowledge;
- Lack of understanding of potential in universities;
- Weakness in networks and information; and
- Finding the right information and the right partner.

Co-recognition between business and Universities:

- Institutional rules and regulations;
- Confidentiality issues;
- Legal formalities;
- Unrealistic expectation; and
- IPR Issues - different (non-aligned) objectives and incentives.

Co-Formulation:

- Values and "language" differences;
- Relationships and Trust;
- Timescales- university long-term; business – shorter term;
- Discipline versus solutions; and
- Different Objectives.

Co-creation:

- Business ability to absorb new knowledge;
- Internal Communication;
- Change management; and
- Business Learning.

Commercialisation:

- Appropriate Business Models;
- Clean IPR;
- Business management;
- Finance; and
- Market Access.

1.5.5.3 Good Practice Lessons

The KTP model achieves this through the way in which it combines a number of good practice approaches which overcome well recognised barriers in the knowledge transfer process of open innovation. The KTP model in its fullest sense, from the identification of business need to the completion of project and final reporting, is not merely a series of processes but one single integrated model of people, processes and mechanisms with important "feedback loops". The success of the KTP model depends on this integration. Because KTP builds this sustainable capacity to innovate in businesses there is an opportunity to increase the capacity for innovation in the UK if it is increasingly targeted to those businesses which:

- Are new to open innovation and have the potential to innovate but currently lack the managerial skills and expertise to do so;
- Lack the technical knowledge to exploit external resources from the knowledge base; and
- Need a step-change in capability to transform the business for new growth opportunities.

Additionally the KTP process also comprises a number of specific additional value-adding elements which combine to deliver successful outcomes, inter alia:

- The mentoring role of the KTP Adviser for business and the Associate;

- The role of the Associate and the Adviser in bridging and brokering between the research base and the business; and
- The processes of partnership building and reflective learning which are encouraged by the structured KTP formalised processes which drive positive behaviours beyond their apparent administrative functions.

KTP therefore was noted to have the ability to enable an increase in "absorptive capacity" in businesses and the UK innovation system, not only by means of the way it combines the good-practice processes to overcome the barriers to knowledge transfer, but also because the model stimulates and encourages organisational learning.

The ability of the KTP model to move businesses from simply having the potential to exploit open innovation to having the capacity and capability to realise that potential is valuable twice over. First, for the success of the KTP project but since the "absorptive capacity" created is cumulative (learned by doing), the stock of businesses which have the potential to undertake successful open innovation is also increased.

1.5.6 Department for Business, Innovation and Skills: Measuring the Economic Impact of Further Education (Includes calculation of Spill over Impacts) Report March 2011

1.5.6.1 Summary

In February 2009, the Learning and Skills Council (LSC), in partnership with the Department for Business, Innovation and Skills (BIS), commissioned a study to develop a model to examine the economic impact of the Further Education (FE) sector. The research team was led by Cambridge Econometrics (CE), in collaboration with the Warwick Institute for Employment Research (IER).

1.5.6.2 Good Practice Lessons

The report details the following benefits associated with different qualifications consist of the following elements:

- **Wage returns:** The benefits to individuals in terms of increased wages over the course of their working life. The main source of evidence is McIntosh (2010), which assesses the existing evidence on the wage returns associated with the successful completion of different qualifications. For example, individuals with a particular qualification earn x%;
- **Employment returns:** Not only could qualifications increase the wages which individuals earn in employment, but they could also increase the probability of being in employment over the course of their lifetime; and
- **Spill overs:** Not all of the benefits of learning will be captured by the learners themselves. The benefits of enhanced productivity could be captured by their employers in the form of higher profits or increased competitiveness, and by

co-workers or other employers due to the transfer of knowledge. At present, there is a relative lack of evidence on spill overs, but Dearden, Reed and Van Reenen (2005) suggest that the increase in productivity from training is double the increase in wages. There is also evidence of a number of 'wider' social benefits to adult learning, but it is very difficult to assign monetary values to such benefits. Based on these considerations, the model assumes that the increase in total productivity is double the increase in wages implied by the above premia.

An example was detailed in the report which notes that £298m of government funding was attached to 94,000 L3 Apprenticeship starts in 2008/09. Based on a success rate of 71%, this translates into around 67,000 achievements. The average NPV is £106,000 for individuals who achieve a L3 Apprenticeship. Multiplying this by the 67,000 achievements implies the total economic value of L3 Apprenticeships is £7bn.

1.5.7 R&D and Innovation – Strategy and support in the UK, Scotland, Wales and Republic of Ireland, NI Assembly, Research and Information Service Research Paper (Jan 2012)

1.5.7.1 Summary

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. The paper's central focus is on support to business, although academic funding is also examined.

1.5.7.2 Barriers to Innovation

The following Key Points emerged from the paper in relation to barriers include:

- A lack of specialist facilities (including incubation centres) which would foster the growth of technologically focussed, knowledge based industry;
- A lack of 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;
- The need for a whole government / cross departmental approach to supporting R&D; and
- The need to retain those people with key skills in STEM subjects.

1.5.7.3 Good Practice Lessons

The following Key Points emerged from the paper:

- 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; and
- 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.

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

1.5.8.1 Summary

HM Treasury note that Northern Ireland is unique in that more than 30 years of conflict have taken their toll, and the economy has suffered partly due to the difficultly in attracting foreign investment. Although the Good Friday Agreement is now more than 12 years old it is obvious that, although helpful, peace has not in itself been sufficient to raise Northern Ireland prosperity to the UK average or even to the UK average excluding South East England. Northern Ireland still has one of the weakest

economies in the UK. Northern Ireland is also a unique part of the UK in that it shares a land border with the Republic of Ireland rather than another part of the UK.

1.5.8.2 Barriers to Innovation

This paper describes the challenges facing the NI Economy, these include:

- Currently GVA per capita remains significantly lower than that of most of the other parts of the UK, with GVA per capita in Northern Ireland in 2009 at £15,800, slightly higher than Wales and North East England (£14,800 and £15,600 respectively) but significantly lower than England (£20,400) and Scotland (£19,700).[3] This can be attributed to low levels of productivity (GDP per employed person) coupled with high rates of economic inactivity. Productivity remains low, with productivity per filled job being 85.3 per cent of the UK average, lower than all other regions other than Wales;
- Low productivity is largely due to under-representation of high productivity sectors in Northern Ireland, including finance and business services. Northern Ireland tends to be over represented compared to the UK average in low productivity sectors such as agriculture and food processing;
- Northern Ireland attracts proportionately more foreign direct investment (FDI) than other UK regions although some of the jobs in the past have been in contact centres paying below the Northern Ireland average wage. Northern Ireland's rate of attraction of FDI has also been less than a third of that in the Republic of Ireland where FDI also tends to be of a higher quality, although on a per capita basis there is less difference.6 A priority for Northern Ireland is to expand these levels of foreign investment in high wage sectors. However, since the start of 2011, the maximum rate of assistance allowable for general investment projects has been significantly reduced by the EU with further changes expected from 2013. Levels of venture capital funding are also lower in Northern Ireland than in all other UK regions;
- The small scale nature of most firms currently operating in Northern Ireland means that there will need to be a significant reliance on inward investment projects to deliver the quantity and quality of employment opportunities needed over the next 25 years to rebalance the economy;
- 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.[9] 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;

- Skills are particularly important in driving productivity and economic success. Yet the skills profile of the working age population in Northern Ireland remains weaker than the UK as a whole, despite recent improvements. For example, fewer people of working age have high level qualifications (level 4 and above) and proportionately more have no or very low level qualifications. [13]This position reflects an historical educational underachievement, but also a weaker labour market which has resulted in a protracted outward migration of skilled people seeking opportunities elsewhere;
- Northern Ireland has the highest proportion of inactive people of working age at 28.4 per cent, which is 5 percentage points above the UK average. [14]The take-up of all benefits for the working-age people is above the UK average, often by a large margin. Moreover, despite rising employment over the past two decades, inactivity rates have not fallen. The wider welfare reform agenda presents further opportunities to engage the inactive; and
- The number of tourists coming to Northern Ireland used to be proportionately higher than in the Republic of Ireland but numbers have never fully recovered from the Troubles. There are opportunities to expand this sector through investment in facilities and accommodation.

1.5.8.3 Good Practice Lessons

This paper sets out a number of possible reforms to the Northern Ireland economy and invites views on the most effective approach to rebalancing the economy.

It examines the possible mechanism for reducing corporation tax rates to 12.5 per cent in Northern Ireland and assesses the potential impact of such a measure. The paper states that reducing the corporation tax rate in Northern Ireland would have a positive impact on both domestic investment and FDI, which could lead to increased economic growth and a stronger private sector. However in order to meet the EU Azores criteria on State Aid, the Northern Ireland Executive would have to meet the conditions of institutional, procedural and fiscal autonomy. As part of this Northern Ireland would have to bear the full fiscal consequences of a reduction in the corporation tax rate. This would be achieved by a reduction in the Northern Ireland block grant. Additionally the paper examines the benefits and costs of granting Northern Ireland other tax reliefs. However these options face various difficulties and could run into State aid issues.

Additionally policy initiatives (non-tax measures) for rebalancing the Northern Ireland economy are assessed and contain a large spectrum of possibilities. Many of these levers lie with the NIE. The Treasury notes that Government will work closely with the NIE as it develops its new economic strategy.

1.5.9 EU Innovation Policy – Best Practice, NI Assembly, Research and Information Service Research Paper (Jan 2012)

1.5.9.1 Summary

This paper outlines Organisation for Economic Development (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.

1.5.9.2 Good Practice Lessons

The following Key Points emerged from the paper:

- The OECD views regions as playing a significant role in fostering innovation;
- They argue in favour of regions developing Regional Innovation Systems which include 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; and 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; and

- 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.

1.5.10 NESTA: Review of Northern Ireland Regional Innovation System: (2009)

1.5.10.1 Summary

Recent statistics present a sobering picture of innovation in Northern Ireland. It has the lowest proportion of innovation-active firms of any area of the UK outside London. Moreover, a recent assessment suggested that Northern Ireland was one of only two regions lagging the UK average on all elements of absorptive and development capacity.

MATRIX – the Northern Ireland Science Industry Panel – has also highlighted important innovation challenges faced by Northern Ireland including low levels of private sector R&D, low levels of university-business collaboration, skills mismatches and a lack of innovation collaboration with external customers. This suggests that Northern Ireland faces significant innovation challenges.

However, the region also has some important 'innovation advantages'. These include the policy discretion that comes with devolution, which creates the potential for Northern Ireland to develop its own innovation policy agenda rather than follow models from other parts of the UK. Northern Ireland's other innovation advantages relate to the significant resources available for supporting innovation and a widespread commitment from both the public and private sectors to the 'innovation agenda'.

1.5.10.2 Good Practice Lessons

The NESTA: Review of Northern Ireland Regional Innovation System report draws on international leading practice and suggests concrete steps which could be taken in Northern Ireland to construct a regional innovation advantage. In their report they make four key recommendations building on leading practice from elsewhere. They note that adopting these recommendations will help to maximise the value of private and public investments in R&D and innovation. The recommendations are as follows:

- Recommendation 1: An Innovation Council to improve system governance To ensure priority is given to the innovation agenda we recommend the introduction of an Innovation Council to analyse, challenge and support developments in Northern Ireland's innovation capability. This could be developed by extending the remit and capability of the existing MATRIX organisation. Ideally, the Innovation Council would be close to the heart of government, have a strong analytical capability, a cross-cutting remit and a strong advocacy function for innovation;
- Recommendation 2: A Service Innovation Grant Scheme to support non-technical innovation To support broadly based and hidden innovation in Northern Ireland firms a Service Innovation Grant scheme, modelled on Finland's Tekes 'Serve' scheme, should be introduced to support non-technical innovation. This will be of direct benefit to innovation in services firms but could also support service innovation by manufacturing firms;
- Recommendation 3: A requirement for collaboration to encourage co-operation on innovation and R&D To boost levels of collaborative and networked innovation among firms, collaboration should be a required element of any industry R&D or innovation project which is publicly supported. This should apply both to the R&D grant scheme and the Service Innovation Grant scheme; and
- Recommendation 4: Northern Ireland Government should work to implement a two tier funding system to encourage stronger regional alignment of the universities To achieve a stronger alignment between developmental activity in the universities and the needs of the regional economy, the Northern Ireland Government should consider the introduction of a two-tier funding system for universities similar to that being suggested in Scotland.

1.5.11 Evaluating the Enterprising Further Education pilot 2011: QA Research and Kate Beresford Associates.

1.5.11.1 Summary

The South East of England Development Agency (SEEDA) and the National Endowment for Science, Technology and the Arts (NESTA) are working in partnership to help further education (FE) institutions foster a culture of enterprise and innovation in young people, by creating a programme of professional development training and support for senior FE staff. In doing so, the Enterprising FE pilot programme has been devised and is being run by Oxford Brookes University. The pilot began in September 2008 and will last for three years.

The key aim of the Enterprising FE programme is to raise awareness of enterprise education in FE for college staff, including:

- What it is and why it matters;
- The context and policy setting;

- Promoters and inhibitors for FE colleges; and
- Practical support and advice about what to do and how to make it happen.

1.5.11.2 Barriers to Innovation

The report has listed a summary of the Major structural challenges facing the Enterprising FE Programme as well as the regional challenges. It is accepted that the major structural challenges can only be addressed at national policy level.

Major Structural Challenges

- Little spare time within the FE curriculum;
- Lack of reference to enterprise within the Ofsted inspection framework, leading to a higher priority being placed on areas that are subject to inspection; and
- No general UK-wide funding stream for developing and delivering enterprise within colleges.

Regional / College Level Issues

- Resistance to change;
- Lack of understanding of the benefits (for the college and its students) of embedding enterprise;
- Lack of support and commitment from senior leaders;
- Lack of advice and support for both senior leaders and lecturers;
- Little time within lecturers' schedules to learn how to incorporate enterprise; and
- A risk-averse culture within FE colleges.

1.5.11.3 Good Practice Lessons

Research and Kate Beresford Associates were commissioned to undertake an evaluation of the Enterprising FE programme being run by Oxford Brookes University on behalf of NESTA and SEEDA. Findings at the interim stage noted that:

- The overwhelming feedback from programme participants has been that the workshops have provided an extremely valuable opportunity to develop individual creativity skills, but there has been a mixed response regarding the potential for college-wide impact. Senior-level participants have generally expressed very positive views about the likely medium- and long-term impact of the programme. Among middle managers and lecturing staff in particular, however, there is still the view that there are significant barriers to wider uptake – mainly related to college culture and colleagues' resistance to change; and
- An alternative approach of delivering workshops to a single college has been tested, to assess whether there is a benefit from engaging with a larger group within a single college (as opposed to attendees from several colleges from across the South East). The senior staff from this cohort were positive about

the overall impact. Lecturing staff and middle managers, however, were positive about the benefit to them as individuals but felt less confident about introducing enterprise into their day-to-day work. There was a suggestion that culture change needs to take place among the leadership before there can be significant impact lower down the college. This programme is predominantly focused on raising awareness of the value of creativity and enterprise, and therefore has naturally focused on working with as many of the senior management team as possible with middle managers and lecturing staff being less involved at this stage.

Advisory group members have also noted that they are keen to learn from the programme and have not yet had the opportunity to do so.

1.5.12 Employer Ownership of Skills Building the Momentum UKCES March 2013

1.5.12.1 Summary

In December 2011, the UK Commission launched the employer ownership of skills, a long term agenda to change the way that we invest in skills. The vision challenges employers, government, unions and providers to invest in talent as a key component of business growth and individual prosperity.

1.5.12.2 Good Practice Lessons

The Scheme seeks to align investment in people with industry requirements and local economic need. It included the following 4 proposals:

- **Incentivise opportunities for young people** – Change the flow of funding for apprenticeships from provider grants to transparent direct payments to employers, via the tax system and bring together trusted data to provide access to information which can inform career and skills investment decisions;
- **Move from grants and qualifications to sustainable investment in outcomes** – Encourage colleges to broaden the measures used to assess their performance by placing greater emphasis on labour market outcomes. Through partners and Investors in People businesses will be encouraged to measure the impact that investment in people has on business performance;
- **Continue to create the conditions for greater employer ownership** – With the right conditions and competitive investment employers step up and form industrial partnerships to take end-to-end responsibility for ensuring the pipeline of talent sectors need to be successful. Review adult vocational qualifications and develop a strategy for ensuring that they are of value to employers and employees; and
- **Unlock the potential of employer and college collaboration** – Work experience becomes a core feature of all vocational learning. Use competitive

investment to incentivise employers to invest in colleges and become part of the local education and training infrastructure, not just consumers of it.

1.5.13 Northern Ireland Knowledge Economy Index: Baseline Report 2011

1.5.13.1 Summary[6]

The Northern Ireland Knowledge Economy Index Baseline Report states that 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 consumers and governments, allied to nervous businesses are reluctant to invest have created conditions that are not supportive of growth.

However in spite of this backdrop the report notes that 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.

1.5.13.2 Good Practice Lessons

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.

In the 1960s, San Diego 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. The report states that Northern Ireland needs to mimic this ambition, and ultimately this success. The report states that to do so would have a transformative effect on the Northern Ireland economy; increasing effect on the Northern Ireland economy; increasing employment, wages and reducing the dependency on the public sector and upon the British taxpayer.

In order to bring about this change the report recommends the following:

[6] NISP CONNECT, in association with Oxford Economics, has adapted CONNECT San Diego's Innovation Report for Northern Ireland. The NI Knowledge Economy Index provides a set of indicators of the strength and impact of the Knowledge Economy in Northern Ireland versus other areas in the UK or Europe depending on the indicator.

- Research: Northern Ireland needs to compete to win more than its fair share of UK and EU research funding;
- Ensuring a business friendly tax and policy environment. This includes a supportive panning system, regulatory framework and firm support network;
- 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;
- Ensure pipeline of skills is in place. Ensuring the knowledge economy has the high end specialist skills it needs to compete globally; and
- Ensuring suitable infrastructure: both in terms of technology infrastructure but also physical connectivity through the air network.

1.6 Statistics and Trends – Knowledge Transfer

1.6.1 Department of Finance and Personnel (adapted from a report published by the Department for Business, Investment and Skills (BIS) UK) - UK Innovation Survey 2011 – Northern Ireland Results[7]

1.6.1.1 Introduction

The UK Innovation Survey 2011 provides a wide range of information related to innovation activity among enterprises, and includes information on the extent of innovation activity, the impact of innovation on businesses and the barriers to innovation.

1.6.1.2 Findings on the extent of Innovation and R&D

Headline figures for Northern Ireland show that:

- During 2008-10, 27 per cent of NI enterprises were innovation active, compared to 31 per cent during 2006-08. The equivalent UK figure was 31 per cent, decreasing from 38 per cent during 2006-08;
- The difference between the proportions of enterprises that were product innovators in NI (14 per cent) and the UK (19 per cent) and process innovators (NI: 7 per cent; UK: 10 per cent) during 2008-10, remained similar when compared to 2006-08;
- There was little difference between the proportion of enterprises that were innovation active in the production and construction sector (27 per cent) and distribution and services sector (26 per cent). For information, under the previous definition of innovation used in the 2009 survey, the proportions of enterprises which were innovation active were 63 per cent and 51 per cent respectively;
- Comparisons between the 2007, 2009 and 2011 surveys suggest that the proportion of firms in NI engaged in innovation activity is likely to have decreased over the period. Thirty-seven per cent of businesses were innovation active in 2004-06, 31 per cent in 2006-08 and 27 per cent during 2008-10. Comparable figures for the UK have also decreased over the period, from 42 per cent in 2004-06 to 38 per cent in 2006-08 and again to 31 per cent in 2008-10; and
- Results from NI enterprises responding to the 2007, 2009 and 2011 surveys show that during 2008-10, 43 per cent of this like-for-like panel were innovation active, representing a 4 percentage points increase compared to 2006-08. The

[7] The UK Innovation Survey 2011 is part of a wider Community Innovation Survey (CIS) covering a range of European countries. This is the seventh iteration of the survey covering the period 2008-10, providing information on the extent of business innovation, factors perceived to be limiting innovation, and the impact of innovation on businesses.

equivalent UK increase was 3 percentage points (to 49 per cent during 2008-10).

1.6.1.3 Barriers to SMEs being innovative

Successful and evidence-based policy interventions require an understanding of the barriers to business innovation. These barriers can be internal obstacles that the enterprise encounters while carrying out innovation activities as well as external factors preventing innovation.

The survey asked about a range of constraining factors and their effect on the ability to innovate. Table 4 shows the proportion of respondents who gave a 'high' rating to each category of constraint. Similar to results from the 2009 survey, cost factors were most commonly regarded as significant barriers

Table 4*: Enterprises regarding potential barriers to innovation as 'high' Percentage of respondents

BARRIER		SIZE OF ENTERPRISE					
		SMEs		Large		All	
		NI %	UK %	NI %	UK %	NI %	UK %
Cost Factors	Direct innovation costs too high	D	12	D	9	15	11
	Cost of finance	18	14	9	7	17	14
	Excessive perceived economic risks	16	12	8	8	15	12
	Availability of finance	18	14	12	7	17	14
Knowledge Factors	Lack of qualified personnel	D	4	D	2	4	4
	Lack of information on markets	D	1	D	1	1	1
	Lack of information on technology	D	1	D	2	1	1
Market Factors	Market dominated by established businesses	D	6	D	5	6	6
	Uncertain demand for innovative goods or services	D	6	D	5	6	6
Other Factors	Need to meet UK Government regulations	D	5	D	4	6	5

* Please note, Table 4 results are not comparable with previous surveys. Please refer to section 8 for details.
D = disclosive figures

1.6.1.4 The Stakeholders involved in delivering an innovative economy

Forty-five per cent of collaborative, broader innovators reported co-operation arrangements compared to 51% in 2006-08. Among broader innovators who collaborated, 74 per cent had agreements that operated at a local/regional level, which was 23 percentage points higher than in the UK. Similar to the 2006-08 survey, UK enterprises were more likely to co-operate on a UK level (67 per cent compared to 51 per cent among NI enterprises with co-operation arrangements).

As shown in Table 7, the most frequent partners for co-operation among NI (and UK) broader innovating enterprises were clients or customers (65 per cent of NI and 72 per cent of UK enterprises) followed by suppliers (58 per cent of NI and 61 per cent of UK enterprises). The least likely co-operation arrangement in NI and the UK was with government or public research institutes.

The percentage of enterprises in NI which reported cooperation activity remained relatively unchanged for each geographical area. The exception to this was cooperation arrangements with countries outside of Europe, which declined by 12 percentage points, from 21 per cent during 2006-08, though it must be remembered that comparisons between the two surveys are limited due to sectoral reclassification and mapping issues.

Table 7*: Co-operation partners Percentage of collaborative, broader innovation active enterprises

TYPE OF PARTNER	GEOGRAPHY OF CO-OPERATION				
	Local/Regional within the UK[a] %	UK %	Other Europe %	All other countries %	Any %
Suppliers of equipment, materials, services or software	31	24	15	8	58
Clients or customers	40	26	14	3	65
Other businesses within the enterprise group	26	19	8	5	48
Competitors or other businesses within the industry	25	12	6	2	39
Universities or other higher education institutions	12	8	D	1	21
Consultants, commercial labs or private R&D institutes	16	12	D	1	29
Government or public research institutes	10	8	D	1	18
Any	74	51	25	9	100

* Please note, Table 7 results are not comparable with previous surveys. Please refer to section 8 for details.
D = disclosive figures

1.6.1.5 Impact on Rationale for Connected 2

From the UK Innovation Survey – Northern Ireland results it is clear to see that there has been a decline in the number of innovation active businesses in Northern Ireland in the last 10 years. The Connected 2 programme aims to decrease the barriers to innovative practices in Northern Ireland by enabling business and HE and FE to collaborate.

1.6.1.6 Summary of Key Statistics

UK Innovation Survey 2011[8][9] NI Results[10] - Summary of Key Findings

Headline figures for Northern Ireland show that:

- During 2008-10, 27 per cent of NI enterprises were innovation active, compared to 31 per cent during 2006-08. The equivalent UK figure was 31 per cent, decreasing from 38 per cent during 2006-08.
- The difference between the proportions of enterprises that were product innovators in NI (14 per cent) and the UK (19 per cent) and process innovators (NI: 7 per cent; UK: 10 per cent) during 2008-10, remained similar when compared to 2006-08.

[8] The UK Innovation Survey 2011 is part of a wider Community Innovation Survey (CIS) covering a range of European countries. This is the seventh iteration of the survey covering the period 2008-10, providing information on the extent of business innovation, factors perceived to be limiting innovation, and the impact of innovation on businesses.
[9] Northern Ireland had the equal second lowest business innovation activity rate of the UK regions and countries. There is considerable variation in innovation activity across detailed NI industry sectors. However, at the broad industry group level, 27% cent of enterprises in the Production and Construction grouping were innovation active compared to 26% in Distribution and Services.
[10] http://www.detini.gov.uk/uk_innovation_survey_2011_ni_results.pdf

UK Innovation Survey 2011[89] NI Results[10] - Summary of Key Findings
• There was little difference between the proportion of enterprises that were innovation active in the production and construction sector (27 per cent) and distribution and services sector (26 per cent). For information, under the previous definition of innovation used in the 2009 survey, the proportions of enterprises which were innovation active were 63 per cent and 51 per cent respectively. • Cost factors continued to be the most common barriers to innovation among NI and UK enterprises. • Comparisons between the 2007, 2009 and 2011 surveys suggest that the proportion of firms in NI engaged in innovation activity is likely to have decreased over the period. Thirty-seven per cent of businesses were innovation active in 2004-06, 31 per cent in 2006-08 and 27 per cent during 2008-10. Comparable figures for the UK have also decreased over the period, from 42 per cent in 2004-06 to 38 per cent in 2006-08 and again to 31 per cent in 2008-10. • Results from NI enterprises responding to the 2007, 2009 and 2011 surveys show that during 2008-10, 43 per cent of this like-for-like panel were innovation active, representing a 4 percentage points increase compared to 2006-08. The equivalent UK increase was 3 percentage points (to 49 per cent during 2008-10).

1.6.2 DETI Business Expenditure on R&D and Higher Education Expenditure on R&D[11] (December 2012)

1.6.2.1 Introduction

The Business Expenditure on R&D and Higher Education Expenditure on R&D Bulletin December 2012 provides information on the level of Research & Development (R&D) activity in Northern Ireland. R&D activity contributes to the development of new technologies, products and processes and is a key driver of productivity growth. The Northern Ireland R&D surveys cover the business sector, higher education and other government financed activities.

It includes information on: the level of R&D; sources of funding for R&D; employment in R&D. Data is presented in cash terms, while real terms estimates have been adjusted for changes in the general price level between years using the GDP deflator. This allows changes in the volume of R&D expenditure to be examined over time. It provides important indicators of the extent to which Northern

1.6.2.2 Findings on the extent of Innovation and R&D

Total expenditure on Research and Development in Northern Ireland in cash terms was £567.5 million in 2011, of which £388.8m (69%) was spent by Businesses, £164.3m (29%) by the Higher Education sector and the remainder (£14.4m or 3%) was Government expenditure. There was an increase of £46.1m (9%) in cash terms in Northern Ireland total R&D expenditure between 2010 and 2011, driven by the Business sector.

[11] http://www.detini.gov.uk/2011_r_d_publication_pub_dec2012_v2.pdf

In real terms, total expenditure increased by £32.1m or 6% from £535.4m in 2010 to £567.5m in 2011. In 2011 the NI Business sector again accounted for a greater share of total R&D expenditure (69%) than the Higher Education sector (29%). In 2010 the figures were 66% and 31% respectively.

Over the last five years (2006-2011) total R&D spending in real terms in NI has risen by 52% and by 69% since 2001. Over the year to 2011 there was an increase in expenditure by Businesses while decreases occurred in Higher Education and Government expenditure. In real terms, expenditure by Businesses increased by £35.6m (10%), Higher Education decreased by £1.8m (-1%) and Government expenditure decreased by £1.6m (-10%) in real terms over the year. Business R&D expenditure rose by 107% between 2006 and 2011 in real terms and by 97% between 2001 and 2010.

Business R&D: In-house Expenditure

NI business R&D expenditure carried out within a company in NI (in-house), accounted for 91% (£354.1m) of total business expenditure in 2011. In-house expenditure increased by 9% between 2010 and 2011.

Business R&D: Sectoral Analysis

In 2011, the majority of R&D was carried out within the Manufacturing sector (79%) with the remainder (21%) carried out in the Services & Other sector. The share of expenditure in the Manufacturing sector compared to the previous year has increased by 11%. Over the year to 2011, an increase in expenditure occurred in the Manufacturing sector and a decrease occurred in the Services & Other sector. The increase in expenditure in the Manufacturing sector, (£61.6m or 25%) was bigger in value and proportional terms than the decrease of £16.8m (-17%) in the Services & Other sector. The sectoral analyses are based on the Standard Industrial Classification 2007 (or SIC 2007) of industries for the 2009 publication and onwards. Care should therefore be taken when making comparisons with previous reports, which are on a SIC2003 basis.

Business R&D: by Company Size

Companies with 250 or more employees accounted for 64% of business R&D expenditure in 2011, although they represented only 11% of R&D performing companies. Small firms (i.e. those with less than 50 employees) represented some 67% of R&D performing companies and accounted for 15% of total business R&D expenditure while R&D expenditure by Small and Medium-sized companies (SMEs)* accounted for 36% of the total business expenditure. Total SME expenditure increased by £7.2m (5%) from 2010 to 2011, in cash terms. However, since 2006 SME expenditure has increased by 72% to £140.6m.The proportion that large companies (250+ employees) make to total R&D expenditure (64%) was more than in the previous two years (2010: 61%; 2009: 55%).

Business R&D: Source of funds

The majority of funding came from companies' own funds (83%), with 15% from Government, 2% from overseas and other sources. The proportion of funding from own funds increased marginally from 81% in 2010 to 83% in 2011.

Business R&D: Ownership

Companies with ownership outside NI play an important role in financing R&D activities in the region. Almost three quarters, £287.7m (74%) of total R&D spend was by such externally owned companies although they accounted for 14% of all R&D performing companies. Their contribution to the total R&D spend was higher than in 2010 (68%) and their cash value increased by £53.6m over the same period. R&D expenditure by locally-owned companies decreased by 8% (-£8.8m) between 2010 and 2011 while R&D Expenditure by externally-owned companies increased by 23% (£53.6m). The majority of R&D expenditure in Manufacturing is carried out by externally-owned companies (82%), compared with the Services & Other sector (43%).

Higher Education R&D

R&D expenditure in the Higher Education sector increased by 1.6% in cash terms between 2010 and 2011 (from £163.0m to £165.6m). Net expenditure in 2011 (excluding spend by businesses undertaken by higher education) was £164.3m. Half of funding (51%) for Higher Education R&D in 2011 came from the Government block grant (£84.4m). In 2011, there were some 1,550 full-time equivalent employees in the Higher Education sector engaged in R&D, decreasing from 1,690 employees in 2010.

1.6.2.3 Impact on Rationale for Connected 2

The DETI Business Expenditure on R&D and Higher Education Expenditure on R&D Report highlights that expenditure on Innovation in Northern Ireland continues to increase with a 9% increase between 2010 and 2011. However one of the main findings of this report is that almost 91% of all the R&D undertaken by businesses in Northern Ireland is in-house. The ‘Connected 2’ programme aims to encourage collaboration between the FE and HE sectors, which made up 29% of R&D spending in Northern Ireland in 2011, and the business sector. It hope this will encourage further R&D research and improve the research base by supporting a two-way flow of knowledge and ideas between researchers, academics, public and private sector enterprises that will work towards ensuring a vibrant research base and wealth creation for Northern Ireland.

1.6.2.4 Summary of Key Statistics

DETI Business Expenditure on R&D and Higher Education Expenditure on R&D[12] (December 2012) - Summary of Key Findings
• Total expenditure on Research and Development in Northern Ireland in cash terms was £567.5 million in 2011, of which £388.8m (69%) was spent by Businesses, £164.3m (29%) by the Higher Education sector and the remainder (£14.4m or 3%) was Government expenditure. There was an increase of £46.1m (9%) in cash terms in Northern Ireland total R&D expenditure between 2010 and 2011, driven by the Business sector; • Total business R&D expenditure in 2011 was £388.8m, up £44.8m (13%) in cash terms on the previous year. Between 2006 and 2011, overall Business R&D expenditure has risen by 133% in cash terms (from £167m); • The percentage increase in Northern Ireland (in house) business R&D expenditure (9.2%) between 2010 and 2011 was the sixth highest of the 12 UK regions. Of the 12 UK regions, nine showed an increase in cash terms over the period; • Higher Education R&D expenditure rose in cash terms by £2.5m (2%) while Government expenditure decreased by £1.2m (-8%) over the year; • The ten biggest spending companies accounted for 62% of the total R&D spend in Northern Ireland in 2011, slightly higher than in 2010 (59%); • Externally owned companies accounted for 74% of Business R&D expenditure compared to 26% by locally owned companies. R&D spend by locally owned companies reported an annual decrease of 8%; and • Expenditure by businesses with less than 250 employees increased by £7.2m (5%) from 2010 to 2011, in cash terms. Since 2006 such expenditure has increased by 72% to £140.6m.

1.6.3 Innovation in NI Tradable Services – June 2007[13] - Stephen Roper and Nola Hewitt-Dundas (InnovationLab (Ireland) Ltd) and Professor Jim Love (Aston Business School) for the Department of Enterprise Trade and Investment

1.6.3.1 Introduction

This report represents the first detailed examination of service sector innovation in Northern Ireland. It builds on information recently collected in Northern Ireland and the rest of the UK as part of the UK Innovation Survey 2005, combines this with data from other government surveys, and also presents a number of sectoral case studies of how innovation actually occurs in Northern Ireland service sector firms. The more specific objectives of the report are:

- To determine the extent of innovation in NI tradable service firms and how this compares both nationally and internationally;
- To clarify the relationship between innovation and export sales; and,

[12] http://www.detini.gov.uk/2011_r_d_publication_pub_dec2012_v2.pdf
[13] http://www.detini.gov.uk/innovation_in_ni_tradable_services___8211__phase_1_report.pdf

- To provide an assessment of appropriate policy measures to stimulate innovation activity in the NI tradable services sector.

1.6.3.2 Findings on the extent of Innovation and R&D

Advertising

Eleven companies were interviewed in the Advertising Sector covering a range of activities including marketing, PR, brand communication, on-line activities breaks etc. with services tending to be customised to the needs of individual customers.

Companies in this sector were highly knowledge-intensive having on average, 70 per cent of employees with degree level qualification or equivalent. The interviewed companies had grown significantly over the past 3 years with employment growth of c. 20 per cent and sales growth of c. 60 per cent to an average employment level of 20 and sales of £3.7m.

The interviewed companies were actively engaged in service innovation, although this tended to be transferred from other companies. In other words, companies were now offering services that were also being offered by other companies. Some evidence of managerial and organisational innovations was also found among the companies.

Sales were dominated by the NI market with over half of the interviewed companies stating that in excess of 90 per cent of sales were made in NI. Despite this sales concentration in NI, some (albeit limited) sales were being made into the ROI and GB markets. The overall profile of sales had however, remained relatively stable in recent years. The companies emphasised the importance of a sales-presence in those markets in which they wished to sell. At the same time, some companies also highlighted increased competition in the GB market in recent years leading to more difficult trading conditions.

Two trends characterise service innovation: first the introduction of services that are complementary to existing service offerings of the business and therefore lead to an expansion in the portfolio of services offered to clients, second, the move towards solutions oriented services.

External stimuli were very important in service innovation, in particular the role of clients and customers in requesting services from the company. The process of identifying opportunities to innovate tends to be informal and includes up-to-date market information and changes in technology.

Clear benefits from service innovation were identified and included gaining new customers and in some cases new markets, and in building a stronger relationship with existing customers. Benefits in terms of increased efficiency and output were also identified.

In terms of the barriers to innovation, as with other sectors examined in this study, again internal resources were highlighted. In particular, the ability to acquire suitable labour and the high investment required in training were emphasised. Companies identified a mismatch between the skills provided to students in FE, HE and those required by firms. Another barrier to innovation in this sector was scale of business. The companies argued that it was difficult for small firms in this sector to bid for contracts and in NI many of the key contracts were from the public sector. Bidding for these contracts is very competitive and extremely difficult for a small business. A further barrier to innovation related to the receptiveness of the NI market for innovations. This was particularly the case with Digital Marketing where investment by NI companies tends to lag significantly behind that of GB companies.

Collaborative relationships were viewed as important in providing access to complementary skills and expertise as well as enabling firms to bid for contracts. Through collaboration, companies could offer clients a broader range of services than would otherwise be possible. However, a key issue for companies was ensuring that where a service was sub-contracted, that the relationship with the client was carefully managed to ensure the highest level of service was provided by the sub-contracting firm.

Some of the companies reported having received public sector support in the past, however, this tended to be mainly in the form of assistance with training and marketing.

Computer Services

Twelve companies were interviewed in the Computer Services Sector and while the majority of companies were customising services to the needs of individual customers or customer groups, a broad array of activity was reported by the interviewed companies. These companies were very knowledge-intensive having on average, 87.6 per cent of employees with a degree or equivalent qualification.

Employment among companies interviewed had increased by c. 18 per cent over the past 3 years, and despite a low proportion of the companies providing data on sales growth, it appears that sales growth also rose markedly over the period, outpacing employment growth. Companies in this sector are much less dependent on the NI market than that in other sectors. On average, sales in NI account for a third of total sales with sales to the ROI equal to 11.3 per cent, 26 per cent to GB, 6.2 per cent to other EU countries and 23.4 per cent in non-EU markets. Where sales had increased into external and export markets this was often attributed to the sales efforts of the firms or the formation of strategic alliances.

Service innovation was common among the interviewed companies with a move to diversity the portfolio of existing services by offering customised solutions or systems integration to clients. Innovation was also directed at developing a more flexible service for clients, responding quicker to customer needs. In some instances service

innovation arose from companies actively targeting particular markets and developing services accordingly.

Internal resources were important in identifying innovative opportunities, although this was often in consultation with clients. In a few instances discussions with technology providers and the development of new technology facilitated opportunities in the market to be identified.

The innovation process was found to be more open in this sector than for the other sectors examined in this study. In other words, it was not uncommon to find cross-functional teams of employees with responsibility for evaluating potential service innovations.

Managerial and organisational innovations were less common among Computer services companies and where it did occur it was often focused on process improvements. This brought benefits to the companies in terms of efficiency gains and credibility where the process was accredited as with CMMI. Where innovations in the structure of the organisation occurred, this brought benefits in terms of focus, communication and education. Finally, where strategic alliances were formed, these had allowed companies to bid for and win contracts that they would otherwise have been unable to tender for.

Internal barriers were perceived to be more important than external barriers to innovation. Employees were perceived as critical to innovation and a reluctance to embrace change was therefore a major barrier to innovation. Externally, regulatory barriers, receptiveness of the market to innovation and difficulties in having on-going collaboration with clients were highlighted as barriers to innovation.

A number of the companies had received public sector support in the past, ranging from support through COMPETE, CPD, FUSION, to Training grants and Marketing Assistance. The companies spoke positively about this assistance believing that it had a significant positive impact on their innovative activities and business performance.

Business Management and Consultancy Services

Eight companies were interviewed in the Business Management and Consultancy sector. These companies undertook a range of activities, but common to all was a very strong focus on the local NI market (c.85 per cent of revenue).

The average size of these organisations was small compared to most of the other sectors examined in this study. Average employment was 10 and average turnover £1.2m. Both turnover and employment had declined over the past 3 years by 15 per cent and 25 per cent respectively. Despite this, all of the organisations stated that they had introduced new services over the past 3 years, with many of these being new to the UK and/or international markets. Managerial and organisational innovation was also common in the sector, with the exception of changes in management techniques.

Service innovation is characterised by attempts by companies to broaden the portfolio of services that they are offering their clients. This is typically in response to customer demand although companies suggested that innovations were as much about co-development with clients as merely responding to their demands.

As with the other service sectors examined in this report, the impetus for innovation usually resides with the MD/CEO of the organisation with other employees being charged with exploitation and implementation of ideas. The decision making process is perhaps more centralised with the MD in this sector than for other sectors, however this may reflect the lower average size of companies interviewed in this sector. Although these companies tended to be small, the innovation process was clearly structured, with a logical and sequential process being pursued from idea to exploitation.

Service innovation in this sector was described by one firm as making the difference between profit and loss. This is clearly a difficult sector in which to operate, being extremely dependent on the local market and often encountering reluctance from local clients for the services being offered by these companies. Considerable effort has been made by some of these companies to change the way in which services are delivered to clients. This has been achieved largely through the integration of IT into service delivery and may create opportunities in the future to enter external markets.

Barriers to innovation were largely internal in the form of financial and human. Given the decline in recent years in sales revenue this has placed considerable pressure on firms to maintain revenue streams which developing new services for clients. One mechanism that has been used by firms to overcome these barriers is collaboration. Collaboration between organisations was viewed as important in building credibility, particularly for small organisations, and in accessing external markets.

Clearly an over-dependence on the NI market places considerable constraints on future growth in these organisations. Given that innovation is a key priority of these organisations and that much of the service innovation is ‘leading-edge’, it is likely that the benefits of this will be limited where sales into external markets remain low.

Finally, public sector financial support for this sector is low (although perhaps justified given the high level of competition between companies and the concentration of sales by companies in this sector on the NI market).

Architectural and Engineering Services

Ten companies were interviewed in the Architectural and Engineering Services sector. This comprised a relatively diverse group of companies spanning a range of activities, legal status and age of business.

Median employment was 55 with average sales of £3.3m with both employment and sales revenue having contracted by approximately 15 per cent over the past 3 years.

Firms are highly dependent on the NI market, accounting for approximately 70 per cent of sales revenue.

Companies in this sector reported difficulties in trying to penetrate external markets and emphasised the importance of establishing satellite offices. Networking is critical in the sector and problems exist for companies in trying to identify appropriate networks/companies with which to collaborate as well as gaining access to many of these networks which are often quite closed.

In recent years it has become increasingly important for companies in this sector to develop niche areas of expertise with this being critical in trying to enter external markets.

This is a highly competitive market and service innovation is viewed as critical to survival and growth. Service innovations tend to be in the development of complementary services and services which add value to clients and were driven by the internal recognition of changing market conditions and new market opportunities.

Companies in this sector tend not to be innovating in terms of how they deliver their services to clients. However, managerial and organisational innovations are evident in management techniques (predominantly quality accreditation), in organisational structure (which varied from acquisitions, to senior management restructuring, new partners etc.) and in the formation of strategic alliances and/or partnerships. Indeed a number of the companies stressed that networking is increasingly critical to doing business.

There are no major barriers to innovation with companies perceiving significant market opportunities both at present and in the future. Clearly networking is critical and ensuring that companies are part of successful teams is important in bidding for and being awarded contracts. The companies in this sector have had limited public sector support for innovation, however, some benefit was highlighted in the provision of market information through Invest NI.

Creative Entertainment

Ten companies were interviewed in the Creative Entertainment sector. The average size of these companies was small with 7 companies having 10 or fewer employees. Sales are dominated by the NI market – accounting for c. 72 per cent of total sales – with a further 17 per cent to the ROI and 5 per cent to GB.

The companies interviewed represent a mix of non-innovating and very innovative companies. For both service innovation and managerial and organisational innovation only half of the firms claimed to have innovated in the previous 3 years. Of those that did innovate, this was mainly concerned with the incorporation of new technology into the service. Closely related to this was a move towards innovations in the delivery of the service to clients with this now being dominated by on-line methods.

Companies claimed to obtain significant gains in their competitiveness from innovation and subsequently a strengthened position in the market. In some instances, the incorporation of new technology not only improved the service quality and delivery to clients but it was also opening up new market opportunities in external markets.

Where firms did not innovate a major reason for this was inertia and a lack of vision for change. In one instance the company had particular problems in determining the commercial feasibility of innovations in their market and this was preventing them from committing resources to new projects.

Collaboration for innovation was found to be less significant in this sector than those previously examined and where it did occur it was to access expertise or funding. Public sector support was identified from a broad array of sources and encompassed funding, training, advice, mentoring etc.

Technical Testing

Only four companies were interviewed in the Technical Testing sector. In general these companies were small although growth in both employment and sales revenue were evident over the past 3 years suggesting that there is the potential for growth in this sector. The sector is heavily dependent on the NI market (c. 86 per cent) for sales with the remainder being to ROI. One of the main reasons for a lack of penetration of GB or export markets is logistics associated with technical testing.

The companies interviewed were active innovators in terms of new/improved services and/or managerial and organisational innovations. Service innovations were frequently providing complementary services to customers, in some cases driven by changes in regulations, and in other cases in providing a better quality service to existing clients.

Companies benefited significantly from innovation, with perhaps the most significant benefit for them being to keep existing customers. In some instances innovation enabled companies to enter new market segments. Where IT was incorporated into existing services, benefits were identified in terms of internal efficiency gains and the provision of a higher quality service to clients, which may result in the company attracting larger clients in the future.

One of the main barriers to current business in the technical testing sector is that a large proportion of it is targeted at the manufacturing sector. As technical testing tends to be geographically confined, then the decline of the manufacturing sector has created significant pressure on companies to source alternative market opportunities.

Public sector support has been important for the companies interviewed both from sector bodies as well as Invest NI.

1.6.3.3 Barriers to SMEs being innovative

For firms across each of the tradable service sectors, innovation was occurring in terms of either the introduction of new or improved services or organizational and managerial innovations. Where innovation had not occurred firms did not specify particular barriers to their innovation efforts. In some instances this lack of innovation was attributed to the position of the firm in the market with limited opportunity to control the service provision.

For innovating firms however, a number of internal and external factors were highlighted as acting as a barrier to innovation. In terms of internal barriers the most commonly cited constraint related to human resources and employee related issues. For example, for some firms' problems existed in recruiting suitably *skilled labour*, with this being closely aligned to a *high investment in training*. The need to invest heavily in employee training represented a barrier to innovation in two ways. First, the lack of skills often prevented potential innovations being identified and implemented. Second, where new services or managerial and organizational innovations were introduced (typically initiated through a top-down management approach) training was often required to ensure staff adapted to new processes.

Another employee-related barrier to innovation was a *resistance to change*. Firms across the tradable service sectors highlighted employees' attitudes as a significant barrier to innovation. This, along with lack of appropriate skills is worrying given the emphasis among tradable service firms on the role of employees in the innovation process. As emphasized in the discussion on service innovation (5.3), these sectors are knowledge intensive with a high proportion of the workforce having degree level, or equivalent qualifications. Employees play a key role in identifying opportunities for innovation and developing these through from concept to application and exploitation. This suggests that human resource issues need to be a priority area for firms in ensuring that potential barriers to innovation are minimized.

Other issues identified by the tradable service firms as being a significant barrier to innovation related to *business scale*. Across the sectors, smaller firms highlighted the scale of their business as a barrier to bidding for large contracts. At the same time, firms also identified ways in which this could be overcome, most notably through the formation of alliances and/or partnerships.

Financial barriers to innovation were not widely cited by the firms, the exception to this being the Business Management and Consultancy sector. This sector had declined over the past 3 years (in terms of reported sales revenue by the interviewed companies), and it is likely that the financial resources available for investing in innovation were therefore lower. Clearly, among Advertising and Computer Services firms, where sales revenue had grown significantly over the previous three years, a lack of finance was not identified as a barrier to innovation.

External barriers to innovation were less frequently cited than internal barriers. At the same time, across the tradable service sectors, firms identified the receptiveness of the local market as a barrier to innovation. In some instances this related to the sophistication of technology used by clients in the NI market while in other cases it related to conservatism by the client in embracing innovative services and approaches to delivery. One way to overcome this is through educating the customer or assisting them to articulate their need for a service. This is however a time consuming and costly approach. Alternatively, firms may target external markets that are more receptive to service innovations. This brings us back to an earlier point concerning the relationship between service innovation and sales into external markets. Where firms introduce an innovation – service, managerial or organisational - it is important that the commercial feasibility of this is clearly understood. Therefore, firms may benefit from understanding clients' needs in different markets before embarking on innovation as opposed to developing new services and then attempting to find a suitable market for them.

Other external barriers to innovation across the tradable service sectors related to regulatory barriers, the difficulties of building strong links with clients, and ever increasing competition.

1.6.3.4 Enablers of Innovation

Enablers – Collaboration

Collaboration with other firms as an enabler of innovation was cited by firms across the tradable service sectors. The intensity of these relationships varied however from subcontracting arrangements to strategic alliances and formal joint ventures. In general however, irrespective of the intensity of the relationship, the collaboration was mutually beneficial to all parties involved with collaboration typically occurring between firms with complementary skills and expertise. The benefit from this was realized both by the client, in being offered a broader range of services in a more competitive manner and by the participating firms, in knowledge flows between the partners.

Other benefits from collaboration include access to new markets and often improved profile and credibility in the market. Collaborative arrangements may therefore provide an important means by which tradable service sector firms gain economies of scale as evident in a broader service portfolio.

Enablers – Public Sector Support

The extent to which firms across the tradable service sectors had received public sector support for innovation varied considerably. Firms in the Computer Services sector were much more likely to report having received public sector support for innovation than firms in the other tradable service sectors. This suggests that in the past the public sector (notably Invest NI) has adopted a selective approach to public sector support for tradable services.

Where public sector support was received by firms this took various forms from assistance with training and marketing to support for specific service innovations. A number of Computer Services firms had received assistance through COMPETE and indicated that this had had a positive effect on innovation. In general, where support had been received this was perceived to have been helpful to the firms and there was a feeling that future engagement of the public sector with these firms would be welcomed, particularly in the provision of market information that would help companies to keep abreast of competitors and market trends.

1.6.3.5 Impact on Rationale for Connected 2

The Innovation in NI Tradable Services Report details the current state of play of innovation in the tradable services sectors in Northern Ireland. In addition it details the key barriers identified by the surveyed businesses as well as the key enablers of innovation and innovative practices. One of the key enablers of innovation highlighted in the report is collaboration. This is the key objective of the 'Connected 2' Programme.

1.6.3.6 Summary of Key Findings

Innovation in NI Tradable Services - Summary of Key Findings
• Aggregate statistics suggest a consistent picture with firms in the Northern Ireland service sector having significantly lower levels of innovative activity than their UK counterparts across all of the measures considered. The single exception is products new to the market where the difference between Northern Ireland and UK is statistically insignificant; • Overall, the frequency of innovation in the service sectors in Northern Ireland is at or below the manufacturing average across the whole range of measures. As expected, R&D in particular proves less common in the service sector in Northern Ireland, with less marked difference in the proportion of firms introducing new or improved products or deriving sales from innovative products. Notably, however, the proportion of sales derived from 'new to the world' products in services in Northern Ireland is only half that in manufacturing; • Sectoral diversity within the Northern Ireland service sector is also striking, as is the degree of diversity between service sectors and the difference in the relative importance of specific innovation activities in each sector. This is strongly suggestive of very different innovation processes in different sectors, a factor reflected in studies adopting a demarcation approach to the analysis of service sector innovation; • Comparisons with UK and the UK regions considered again emphasise the diversity of innovation processes within the Northern Ireland service sector and performance relative to the UK; • Overall levels of service innovation in NI are below those in the UK, Scotland, Wales and the North East although strong sectoral variations are evident; and • Key differences emerge with different sectors, however, with two sectors – computer services and R&D, other business services – being more innovation active in NI than in UK. Two other sectors – transport and communication and real estate and renting – seem broadly in line with their UK counterparts. Other sectors seem to be below UK levels of innovative activity and that in comparative regions.

Innovation in NI Tradable Services - Summary of Key Findings
Comparisons with Ireland suggest a slightly different picture with few significant differences evident in either aggregate levels of service innovation or those at a sectoral level. This suggests broad parity between levels of service sector innovation in Northern Ireland and Ireland. It also suggests that the structure (i.e. sectoral and business size-mix) of the service sector in Ireland is no more favourable for innovation than that in Northern Ireland. Broader EU comparisons are limited due the data available. In terms of sales of new to the market products, however, service innovation seems similar in Northern Ireland (2.2 per cent) and Ireland (1.8 per cent). They also indicate similar levels of new to the market activity in some other European economies with Finland at 2.3 per cent and the Netherlands at 2.5 per cent. Other EU economies, notably France, Italy and Austria have significantly higher levels of sales derived from new to the market products.

1.6.4 Higher Education – Business & Community Interaction Survey for Academic Year 2011/12 – NI Analysis[14]

1.6.4.1 Introduction

The Higher Education Business and Community Interaction Survey (HE-BCI) is the main vehicle for measuring the volume and direction of interactions between UK Higher Education Institutions (HEIs) and business and the wider community. The survey collects information on the infrastructure, capacity and strategy of HEIs, and also numeric and financial data regarding Third Stream activity (that is, activities concerned with the generation, use, application and exploitation of knowledge and other university capabilities outside academic environments, these being distinct from the core activities of teaching and research).

1.6.4.2 Findings on the extent of Innovation and R&D[15]

The HE-BCI survey details the volume and value of research and knowledge transfer links between the Higher Education Institutions in England, Scotland, Wales and Northern Ireland and businesses and the wider community. DEL publishes an annual "Summary Report" of the HE-BCI survey which analyses the performance of the Northern Ireland Higher Education sector and compares it with that of the HE sector in the UK as a whole and also with the sectors in England, Scotland and Wales.

The survey collects data and reports on the following:

- Collaborative research;
- Contract research;
- Consultancy;
- Facilities and equipment-related services;

[14] http://www.delni.gov.uk/es/he-business-and-community-interaction-survey-2011-12-northern-ireland-analysis.pdf
[15] Based upon Table 1b :Research related activities - contract research by HE institution

- Continuing professional development and Continuing Education;
- Regeneration and development programmes; and
- Intellectual property (including sale of shares).

HE-BCI defines collaborative research as R&D undertaken collaboratively between a HEI and an organisation/individual from business or community sectors. The latest report shows that such income from collaborative research in NI decreased by 11% from around £39.9 million in 2010/11 to £35.3 million in 2011/12.

In 2011/12, the value of contract research in the UK between HEIs and business and the wider community has risen by nearly 6 per cent from just over £1.05 billion in 2010-11 to £1.11 billion[16]. In Northern Ireland, although on a smaller scale, the value of contract research is still significantly large, almost £20 million in 2011/2012.

There are three HE institutions engaged in contract research in Northern Ireland:

- Queen's University Belfast
- The Ulster University; and
- Stranmillis University College

Queen's University Belfast is a member of the Russell Group[17][18] of research driven universities in the UK. As such it has a unique focus on R&D across a multiplicity of sectors in Northern Ireland. According to the HE-BCI Survey, Queen's University engaged in research with 11 SMEs[19] in Northern Ireland in 2011/2012, 302 other (Non-SME) commercial businesses[20] and 291 non-commercial organisations[21]. The total value of the research contracts to Queen's University was £15m 2011/2012.

The University of Ulster is Northern Ireland's other HE institution and it too has a focus on world class research. According to the HE-BCI Survey, The University of Ulster engaged in research with 16 SMEs[19] in Northern Ireland in 2011/2012, 17 other (Non-SME) commercial businesses[20] and 164 non-commercial organisations[21]. The total value of the research contracts to the University of Ulster was £4.5m in 2011/2012.

Stranmillis University College is a specialist teaching college which is operated as a separate financial entity under the jurisdiction of Queen's University. According to the HE-BCI Survey, Stranmillis University College engaged in research with 2 SMEs[19], 3 other (Non-SME) commercial businesses[20] and 12 Non-commercial organisations[21].

[16] http://www.hefce.ac.uk/pubs/year/2013/201311/
[17] The Russell Group represents 24 leading UK universities which are committed to maintaining the very best research, an outstanding teaching and learning experience and unrivalled links with business and the public sector.
[18] http://www.russellgroup.ac.uk/
[19] Small and medium enterprises (SMEs) includes enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million. SMEs include micro, small and medium enterprises and sole traders
[20] Other (non-SME) commercial businesses includes other commercial businesses which do not match the above definition of SMEs.
[21] Non-commercial organisations includes organisations from which its shareholders or trustees do not benefit financially

The total value of the research contracts to Stranmillis University College was £138,000 in 2011/2012.

While the latest HE-BCI report shows that the overall income received by local universities from business and community interaction has fallen from a record high of £102 million in AY 2010/11 to £87 million in AY 2011/12 - the underlying trend is still very much upwards having increased from £38m in AY 2002/03 and again from £61m in AY 2007/08.

Furthermore, the report shows that Northern Ireland universities are still punching above their weight compared to their UK counterparts with Queen's University's and the University of Ulster's income from business and community interaction now representing 2.5% of the UK total. This is impressive considering the Northern Ireland economy currently represents 2.2% of UK economic output or Gross Value Added and accounts for 2.0% of full time equivalent academics in the UK.

Contributory factors to this strong overall performance have been:

- income from collaborative research of some £35.4 million, representing 3.6% of the UK total.
- income from intellectual property (including the sale of shares) growing exponentially since AY 2002/03 (by 2,550%) to some £5.4 million now representing a substantial 6.9% of the UK total (this is a vital indicator for the value added by a university when interacting with a range of external partners. It is commonly in the form of licences granted to private companies, allowing them to exploit an invention protected by a patent).
- the number of spin-off companies still active after 3 years having increased by 55% since AY 2002/03, now standing at 48 spin-offs representing 4.8% of the UK total.

This performance reflects a high level of collaboration by the two universities with a wide range of industrial sectors. University income from the use of facilities and equipment (for example prototyping equipment or digital media suites) has also increased significantly over the last year - by around one-quarter to £7.3 million. Consultancy income is also up by 4% which is highly creditable given the severity and duration of the current economic downturn.

It is also notable that the proportion of income universities received from direct engagement with small and medium sized businesses, as reflected by HE-BCI, increased by over one-third in 2011/12.

The table below provides a summary of the trends in Key HE – BCI Indicators.

Table 1.4: Trends in Key HE – BCI Indicators

Indicator	Recent change (since 2010/11)	Long-term trend (since 2002/03)	NI as a percentage of the UK total*
Collaborative Research Income	-11%	28%	3.6%
Contract Research Income	-1%	565%	1.8%
Consultancy	4%	371%	1.8%
Facilities & Equipment Related Services	24%	4075%	5.2%
Education & CPD	-11%	558%	0.8%
Regeneration	-46%	56%	4.1%
Intellectual Property	-45%	2550%	6.9%
Number of Spin-off Companies	-2%	55%	4.8%
Number of Disclosures	-18%	66%	2.2%
Patent Applications	-15%	61%	3.1%
Patents Granted	-27%	1400%	3.6%

**NI represents 2.2% of UK GVA*

**NI represents 2.0% of UK FTE Higher Education Academics.*

Source: http://www.delni.gov.uk/es/he-business-and-community-interaction-survey-2011-12-northern-ireland-analysis.pdf

The table below provides a breakdown of real-terms income from all sources for HEIs:

Table 1.5: Real-terms income from all sources

Real-terms income from all sources (£000s)	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Collaborative research	27,711	9,789	12,218	11,003	14,182	20,515	29,682	32,483	39,892	35,398
Contract research	2,967	5,901	8,628	8,555	10,746	12,770	20,368	18,158	19,958	19,729
Consultancy	1,516	2,107	1,218	1,532	2,609	3,051	4,107	4,978	6,875	7,138
Facilities and equipment-related services	174	229	352	558	2,030	2,662	7,564	6,396	5,853	7,265
Continuing professional development and Continuing Education	745	1,600	1,977	1,627	5,009	6,004	6,744	7,249	5,517	4,905
Regeneration and development programmes	4,792	9,870	9,206	6,972	17,673	14,058	15,447	15,182	13,930	7,457
Intellectual property (including sale of shares)	205	293	299	115	861	1,897	4,039	5,181	9,789	5,432
Total Income	**38,110**	**29,789**	**33,898**	**30,362**	**53,110**	**60,957**	**87,951**	**89,627**	**101,814**	**87,324**

Source: http://www.delni.gov.uk/es/he-business-and-community-interaction-survey-2011-12-northern-ireland-analysis.pdf

1.6.4.3 Impact on Rationale for 'Connected 2'

Given the value of research to the NI economy and that of the businesses and HE institutions that operate in that environment any scheme aimed to increase the levels of innovation and collaboration between Higher Education Institutions (HEIs) and business and the wider community can only be beneficial.

While it is difficult to gauge the impact of Connected on the high level HE-BCI data (particularly given that HE-BCI excludes FE college activities), there is a clear need, as well as policy prerogative, to seek to improve Northern Ireland's innovation performance.

The priority given to this by the NI Executive is reflected in DEL's recent decision to increase by close to 30% the Department's core funding for Queen's University's and the University of Ulster's business and community facing activities from the start of AY 2013/14 through Round 4 of the Higher Education Innovation Fund. (There had been no increase in funding in the previous nine years). The aim of the Higher Education Innovation Fund is to encourage the sector to increase its capability to respond to the needs of business 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.

In supporting the universities' underlying KT infrastructure, NI HEIF very much complements the specific role of Connected in driving greater collaboration between the HE and FE sectors focussed on the needs of business and the wider community.

This context would suggest that, dependent on the performance of Connected as assessed in this evaluation, there may be a case for DEL also to consider further - and/or increased investment in knowledge transfer through Connected itself.

1.6.4.4 Summary of Key Statistics

Table 1.6: Summary of HE-BCI Statistics – NI – YEAR 2011 / 2012

Contract Research	QUB	UU	Stranmillis UC	NI overall
SMEs[22] – volume	• Carried out for 11 SMEs in 2011/12 down from 53 SMEs in 2010/11	• Carried out for 16 SMEs in 2011/12 up from 18 SMEs in 2010/11	• Carried out for 2 SMEs in 2011/12 up from 1 SME in 2010/11	• Carried out for 29 SMEs in 2011/12 down from 72 SMEs in 2010/11
SMEs[22] – value	• Total value of research contracts with SMEs was £179,000 down from £327,000 in 2010/11	• Total value of research contracts with SMEs was £418,000 up from £389,000 in 2010/11	• Total value of research contracts with SMEs was £2,000 down from £18,000 in 2010/11	• Total value of research contracts with SMEs was £599,000 down from £734,000 in 2010/11
Non-SMEs [23]	• Carried out for 129 Other (non-SME) commercial businesses • Decreased from 134 in 2010/11	• Carried out for 17 Other (non-SME) commercial businesses • Decreased from 19 in 2010/11	• Carried out for 3 Other (non-SME) commercial businesses • The same as in 2010/11	• Carried out for 149 Other (non-SME) commercial businesses • Decreased from 156 in 2010/11
Non-SMEs[23] Value	• Total value of research contracts with Other (non-SME) commercial businesses was £5,033,000 down from £5,131,000 in 2010/11	• Total value of research contracts with Other (non-SME) commercial businesses was £751,000 up from £722,000 in 2010/11	• Total value of research contracts with Other (non-SME) commercial businesses was £1,000 down from £2,000 in 2010/11	• Total value of research contracts with Other (non-SME) commercial businesses was £5,785,000 down from £5,855,000 in 2010/11

[22] Small and medium enterprises (SMEs) includes enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million. SMEs include micro, small and medium enterprises and sole traders (HE_BCI definitions)
[23] Other (non-SME) commercial businesses includes other commercial businesses which do not match the above definition of SMEs.

Contract Research	QUB	UU	Stranmillis UC	NI overall
Non-Commercial [24] (volume)	• Carried out for 302 Non-commercial organisations • Increased from 291 in 2010/11	• Carried out for 164 Non-commercial organisations • Decreased from 174 in 2010/11	• Carried out for 12 Non-commercial organisations • Decreased from 18 in 2010/11	• Carried out for 478 Non-commercial organisations • Decreased from 483 in 2010/11
Non-Commercial Value[24]	• Total value of contracts with non-commercial organisations was £9,829,000 in 2011/12 up from £8,928,000 in 2010/11	• Total value of contracts with non-commercial organisations was £3,381,000 in 2011/12 down from £4,248,000 in 2010/11	• Total value of contracts with non-commercial organisations was £135,000 in 2011/12 down from £193,000 in 2010/11	• Total value of contracts with non-commercial organisations was £13,345,000 in 2011/12 down from £13,369,000 in 2010/11
Total (No of Organisations)	• Total contract research projects undertaken totalled 442 in 2011/12 down from 478 in 2010/11	• Total contract research projects undertaken totalled 197 in 2011/12 down from 211 in 2010/11	• Total contract research projects undertaken totalled 17 in 2011/12 down from 22 in 2010/11	• Total contract research projects totalled 656 in 2011/12 down from 711 in 2010/11
Total (Value)	• Total value of research contracts was £15,041,000 in 2011/12 up from £14,386,000 in 2010/11.	• Total value of research contracts was £4,550,000 in 2011/12 down from £5,359,000 in 2010/11	• Total value of research contracts was £138,000 in 2011/12 down from £213,000 in 2010/11	• Total value of research contracts was £19,729,000 in 2011/12 down from £19,958,000 in 2010/11

Source: Higher Education – Business & Community Interaction Survey for Academic Year 2011/12

[24] Non-commercial organisations includes organisations from which its shareholders or trustees do not benefit financially

2 PROJECT INFORMATION

2.1 Performance vs Targets By Quarter – Years 1 and 2 (summarised in Section 5.2 in Report)

Table 2.1: Performance vs. Targets – Years 1 and 2: Project Generation, Management and Development

Target	Yr 1 Target	Q1 Apr – Jun 2010	Q2 Jul – Sep 2010	Q3 Oct – Dec 2010	Q4 Jan – Mar 2011	Yr 1 Total	Yr 2 Target	Q1 Apr - Jun 2011	Q2 Jul– Sep 2011	Q3 Oct – Dec 2011	Q4 Jan – Mar 2012	Yr 2 Total
Development of HE/FE clusters[25]	1	1	1: Creative Design Cluster on-going	1: Creative Design Cluster on-going	1: Creative Design Cluster on-going	**1**	1	On-going: Design cluster form Yr 1	On-going: Design cluster form Yr 1	On-going: Design cluster form Yr 1 & initial discussions for an energy cluster	Design cluster from Yr 1 on-going; its management handed over to BMC to allow focus on a new energy cluster Meeting for an energy cluster with 6 colleges and 2 universities arranged for June 2012.	**2** [Design cluster form Yr 1 on-going Energy cluster established in Yr 2 now led by SRC]

[25] The cluster is a multidisciplinary innovation team. The first cluster had a focus on design and design across a number of areas including product development, digital media, engineering and business while the second focused on energy.

Target	Yr 1 Target	Q1 Apr – Jun 2010	Q2 Jul – Sep 2010	Q3 Oct – Dec 2010	Q4 Jan – Mar 2011	Yr 1 Total	Yr 2 Target	Q1 Apr - Jun 2011	Q2 Jul– Sep 2011	Q3 Oct – Dec 2011	Q4 Jan – Mar 2012	Yr 2 Total
Development of Content Management System[26]	1	On-going: Tenders issued	Tender has been awarded	On-going: tender awarded in September 2010 to Metecplus; design work being completed and on target	On-going: CRM fully designed and tested and on target	**On-going and on target:** CMS developed by Metecplus through a tendering process; system fully designed and tested by end Yr 1	On-going development	On-going: All Project Partners have received training on the site and now have full access to the new Connected CRM	On-going: continues to be updated and developed	On-going: further development taken place (incl. building of bespoke reports and work on finalising user accounts and additional training delivered to QUB units)	On-going: continues to work well and is utilised by project staff	**On-going and on** target: continues to be developed / work well and is utilised by project staff
Development of sector expertise map[27]	1	Development work to begin in October	On-going: Working group established to create and develop a sector expertise map	On-going and on target: Working Group due to meet January 2011	On-going and on target: 2 meetings of working group (Jan & Mar 2011). Style, outline, objectives for map agreed. First draft expected in March but this was pushed back to April.	**On-going:** Working group established and style, outline and objectives for the map agreed.	On-going development	On-going	On-going	On-going	On-going	**On-going**

[26] A recommendation from the evaluation of the Connected pilot was to introduce a Customer Relationship Management (CRM) system that would monitor and record progress against objectives and targets. The system was developed by an external company following a tendering process in Year 1 and continued to be developed in the subsequent years (aspects such the building of bespoke reports and work on finalising user accounts). In addition, training on the site was delivered to all Programme partners in Year 2.
[27] A recommendation from the evaluation of the Connected pilot was to develop a Sector Expertise Map which linked AFBI and CAFRE to the Connected Programme and included them in a map of R&D provision in Northern Ireland. The Connected Business Development Manager set up a HE/FE working group to assist in the development of the Connected Sector Expertise Map.

Target	Yr 1 Target	Q1 Apr – Jun 2010	Q2 Jul – Sep 2010	Q3 Oct – Dec 2010	Q4 Jan – Mar 2011	Yr 1 Total	Yr 2 Target	Q1 Apr - Jun 2011	Q2 Jul– Sep 2011	Q3 Oct – Dec 2011	Q4 Jan – Mar 2012	Yr 2 Total
Stakeholder meetings[28]	5	1	0	1	2	**4**	5	1	1	1	1	**4**
International innovation recce visits[29]	1	0	1	Completed	Completed	**1**	1	0	0	0	1	**1**
Knowledge Transfer team meetings[30][31]	4	0	1	0	1	**2**	4	1	1	1	1	**4**
Newsletters[32]	2	0	0	0	1	**1**	2	0	1	0	2 (U2B & Connected Summer 2012)	**3**
Events attended[33]	8	5	0	18	10	**33**	8	5 (an additional 9 attended but not collaborative)	3 (an additional 5 attended but not collaborative)	7 (a further 9 were attended but not collaborative	4	**19** (a further 23 attended but not collaborative)

[28] Stakeholder meetings include management committee meetings, and steering committee meetings. The Management Committee is as follows: Gerry Campbell and Lynn Connaughton CNI. Eddie Friel and Michael Patterson Ulster and Tom Edgar and Michael McCleave QUB. Catherine McCoey acts as administrator.
[29] The first international collaborative visit was to Germany (Sept. 2010) with a focus on engineering and technology and was intended to develop and build networks for a HE/FE study visit in Feb/Mar 2011. The second was to Japan (Jan. 2012); it sought to strengthen existing links at University level and identify areas of possible joint research.
[30] A Knowledge Transfer Team Meeting was held at Loughry Campus in February 2011; thereby extending links with AFBI and CAFRE.
[31] On average, 23 staff from HE and FE attend these meetings. The location of the meeting is changed each time and the meetings are used as an opportunity to showcase expertise at various HE/FE locations this helps to build up awareness of each other's expertise. Therefore, different academics attend based on areas of interested. In addition, these meetings are used to highlight particular areas of work and presentations would often be delivered by academics. The meeting is chaired by Lynn Connaughton and further provides the opportunity to update on project progress and address any issues that there may be. At the end of each of these meetings, there is time for networking time that is used by HE/ FE staff.
[32] The Connected newsletter is issued twice per annum to all project partners who in turn issue to their clients current and potential. Colleges NI also a small list of companies who have registered to receive the newsletter. It highlights key achievements of the Connected programme.
[33] Events that were attended by QUB, UU and the colleges to represent Connected. Events were attended both by the individual institutions and on a collaborative basis (i.e. more than one of the partners attended the same event). These included Knowledge Transfer Awards, Social Media events and conferences.

Target	Yr 1 Target	Q1 Apr – Jun 2010	Q2 Jul – Sep 2010	Q3 Oct – Dec 2010	Q4 Jan – Mar 2011	Yr 1 Total	Yr 2 Target	Q1 Apr - Jun 2011	Q2 Jul– Sep 2011	Q3 Oct – Dec 2011	Q4 Jan – Mar 2012	Yr 2 Total
Events delivered[34]	6	5	1	4	4	**14**	6	3 (an additional 7 delivered but not collaborative)	1 (an additional 1 delivered but not collaborative)	5	4	**13** (a further 8 delivered but not collaborative)
Editorial and press articles[35]	10	2	2	0	0	**4**	10	4	0	3	3	**10**
Case Studies Published on Connected internet site[36]	5	0	0	5 cases published to be posted onto site	0	**5**	5	0	0	0	5 (On new website to be launched 1st June)	**5**
Internal HE/FE Events[37]	2	0	0	1	1	**2**	2	0	0	0	1 (2 planned for May)	**1**

Source: Targets from: Connected 2 Proposal for Collaboration (2010); Quarterly Progress figures from: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – March 2012); Year 1 & Year 2 totals: RSM McClure Watters

[34] Events that were delivered by QUB, UU and the colleges. Events included lectures, conferences and seminars, some of which directly related to a SSP.
[35] Articles published in relation to Connected / Sector Specific Projects in the Ulster Business magazine.
[36] The Yr 2 Qtr 4 progress report noted that: the new website has been designed and all copy work including a bank of case studies has been submitted to be uploaded onto the site. Coding work on the site has to be completed by the designers. All work will be completed by the end of May and the site is due to be launched in June. In Yr 3 Qtr 3, it was reported that the new Connected website www.connected.ni.org had been launched. The site currently showcases 19 Connected case studies, news articles and events. The site also houses the first edition of the Connected sector expertise map. This is a first edition of this map and will be continually developed. Overall, Colleges NI report that the site has been very well received amongst project partners.
[37] Include events such as meetings between project partners and Invest NI which provided the opportunity for institutions to showcase their expertise, develop contacts and receive guidance.

Table 2.2: Performance vs. Targets – Years 1 and 2: Knowledge Transfer Project Delivery

Target	Yr 1 Target	Q1 Apr – Jun 2010	Q2 Jul – Sep 2010	Q3 Oct – Dec 2010	Q4 Jan – Mar 2011	Yr 1 Total	Yr 2 Target	Q1 Apr - Jun 2011	Q2 Jul– Sep 2011	Q3 Oct – Dec 2011	Q4 Jan – Mar 2012	Yr 2 Total
General Enquiries generated[38]	100	69	157	190	188	**604**	110	157	52	123	102	**434**
No of Sector Specific Projects[39]	Total 12: 8 (A)+4(B) = 12(C)	4 (A) +11 (B)=15	4 (A) +11 (B) +15	4 (A) +11 (B) +15	4 (A) +11 (B) +15	**15**	Total 14: 8 (A)+6(B) = 14(C)	10(A)+5(B) =15(C)[40]	8(A)+18(B) =26(C)	8:(A)+17(B) [41]=25(C)	8:(A)+17(B)= 25(C)	**25**
Completed projects with current clients. [42]	31	31	32	105	34	**202**	33	0	0	1	8	**9**
Completed projects with new clients	10	12	18	29	21	**80**	10	9	9	40	9	**67**
Completed projects with re-engaged clients (not involved with Connected 1) [43]	10	0	0	4	0	**4**	11	0	0	2	6	**8**

[38] Enquiries from potential client companies.
[39] SSPs are calculated as follows: A +B = C
A = projects carried over from previous year** B = total no. of new projects for current year C = total no. of projects delivered in one year
** Not all SSPs will be carried over from one year to the next as some will naturally come to an end or become self-sufficient, this natural progression will allow for new SSPs to be developed and delivered. Therefore A in the following year is those SSPs being carried forwarded from the previous year, net those that have completed
[40] Typo in summary table in Quarterly Progress Report which shows either 15 or 14 (8(A) + 6 (B))) completed – in fact according to the listing of SSPs in Appendix 2 of Yr 2 Q1 Progress Report, there are 10 continued and 5 new.
[41] One SSP was dropped since the last quarter.
[42] Targets for projects with current clients and new clients need to be considered together: in Year 2, the target for the former was not met, but that for the latter was exceeded. There was a significant increase in the number of new clients coming through the project who had no previous engagement experience; once these clients' needs were addressed, Connected resources were depleted / little remaining to service other clients such as current clients. However, it's also worth noting that the target for completed projects with current clients was exceeded by a significant amount in Year 1 (which balances the lower performance in Year 2).
[43] There are several possible explanations for lower performance in the "completed projects with re-engaged clients" category. One may be the focus on getting new clients involved – this has resulted in fewer opportunities to re-engage with older clients; in addition, it is possible that these are not being reported or being reported as "new" rather than "re-engaged".

Target	Yr 1 Target	Q1 Apr – Jun 2010	Q2 Jul – Sep 2010	Q3 Oct – Dec 2010	Q4 Jan – Mar 2011	Yr 1 Total	Yr 2 Target	Q1 Apr - Jun 2011	Q2 Jul– Sep 2011	Q3 Oct – Dec 2011	Q4 Jan – Mar 2012	Yr 2 Total
Completed projects with current Connected 1 clients in new business areas	10	0	5	3	0	**8**	11	30	0	0	6	**36**
TOTAL of all above completed projects	61	41[44]	55	141	55	**294**	65	39	9	43	29	**120**
NPV cases completed	24	0	0	0	10	**10**	32	24	0	0	14 (Full profile of NPV case studies on completed projects beginning in June)	**38**
Innovation initiatives supporting the above completed projects is segmented below:												
KTPs	3	0	1	1	0	**2**	3	3[45]	0	0	0	**3**
Invest NI Innovation Vouchers	18	5	12	13	13	**43**	20	3	2	15	13	**33**
Other projects[46]	40	36	42	57	38	**173**	42	33	7	28	16	**84**
Value of the projects delivered (i.e. income/ fees paid to HE/FE)												
KTPs	£60,000	£0	£10,410	£7,065	£0	**£17,475**	£60,000	£3000[45]	£0	£0	£0	**£3,000**
Innovation Vouchers	£72,000	£20,000	£49,200	£29,200	£52,000	**£150,400**	£80,000	£12,000	£8,000	£65,000	£52,306	**£137,306**
Other Projects	£60,000	£62,241	£62,504	£182,083	£34,295	**£341,123**	£63,000	£64,736	£20,502	£61,444	£66,426	**£213,108**
TOTAL	£192,000	£82,241	£122,114	£218,348[47]	£86,295	**£508,998**	£203,000	£79,736	£28,502	£126,444	£118,732	**£353,414**

Source: Targets from: Connected 2 Proposal for Collaboration (2010); Quarterly Progress figures from: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – March 2012); Year 1 & Year 2 totals: RSM McClure Watters

[44] Progress figure for Y1 Q1 was reported as 41 in the Quarterly Report – this was a typo and the total is 43 as shown
[45] These 3 are "Fusions" - similar to KTP only they support companies in the RoI. These were generated by University of Ulster.
[46] including: full cost recovery projects for industry. i.e. prototype work, material testing, training, consultancy.
[47] Y1 Q3 figure was reported as £218,384 in the Quarterly Report. This was a typo and based on the figures provided, the total should be £218,348.

Table 2.3: Performance vs. Targets – Years 1 and 2: Internal Knowledge Transfer

Target	Yr 1 Target	Q1 Apr – Jun 2010	Q2 Jul – Sep 2010	Q3 Oct – Dec 2010	Q4 Jan – Mar 2011	Yr 1 Total	Yr 2 Target	Q1 Apr - Jun 2011	Q2 Jul– Sep 2011	Q3 Oct – Dec 2011	Q4 Jan – Mar 2012	Yr 2 Total
Placements[48]	3	2	3	1	1	**7**	3	0	0	0	0	**0**
Training and development engagements[49]	20	6	6	21	33	**66**	20	19	6	16	43	**84**
Staff exchange visits[50]	30	7	7	28	15	**57**	30	14	6	1	22	**43**
International visits[51]	6	0	1	9	9	**19**	8	1	3	1	2	**7**

Source: Targets from: Connected 2 Proposal for Collaboration (2010); Quarterly Progress figures from: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – March 2012); Year 1 & Year 2 totals: RSM McClure Watters

[48] A number of placements took place: including FE staff taking placements with HE and HE staff taking industry placements. PPRC at QUB hosted two placements from NRC and one from SRC. Life and Health Sciences staff at UU availed to a number of day placements within the company McElwain Smart Technologies. UU Media staff also had placements with BMC.
[49] To enhance the ability of university and college staff to engage with businesses and includes courses such as the Diploma in packaging technology delivered by CAFRE completed by staff from QUB. Training funded is diverse in nature. The aim is to ensure that staff are up to date with business and community practices and enhance the ability of project staff to engage with business more effectively, particularly with emerging technologies and within priority areas. Funding also includes supporting international visits and network. Includes accredited and non accredited training.
[50] Refers to staff exchange visits between the project partners involved in Connected. In addition, it would also include visits whereby only one partner is connected staff. Often staff will be trying to prime new projects and research particular areas of expertise and will therefore visit certain researchers or academics.
[51] Visits completed by representatives from the partner institutions involved in Connected to establish new relationships and strengthening existing links with other international institutions with the aim of developing future strategic projects and transferring any knowledge gained to other Connected partners.

2.2 Performance vs Targets By Quarter– Years 3 and 4 (summarised in Section 5.2 in Report)

Table 2.4: Performance vs Targets – Years 3 and 4 Project Generation, Management and Development

Target	Yr 3 Target	Q1 – Apr – June 2012	Q2 – Jul – Sep 2012	Q3 – Oct – Dec 2012	Q4 - Jan – March 2013	Yr 3 Total	Yr 4 Target	Year 4 Target for Q1	Q1 – Apr – June 2013	Year 4 Total (Q1 only)
Development of HE/FE clusters[52]	1	0	0	0	2	**2**	1	0.25	0	**0**
Development of Content Management System[53]	On-going development	On-Going	On-Going	On-Going	On-Going	**On-Going[54]**	On-going development	On-going	On-Going	**On-Going**
Development of sector expertise map[55]	On-going development	On-Going	On-Going	On-Going. Version 1 on website	On-Going. Version 1 on website	**On-Going. Version 1 on website[56]**	On-going development	On-going development	On-Going. Version 1 on website	**On-Going**
Stakeholder meetings[57]	5	1	0	1	1	**3**	5	1.25	1	**1**
International innovation recce visits[58]	1	0	0	1	0	**1**	1	0.25	0	**0**
Knowledge Transfer team meetings[59]	4	1	0	0	0	**1**	4	1	0	**0**
Newsletters[60]	2	1	0	0	1	**2**	2	0.5	0	**0**
Events attended[61]	8	1	5	8	4	**18**	8	2	6	**6**

[52] The cluster is a multidisciplinary innovation team. The third cluster is referred to as the Industrial Advisory Board (IAB) with a focus on developing a training programme and with representation from the construction sector. The fourth is a renewable cluster : 'renewable development forum' and is still in the early stages of development.
[53] See footnote re: CMS below table for Years 1 and 2.
[54] Includes Colleges NI work to monitor the CMS on regular basis carry, out training, made changes, set up new accounts as necessary and ensure that the system is updated as new projects come on to the project or close
[55] See footnote re: Sector Expertise Map below table for Years 1 and 2.
[56] In terms of meeting the target, this has been achieved - the Sector Expertise Map has been developed and uploaded to the Connected 2 website. However Colleges NI recognise that this work will need to be reviewed and updated to ensure that the Map is a "living" document. Hence it is reported as "ongoing".
[57]. See footnote re: stakeholder meetings below table for Years 1 and 2.
[58] The third international collaborative visit was to Japan in November – December 2012 and involved researchers and directors from UU, QUB, Colleges NI and SERC. It was intended to provide networking opportunities and provide opportunities for future collaborations.
[59] See footnote re: KT team meetings below table for Years 1 and 2
[60] See footnote re: Connected newsletter below table for Years 1 and 2
[61] See footnote re: events attended below table for Years 1 and 2

Target	Yr 3 Target	Q1 – Apr – June 2012	Q2 – Jul – Sep 2012	Q3 – Oct – Dec 2012	Q4 - Jan – March 2013	Yr 3 Total	Yr 4 Target	Year 4 Target for Q1	Q1 – Apr – June 2013	Year 4 Total (Q1 only)
Events delivered[62]	6	6	0	1	7	**14**	6	1.5	8	**8**
Editorial and press articles[63]	10	1	1	0	9	**11**	10	2.5	2	**2**
Case Studies Published on Connected internet site	5	5	0	0	7	**12**	5	1.25	0	**0**
Internal HE/FE Events[64]	2	2	0	0	0	**2**	2	0.5	0	**0**

Source: Targets from: Connected 2 Proposal for Collaboration (2010); Quarterly Progress figures from: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – March 2012); Year 3 & Year 4 totals: RSM McClure Watters

Table 2.5: Performance vs Targets – Years 3 and 4: Knowledge Transfer Project Delivery

Target	Yr 3 Target	Q1 – Apr – June 2012	Q2 – Jul – Sep 2012	Q3 – Oct – Dec 2012	Q4 - Jan – March 2013	Yr 3 Total	Yr 4 Target	Year 4 Target for Q1	Q1 – Apr – June 2013	Year 4 Total (Q1 only)
General Enquiries generated[65]	120	62	129	84	101	**376**	130	32.5	50	**50**
No of Sector Specific Projects[66]	Total 16 10(A) + 6 (B) = 16 (C)	18 (A) + 8 (B)[67] – 26 (C)	18 (A) + 7 (B) = 25 (C)[68]	18 (A) + 7 (B) = 25 (C)	18 (A) + 7 (B) = 25 (C)	**25**	Total 18 12(A) + 6 (B) = 18 (C)	4.5	22 (A) + 11(B) = 33 (C)	**33**
Completed projects with current clients.	34	5	9	4	17	**35**	37	9.25	3	**3**
Completed projects with new clients	12	18	3	32	23	**76**	12	3	6	**6**

[62] See footnote re: events delivered below table for Years 1 and 2
[63] Articles published in relation to Connected / Sector Specific Projects in the Ulster Business magazine.
[64] See footnote re: internal HE / FE events below table for Years 1 and 2
[65] Enquiries from potential client companies.
[66] SSPs are calculated as follows: A +B = C
A = projects carried over from previous year** B = total no. of new projects for current year C = total no. of projects delivered in one year
** Not all SSPs will be carried over from one year to the next as some will naturally come to an end or become self-sufficient, this natural progression will allow for new SSPs to be developed and delivered. Therefore A in the following year is those SSPs being carried forwarded from the previous year, net those that have completed
[67] Two of these projects involve collaboration with CAFRE.
[68] In this quarter 2 SSP Projects were merged to give a total of 25

Target	Yr 3 Target	Q1 – Apr – June 2012	Q2 – Jul – Sep 2012	Q3 – Oct – Dec 2012	Q4 - Jan – March 2013	Yr 3 Total	Yr 4 Target	Year 4 Target for Q1	Q1 – Apr – June 2013	Year 4 Total (Q1 only)
Completed projects with re-engaged clients (not involved with Connected 1) [69]	11	1	1	0	0	**2**	12	3	0	**0**
Completed projects with current Connected 1 clients in new business areas[70]	11	1	2	2	0	**5**	12	3	0	**0**
TOTAL of all above completed projects	68	25	15	38	40	**118**	73	18.25	9	**9**
NPV cases completed	32	20	0	0	0	**20**	32	8	0	**0**
Innovation initiatives supporting the above completed projects is segmented below:										
Knowledge Transfer Partnerships	2	0	0	0	0	**0**	3	0.75	0	**0**
Invest NI Innovation Vouchers	22	1	0	3	26	**30**	24	6	6	**6**
Other projects[71]	44	24	15	35	14	**88**	46	15	3	**3**
Value of the projects delivered (i.e. income/ fees paid to HE/FE)										
KTPs	£60,000[72]	£0	£0	£0	£0	**£0**	£60,000	£20,000	£0	**£0**
Innovation Vouchers	£88,000	£4,000	£0	£12,000	£108,600	**£124,600**	£96,000	£24,000	£31,200	**£31,200**
Other Projects	£66,000	£76,294	£36,732	£73,595	£41,518	**£228,139**	£69,000	£17250	£13,268	**£13,268**
TOTAL	£214,000	80,294	36,732	85,595	150,118[73]	**£352,739**	225,000	£56,250	44,468	**£44,468**

Source: Targets from: Connected 2 Proposal for Collaboration (2010); Quarterly Progress figures from: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – March 2012); Year 3 & Year 4 totals: RSM McClure Watters

[69] There are several possible explanations for lower performance in the "completed projects with re-engaged clients" category. One reason may be the focus on getting new clients involved – this has resulted in fewer opportunities to re-engage with older clients; in addition, it is possible that these are not being reported or being reported as "new" rather than "re-engaged".

[70] There are several possible explanations for lower performance in the "completed projects with current clients in new business areas". One reason may be the focus on getting new clients involved – this may have resulted in fewer opportunities to engage with current clients in new business areas.

[71] including: full cost recovery projects for industry. i.e. prototype work, material testing, training, consultancy.

[72] Target for KTP income – typo / shown as £40K in Proposal – should have been £60K as shown.

[73] This figure was reported as £85,595 in the Quarterly Report. This was a typo and based on the figures provided, the total should be £150,118 as shown.

Table 2.6: Performance vs Targets – Years 3 and 4 : Internal Knowledge Transfer

Target	Yr 3 Target	Q1 – Apr – June 2012	Q2 – Jul – Sep 2012	Q3 – Oct – Dec 2012	Q4 - Jan – March 2013	Yr 3 Total	Yr 4 Target	Year 4 Target for Q1	Q1 – Apr – June 2013	Year 4 Total (Q1 only)
Placements[74]	3	0	0	0	1	**1**	3	0.75	0	**0**
Training and development engagements[75]	20	15	6	23	28	**72**	20	5	12	**12**
Staff exchange visits[76]	30	2	8	2	18	**30**	30	7.5	8	**8**
International visits[77]	10	2	1	3	1	**7**	10	2.5	5	**5**

Source: Targets from: Connected 2 Proposal for Collaboration (2010); Quarterly Progress figures from: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – March 2012); Year 3 & Year 4 totals: RSM McClure Watters

[74] NRC placement with company to Nampak Ballymena for a three months period. Came about as a direct result of a joint visit with QUB and NRC
[75] To enhance the ability of university and college staff to engage with businesses and includes courses such as the Diploma in packaging technology delivered by CAFRE completed by staff from QUB. See also details provided in table for Years 1 and 2.
[76] See also details provided in table for Years 1 and 2.
[77] Visits completed by representatives from the partner institutions involved in Connected to establish new relationships and strengthening existing links with other international institutions with the aim of developing future strategic projects and transferring any knowledge gained to other Connected partners.

2.3 Colleges NI - Information (summarised in Section 5.3 of report)

2.3.1 Year 1: Completed Projects, Income, Client Type, Type of Income Generated

Table 2.7 Year 1: Completed Projects

	Projects Completed					% of total completed projects
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC	-	-	-	-	-	0
NRC	2	7	10	4	23	10.3
NWRC	8	7	3	-	18	8.0
SERC	-	-	7	-	7	3.1
SRC	-	4	5	-	9	4.0
SWC	-	-	-	12	12	5.4
Higher Education						
Queen's University	32	30	40	30	132	58.9
University of Ulster	1	7	6	9	23	10.3
Total	**43**	**55**	**71**	**55**	**224**	**100**

Source: Colleges NI

Table 2.8 Year 1: Income

	Income					% of total income
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC	-	-	-	-	0	0
NRC	8,000	9,950	28,700	11,232	57,882	11
NWRC	4,536	39,096	12,000	-	55,632	11
SERC	-	-	55,648	-	55,648	11
SRC	-	10,410	13,565	-	23,975	5
SWC	-	-	-	21,060	21,060	4
Higher Education						
Queen's University	65,705	34,658	93,935	22,000	216,298	42
University of Ulster	4,000	28,000	14,500	32,000	78,500	15
Total	**82,241**	**122,114**	**218,348**	**86,292**	**508,995**	**100**

Source: Colleges NI

Table 2.9 Year 1: Client Type

	Client type					% of all clients
	Q1	Q2	Q3	Q4	Total	
New Client	12	18	29	51	110	37
Current Client	31	32	105	2	170	58
Re-Engaged	-	-	4	2	6	2
Connected1 new business area	-	5	3		8	3
Total	**43**	**55**	**141**	**55**	**294**	**100**

NB: Includes non-income generating

Source: Colleges NI

Table 2.10 Year 1: Type of Income Generated

	Type of Income Generated					
	Q1	Q2	Q3	Q4	Total	Invest NI
Further Education						
BMC						
Invest NI Innovation Vouchers	-	-	-	-	-	-
Full Cost Recovery	-	-	-	-	-	-
KTP	-	-	-	-	-	-
NRC						
Invest NI Innovation Vouchers	8000	-	-	-	8000	2
Full Cost Recovery	-	9950	28700	11232	49882	
KTP	-	-	-	-	-	
NWRC						
Invest NI Innovation Vouchers	-	8000	12000	-	20000	5
Full Cost Recovery	4536	31096	-	-	35632	
KTP	-	-	-	-	-	
SRC						
Invest NI Innovation Vouchers	-	-	4000	-	4000	1
Full Cost Recovery	-	-	2500	-	2500	
KTP	-	10410	7065	-	17475	
SWC						
Invest NI Innovation Vouchers	-	-	-	20000	20000	5
Full Cost Recovery	-	-	-	1060	1060	
KTP	-	-	-	-	-	

	Type of Income Generated					
	Q1	Q2	Q3	Q4	Total	Invest NI
SERC						
Invest NI Innovation Vouchers	-	-	-	-	-	
Full Cost Recovery	-	-	55648	-	55648	
KTP	-	-	-	-	-	
Higher Education						
University of Ulster						
Invest NI Innovation Vouchers	4000	28000	12000	28000	72000	18
Full Cost Recovery	-	-	2500	3000	5500	
KTP/FUSION	-	-	-	1000	1000	
Queen's University						
Invest NI Innovation Vouchers	8000	12000	28000	4000	52000	13
Full Cost Recovery	57705	22658	65935	18000	164298	
KTP						
Total	**82241**	**122114**	**218348**	**86292**	**508995**	**44**

Source: Colleges NI

2.3.2Year 2: Completed Projects, Income, Client Type, Type of Income Generated

Table 2.11 Year 2: Completed Projects

	Projects Completed					% of total completed projects
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC				1	1	0.9
NRC	11		3	7	21	18.1
NWRC			8	2	10	8.6
SERC				2	2	1.7
SRC				3	3	2.6
SWC		4	3	1	8	6.9
Higher Education						
Queen's University	23	3		6	32	27.6
University of Ulster	5	2	25	7	39	33.6
Total	**39**	**9**	**39**	**29**	**116**	100.0%

Source: Colleges NI

Table 2.12 Year 2: Income

	Income					% of total income
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC				750	750	0.2
NRC	50735		13725	42800	107260	32.2
NWRC			25425	8000	33425	10.0
SERC				13400	13400	4.0
SRC				12000	12000	3.6
SWC		19760	8134	4000	31894	9.6
Higher Education						
Queen's University	10361	742		12782	23885	7.2
University of Ulster	18200	8000	59400	25000	110600	33.2
Total	**79296**	**28502**	**106684**	**118732**	**333214**	100

NB: Yr2 Q3 = 4 SWC Projects reported twice note taken from these figures

NB: YR2 Q1 = £440 FE Income out with quarterly report

Source: Colleges NI

Table 2.13 Year 2: Client Type

	Client type					% of all clients
	Q1	Q2	Q3	Q4	Total	
New Client	9	9	36	9	63	54.3
Current Client	30		1	8	39	33.6
Re-Engaged			2	6	8	6.9
Connected1 new business area				6	6	5.2
Total	**39**	**9**	**39**	**29**	116	100

Source: Colleges NI

Table 2.14 Year 2: Type of Income Generated

	Type of Income Generated					Invest NI
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC						
Invest NI Innovation Vouchers	-	-	-	-	-	
Full Cost Recovery	-	-	-	750		
KTP	-	-	-	-	-	
NRC						
Invest NI Innovation Vouchers	-	-	-	-	-	
Full Cost Recovery	50735		13725	42800	107260	
KTP	-	-	-	-	-	
NWRC						
Invest NI Innovation Vouchers	-	-	25000	8000	33000	8
Full Cost Recovery	-	-	425	-	425	
KTP	-	-	-	-	-	
SRC						
Invest NI Innovation Vouchers	-	-	-	12000	12000	3
Full Cost Recovery	-	-	-	-	-	
KTP	-	-	-	-	-	
SWC						
Invest NI Innovation Vouchers	-	-	4000	4000	8000	2
Full Cost Recovery	-	19760	4134	-	23894	
KTP	-	-	-	-	-	
SERC						
Invest NI Innovation Vouchers	-	-	-	-	-	
Full Cost Recovery	-	-	-	13400	13400	
KTP	-	-	-	-	-	
Higher Education						
University of Ulster						
Invest NI Innovation Vouchers	4000	8000	36000	24000	72000	18
Full Cost Recovery	11200	-	23400	1000	35600	
KTP/FUSION	3000	-	-	-	-	

	Type of Income Generated					Invest NI
	Q1	Q2	Q3	Q4	Total	
Queen's University						
Invest NI Innovation Vouchers	8000	-	-	4306	12306	3
Full Cost Recovery	2361	742	-	8476	11579	
KTP	-	-	-	-	-	
Total	**79736**	**28502**	**106684**	**117832**	**333214**	**34**

NB: Column one - £440 income short

NB: Column two – figure minus SWC double reported figures

NB: Column five - £20,200 short against year2 reports

Source: Colleges NI

2.3.3 Year 3: Completed Projects, Income, Client Type, Type of Income Generated

Table 2.15 Year 3 Completed Projects

	Projects Completed					% of total completed projects
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC	1	1	-	4	6	5.0
NRC	6	6	9		21	17.5
NWRC			2	2	4	3.3
SERC				1	1	0.8
SRC				4	5	4.2
SWC			1	2	3	2.5
Higher Education						
Queen's University	16	3	11	17	47	39.2
University of Ulster	2	6	15	10	33	27.5
Total	**25**	**16**	**38**	**40**	**120**	100

NB: Q2 – figure out by 2 with quarterly report

Source: Colleges NI

Table 2.16 Year 3: Income

	Income					% of total income
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC	750	1680	-	6400	8830	2.4
NRC	38000	17875	29180	-	85055	22.9
NWRC	-	-	8000	12168	20168	5.4
SERC	-	-	-	4500	4500	1.2
SRC	-	-	-	20600	20600	5.5
SWC	-	-	3750	350	4100	1.1
Higher Education						
Queen's University	31817	902	10170	38100	80989	21.8
University of Ulster	9727	35734	34495	68000	147956	39.8
Total	**80294**	**56191**	**85595**	**150118**	**372198**	100

NB: End of year income figure is £19460 greater than that reported at end of year due to backdating on system. Will be reported in quarterly report Y4 Q2 July-September 2012.

Source: Colleges NI

Table 2.17: Year 3: Client Type

	Client type					% of all clients
	Q1	Q2	Q3	Q4	Total	
New Client	18	3	33	23	77	62.1
Current Client	5	9	9	17	40	32.3
Re-Engaged	1	1	-	-	2	1.6
Connected1 new business area	1	2	2	-	5	4.0
Total	**25**	**15**	**44**	**40**	**124**	**100**

NB: Includes non-income generating clients

Source: Colleges NI

Table 2.18 Year 3: Type of Income Generated

	Type of Income Generated					Invest NI
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC						
Invest NI Innovation Vouchers	-	-	-	4000	4000	1
Full Cost Recovery	750	1680	-	2400	4830	
KTP	-	-	-	-	-	
NRC						
Invest NI Innovation Vouchers	-	-	-	-		
Full Cost Recovery	38000	17875	29180	-	85055	
KTP	-	-	-	-		
NWRC						
Invest NI Innovation Vouchers	-	-	8000	-	8000	
Full Cost Recovery	-	-	-	12168	12168	
KTP	-	-	-	-	-	
SRC						
Invest NI Innovation Vouchers	-	-	-	20600	20600	
Full Cost Recovery	-	-	-			
KTP	-	-	-			
SWC						
Invest NI Innovation Vouchers	-	-	3750	350	4100	
Full Cost Recovery	-	-	-	-	-	
KTP	-	-	-	4500	4500	
SERC						
Invest NI Innovation Vouchers	-	-	-	-	-	
Full Cost Recovery	-	-	-	4500	4500	
KTP	-	-	-	-	-	
Higher Education						
University of Ulster	-	-	-	-	-	
Invest NI Innovation Vouchers	4000	4000	-	16000	24000	6
Full Cost Recovery	5727	31734	34495	22100	94056	
KTP	-	-	-	-	-	

	Type of Income Generated					Invest NI
	Q1	Q2	Q3	Q4	Total	
Queen's University						
Invest NI Innovation Vouchers	-	-	4000	68000	72000	18
Full Cost Recovery	31817	902	6170	-	38889	
KTP	-	-	-	-	-	
Total	**80294**	**56192**	**88595**	**150118**	**372198**	**25**

NB: Column 2 – This figure out with quarterly report by £19,460

Source: Colleges NI

2.3.4 Year 4: Completed Projects, Income, Client Type, Type of Income Generated

Table 2.19 Year 4: Completed Projects

Year Four	Projects Completed					% of total completed projects
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC	1					11.1
NRC	-					-
NWRC	2					22.2
SERC	-					-
SRC	-					-
SWC	-					-
Higher Education						0.0
Queen's University	0					0.0
University of Ulster	6					66.7
Total	**9**					100

Source: Colleges NI

Table 2.20 Year 4: Income

	Income					% of total income
	Q1	Q2	Q3	Q4	Total	
Further Education						
BMC	1100					2.5
NRC	-					-
NWRC	12168					27.4
SERC	-					-
SRC	-					-
SWC	-					-
Higher Education						-
Queen's University	-					-
University of Ulster	31200					70.2
Total	**44468**					**100**

Source: Colleges NI

Table 2.21 Year 4: Client Type

	Client type					% of all clients
	Q1	Q2	Q3	Q4	Total	
New Client	6					66.7
Current Client	3					33.3
Re-Engaged	-					-
Connected1 new business area	-					-
Total	**9**					**100**

Source: Colleges NI

Table 2.22 Year 4: Type of Income Generated

	Type of Income Generated					
	Q1	Q2	Q3	Q4	Total	Invest NI
Further Education						
BMC						
Invest NI Innovation Vouchers						
Full Cost Recovery	1100					
KTP						
NRC						
Invest NI Innovation Vouchers						
Full Cost Recovery						
KTP						
NWRC						
Invest NI Innovation Vouchers						
Full Cost Recovery	12168					
KTP						
SRC						
Invest NI Innovation Vouchers						
Full Cost Recovery						
KTP						
SWC						
Invest NI Innovation Vouchers						
Full Cost Recovery						
KTP						
SERC						
Invest NI Innovation Vouchers						
Full Cost Recovery						
KTP						
Higher Education						
University of Ulster						
Invest NI Innovation Vouchers	31200					6
Full Cost Recovery						
KTP						

	Type of Income Generated					
	Q1	Q2	Q3	Q4	Total	Invest NI
Queen's University						
Invest NI Innovation Vouchers						
Full Cost Recovery						
KTP						
Total	**44468**					**6**

Source: Colleges NI

2.4 Sector Specific Projects (SSPs) : Year 1 to Year 4 Quarter 1

2.4.1 All Sector Specific Projects (SSP) from Year 1 to Year 4 Quarter 1 – Descriptions x 50

Table 2.23: Sector Specific Projects x 50

No.	Lead	Project Title	Project Summary
1	NWRC	Epi Centre Advanced Engineering	Through KTPs, consultancy and innovation the EPIC has the capacity to provide solutions to SMEs enabling technology and knowledge transfer. Will deliver projects through product and process development and carry out consultancy and support work from very small SMES to multinational companies. Through connectivity and partnering with LYIT and UU the project has the capacity to enable developments in Sustainability, Engineering and Energy, rapid prototyping nerves
2	NWRC	Skills Set Media Academy	A series of residential training programmes, guest lecturers and visits to companies and conferences planned in collaboration with lecturers, technical staff and national companies working in the area of moving image and interactive media within the NI Skillset Media Academy partner institutes (NWRC, UU, BMC, SRC). The overall project will focus on new and developing software and hardware and on individuals and companies considered leaders in their fields and will enable the HE and FE institutions to improve training to students and subsequently offer a more industry-prepared graduate and a wider range of training services to digital arts businesses. The Creative Digital Media sector was identified by NIAES, DETI/Invest NI, DEL, NESTA, NIE and ACNI as one of the most important areas of growth within the global, knowledge-based economy. Invest NI are currently writing a Digital Media Strategy for Northern Ireland. Project staff on this project will advise and feed into this strategy. The NI Creative Skillset Media Academy (NICSMA) programme was developed through consultation with NICSMA staff and media sector. In 2012/13, NICSMA organised and delivered: 3 visits by NICSMA (i.e. NWRC, UU and BMC) staff to centres of excellence; 3 training courses in the advanced uses of post-production software; 7 seminars/workshops by guest professionals covering business and technical skills; the participation of staff and students in a joint project with a successful local production company to create 52 short programmes for TV; the Ulster Media Show 2012, celebrating the achievements of students from NWRC, UU and BMC on NICSMA approved courses. NICSMA provided a successful platform for HE and FE institutions to work with the media industry, which can be continued and developed in 2013/14.
3	NWRC	Mental Health Across the Ages	This project is a continuation of a process of international collaboration to share/ develop research, knowledge and best practice initiatives to promote HE curriculum development and delivery in the area of mental health policy and practice. This area of study has particular importance to the northwest region with the anticipated development of a centre for Mental health at UU (Magee)and the clear need to develop a coordinated approach to mental health education / training by all stakeholders from both education and in those in frontline practice. Employer liaison feedback has highlighted the need to raise the profile of mental health professions for HE students to ensure that sufficient numbers of high calibre students consider this career pathway. This project will target a number of those within the social economy sector. The economic and social costs of mental illness in NI amounted to nearly £3 billion in 2002-03 more than the total spend on all health and social care for all health conditions. Following publication of the Bamford Action Plan (2009) it has become apparent that there is a significant need for a skilled and adequate workforce to meet the demands of the mental health services. Particular population groups identified by Bamford as being of concern include; older people, ethnic minorities, learning disability, prisoners, people with hearing impairments, substance misuse, ASD and acquired brain injury. **[Note: this project was merged with the Social Economy SSP – see bottom of next page]]**

No.	Lead	Project Title	Project Summary
			Community agencies are a crucial part of delivering the Bamford vision and make an important contribution to the Northern Ireland economy. Providing training/networking opportunities for Industry/FE/HE would assist with meeting the strategic aims of the Social Economy Enterprise Strategy (DETINI 2010) • Increasing awareness of the sector and establishing its value to the local economy; • developing the sector and increasing its business strength; and • creating a supportive, enabling environment
5	NWRC	Creative Collaborations	The ethos of this project will be based on the traditional industry (i.e. non creative) taking advantage of the new ideas, creative skills, knowledge and expertise of local creative businesses/entrepreneurs with the support of local undergraduates. Whilst encouraging the student to explore entrepreneurial opportunities in the creative industries sector this project also encourages traditional industries to embrace and develop creativity with the support of local creative talents. NORIBIC will deliver the programme and NWRC/UU staff will provide graduates, mentoring support and advice to both companies.
8	NWRC	Small Companies Or Private Enterprise (SCOPE)	On a former project, NWRC collaborated with NORIBIC on a programme to pair non-creative companies with the creative sector. The premise was that new technologies can offer solutions to problems within traditional sectors that have not previously been explored. This proposal aims to use the experience from this initiative and develop it as a progression pilot, building on the previous collaborative activities of 2010. We propose to target six companies, identified by UU Magee and ourselves; I will visit them to assess their current processes and practices with a view to providing them with advice on how technology or modern creative sector advances, could assist or streamline a business area. The process will involve building up a relationship with companies that are not normally associated with the college. As an output, each company will receive a document/report on their general use of ICT with recommendations on how improvements could be made and with sign-posting to possible avenues for implementation. It is likely that sign-posting could direct companies to programmes such as Innovation Vouchers, KTP or EPI Centre.
9	NWRC	Software And Gaming Events (SAGE)	Computer gaming is now available as a GCSE qualification. Also, other GCSE and A-Level ICT subjects are starting to change the focus towards software and creative media type development. However, school teachers do not have the skills to undertake delivery of these specialist areas and there is a danger that the college, the university and the region in general will miss out on future opportunities if there is no form of intervention. Skillset have now a dedicated section on their website for computer gaming, with a subsection on issues for interactive media and computer gaming for schools. They state that they are "uniquely positioned to be able to view the entry points, progression routes and transferable skills required to build a career in a fast–changing and inter–connected industry". They further propose "that media literacy be embedded into the curriculum and given enhanced status as a subject and that teachers are fully supported in teaching media and using the media as a teaching tool."This project proposes to make a start on addressing issues raised by Skillset and others by delivering focussed workshops and information sessions to help schools meet the new opportunities and challenges that arise with interactive media. These introductory sessions will be offered free of charge in the first instance and we will enlist the help of School/ University/Employer Connections to promote it to the schools. In addition involvement with Digital Derry 2012 and the City of Culture 2013 initiatives will inform these activities
10	NWRC	Social Economy Project	The economic and social costs of mental illness in NI amounted to nearly £3 billion in 2002-03 more than the total spend on all health and social care for all health conditions. In light of this report and the publication of Bamford action plan 2009, it has become apparent that there is a significant need for a skilled and adequate workforce to meet the demands of the mental health services. Particular population groups identified by Bamford as being of concern include, older people, ethnic minorities, learning disability, people with hearing impairments, substance misuse, asd and acquired brain injury. Community agencies are a crucial part of delivering the Bamford vision and make an important contribution to the northern Ireland economy. Providing training and networking opportunities for industry HE/FE would assist with meeting the strategic aims of the social economy enterprise strategy (DETINI). Increasing awareness of the sector and establishing its value to the local economy, developing sector and increasing its business strength, creating a supportive enabling environment.

No.	Lead	Project Title	Project Summary
12	NWRC	Raising the Steaks for Food Processors to Win New Contracts	Carry out a business needs analysis with food processors in order to develop a business improvement plan. Explore what support is required within the business to improve product and process development. Provide support to improve the potential for the business to win new contracts to supply their product.
13	NWRC	Employer Engagement and Business Development	This will be developed through a series of best practice visits, expert workshops, attendance at conferences and collaboration with local industry, the University sector and the Higher Education Academy. The main aims will focus on: • Curriculum development • Progression pathways • Collaboration with industry Staff will have an increased awareness of creative and innovative practices in academia and industry for curriculum development and delivery and will seek to establish progression pathways. The Project will explore delivery methods in other Higher Education Providers (HEPs).The project seeks to further develop stakeholder engagement with both industry and the university sector. Therefore the focus will be on collaboration with industry to explore business development, Foundation Degree developments and innovation voucher potential. Outputs will be disseminated on a cross College basis. Tendering opportunities will be explored in order to advance training beyond the college environment and assist on engaging better with industry by providing training tailored to their needs and circumstances. This will also include the opportunity to disseminate best practice within both the educational and industry sectors.
14	NWRC	Building STEM Connectivity	This project has evolved from the Connected Epic Centre project, which Connected has funded and supported since its pilot phase. This is a new project that takes the learning from the Epic Centre project and broadens it out across other disciplines with STEM subjects. The rationale for this was to build connectivity and partnerships recognising the significant importance of other STEM areas identified by the MATRIX Review. There is a need to continue building connectivity in the priority skill areas which are recognised as key economic drivers i.e. Engineering, Computing, Science and Renewable Energy and the Built Environment. It is also recognised that females are significantly underrepresented in STEM industry and project activity will therefore where possible promote career opportunities to this under represented group.
15	NWRC	Food Development Business generation & support Unit	NWRC wish to assess the feasibility of establishing a 'Food Development Business Generation and Support Unit" at their premises in Northland Building. The idea is to provide a supportive environment in which new and existing food businesses can take steps to generate and commercialise their business ideas.

No.	Lead	Project Title	Project Summary
17	SRC	Business Innovation	The Business Support Centre at SRC acts as the main interface between the College and Industry. In striving to meet the aims as set out in FE means business, the Business Support Centre works with curriculum managers to develop provision that mirrors the needs of business clients. Staff within the centre have outward facing roles and interface with local SMEs on a daily basis to achieve these aims. This project will focus on attracting and working with companies who have not worked with either the HE or FE sector in trying to engage them in Knowledge Transfer projects that will provide growth opportunities for these companies. Staff will promote a wide range of Knowledge Transfer programmes to clients and manage the linking of these projects with academic staff within the college.
18	SRC	CERR Project	The UK has set itself the target of 60% reduction in co2 emissions by 2050. Nearly 1/3 of UK carbon emissions are from housing. There will be greater emphasis in building new houses to rigorous energy efficiency standards and focusing on refurbishing homes of the past as homes for the future. The Centre of Excellence for refurbishment and retrofit will be high profile 'living refurbishment demonstrator'. The principle aim of the centre is to provide training in order to directly support the construction industry in the areas of passive house build, sustainable retrofitting of existing houses, renewable energy technologies, and new and innovative construction techniques and materials. This will provide the sector with the skills and information to achieve excellence in sustainable refurbishment.
19	SRC	R&D in Science Curricular Pathways	Through the Connected 2 Year 3 programme Southern Regional College aims to develop a business excellence support programme to support the development of Life Science and Chemical Science professionals in response to our industry partner needs. The intention of this project is to liaise with HEIs, the Sector Skills Council and local employers to develop a sustainable strategic vision for the growth of STEM based curriculum within the southern region.
20	SRC	Food Technology	Through the Connected 2 Year 3 programme Southern Regional College aims to develop their engagement with the Food sector. This will entail developing a business excellence support programme for the Food sector. Through the provision of technical services, research and development, technical advice, and training services it aims to meet the long-term needs of the food industry and introduce an 'innovation culture' into the agri-food sector. Staff working on this programme shall be up-skilled and knowledge embedded in the College with planned development for new curriculum development.
21	SRC	Integrated Sustainable Building Technology	Over the last 3 years the Connected project has allowed SRC to significantly increase its profile as a Centre of Expertise in the area of Sustainable Building and Retrofitting. This has been achieved through collaboration and the establishment of a number of forums with external agencies, University of Ulster and industry. The college has also benefited greatly from the staff development opportunities provided through Connected. To complement this SRC has invested over £60,000 in the development of the ISTB Centre that will be fully completed in September 2013 and will provide greater scope for Connected outputs in year 4. As the profile of the college in this area has risen over the last number of years the demand for support has also grown. The introduction of the Technology Strategy Board's Innovation Voucher scheme in October 2012, specifically for companies in the Built Environment sector is a strong indication of the need to support this sector with innovative developments and continued research.
22	SRC	Life & Chemical	Through the Connected 2 Year 4 programme, Southern Regional College aims to continue the development of a business excellence support programme to support the development of Life Science and Chemical Science professionals in response to our industry partner needs. The intention of this project is to liaise with HEIs, the Sector Skills Council and local employers to develop a

No.	Lead	Project Title	Project Summary
		Sciences	sustainable strategic vision for the growth of STEM based curriculum within the Southern Region .In year 3 of the programme, limited activity in this strand has already allowed the college to develop strong links and credibility with industry partners. We believe a more focused approach in this area will allow us to take these relationships to a higher level. Connected staff have submitted strong business cases to Senior Management for additional investment in equipment and resources to support this project and area of work and this has received positive feedback.
23	SRC	Advanced Engineering / Manufacturing	Over the last 3 years the Connected project has allowed SRC to significantly increase its profile as a Centre of Expertise in the area of Sustainable Building and Retrofitting. This has been achieved through collaboration and the establishment of a number of forums with external agencies, University of Ulster and industry. The college has also benefited greatly from the staff development opportunities provided through Connected. To complement this SRC has invested over £60,000 in the development of the ISTB Centre that will be fully completed in September 2013 and will provide greater scope for Connected outputs in year 4. As the profile of the college in this area has risen over the last number of years the demand for support has also grown. The introduction of the Technology Strategy Board's Innovation Voucher scheme in October 2012, specifically for companies in the Built Environment sector is a strong indication of the need to support this sector with innovative developments and continued research.
25	SWC	Niche Engineering	Northern Ireland has a tradition of excellence in traditional heavy engineering industries. However, it has also a world leading position in certain niche areas – aeronautical engineering, motorsport technology, and renewable technology; for example. This project will build on the existing excellence in these areas to widen participation in these sectors and so stimulate more involvement in these sectors. The project will also promote the STEM agenda by a series of events and materials for schools.
26	SWC	Sustainability and Renewable Technology	Sustainability and Renewable Technology is an issue of great importance to two of our premier local industrial sectors – construction and engineering. There is potential to develop skills in these areas which will have significant export potential. This project will help local industry develop these skills.
29	SWC	ICT	The use of digital media as a communications and business tool has exploded in recent years, and many local small firms do not have expertise in house to develop the tools they need to deliver their services in competition. This project aims to provide such firms with access to the most up-to-date tools and techniques for using digital media as a business and communications tool, to the benefit of their business. Examples might include social networking media, cloud based tools, open source etc.
31	SWC	Manufacturing Productivity	Firms and particularly small firms in the west of northern Ireland, lag the rest of GB in terms of both value added nature of their products and the productivity of the workforce. This project seeks to assist these firms with increasing the value added element to their operations by either assistance with product development to increase the margins in their products or with operations efficiency and waste elimination.
34	SWC	Major Infrastructure Development	Major Infrastructure development is vital for the construction sector and the regeneration of the South-West region of Northern Ireland. The South West College, from its three principal campuses in Dungannon, Enniskillen and Omagh, has developed, and continues to develop, strong links with the main stakeholders, involved in major infrastructure projects in the catchment area of the College. Furthermore opportunities have been taken to be involved in studies and initiatives to improve the cross-border infrastructure of the region. The recently established Industrial Advisory Board (IAB) is delivering on its key objectives, being college/industry engagement, curriculum development and college promotion. The collaboration with the University of Ulster has strengthened

No.	Lead	Project Title	Project Summary
			the academic linkage, through the development of Foundation Degree Courses franchised by the University, but delivered in the College. Joint research projects and professional recognition have resulted from this continuing strong and effective collaboration. The "Professional Pathways" initiative, developed by the College, encourages all students to seek professional affiliation, by mentoring and "continuing personal development, with the ultimate goal of accredited professional qualifications, recognised across the construction sector.
35	SWC	Smart Homes	The Construction Industry is currently in decline. One area of possible growth is in the introduction of new energy efficient technologies to improve household efficiencies. This Project aims to raise awareness of and skills in these technologies among local firms to enable them to increase their market prospects. It aims to identify how Knowledge Transfers can be developed and will explore international links through Conference Opportunities.
36	SWC	Digital Visualisation	Northern Ireland is fast becoming a centre for Film and TV Production: along with the standard technology, the demand for visual effects is increasing. SWC proposes to work with QUB to develop capability and exemplar projects in the areas of visual effects - 3D motion capture, 3D animation – to enable local firms to work with production companies involved in the major films.
37	SWC	Creativity design and innovation	In order to succeed in the changing world, organisations will need to be more creative and innovative. They need to focus on innovation, develop new products and services, operate more efficiently, and break into new markets. This project aims to develop a creativity and implementation process so that they can innovate, in a controlled and predictable manner, thereby improving business results through new product development or process improvement. The project will act as a seed bed for ideas and will directly link to further sources of assistance from e.g. SWC Innotech or Invest NI, with R&D grants, marketing assistance, etc. The project will develop and deliver creativity and Innovation workshops These workshops will take participants through a structured program of innovation with a view to stimulating a solution to their own particular problem; and also to equip them with a set of tools to continue to innovate within their own job role on an ongoing basis.
38	NRC	E3 - Enhancing Engineering Expertise	Under the first phase of Connected the NRC School of Engineering worked hard to develop collaborative relationships with both HE partners and industry (UU & QUB) to exploit knowledge transfer opportunities in order to better address the needs of the manufacturing sector from a technological, process and skills perspective. This collaboration contributes to the out workings of the recommendations of the MATRIX report 'a flexible and responsive skills system that leads Europe in terms of its ability to meet changing demands…' Now that these relationships are developed this project seeks to build on the outcomes of previous work to focus on a series of specific areas which are outlined below.
39	NRC	Clean Green Construction	MATRIX has identified 4 global megatrends, one of which is CLEAN & GREEN. Clearly if Northern Ireland wishes to service this megatrend then NRC, as a major skills supplier in this area, needs to build its expertise and relationships in the following areas to inform new curriculum and skills delivery interventions to meet the needs of the construction sector. • Emerging Biotecture network and its link with UU to build a prototype house on UU campus at Jordanstown (funded by Invest NI under its Collaborative Networks Programme) • University of Ulster – Centre for Construction Excellence

No.	Lead	Project Title	Project Summary
			• Sustainability & waste management; link with Coleraine Borough Council who are interested in the impact of these areas on the Borough. • Geothermal technology; NRC has a link with Ballymena Borough Council who are exploring the use of this technology within the Borough and NRC are well placed to inform this experience • Other emerging alternative energies and technologies Sustainability compliance frameworks and associated awareness and training e.g.: BREEAM, (for commercial projects across 10 separate sectors) Code for Sustainable homes (for residential projects) and SKA rating (for fit out projects)
40	NRC	Counselling for Health	The need for this project has been driven by the following factors • MATRIX has identified 4 global megatrends – 2 of which link with the area of counselling: Health & Vitality and Safe & Secure • NRC's pioneering role in the development and delivery of the Foundation degree in Counselling, in conjunction with UU, ensures that the team at NRC are well placed to note emerging skills needs in the counselling sector. • Each year NRC works with approximately 200 counselling students, many of whom are employed in the health & well-being sector. In addition NRC is in regular contact with the relevant professional bodies for counselling – BACP & IACP. These contacts have led the team at NRC to identify emerging growth areas in the field of counselling where training interventions and up skilling of the current practitioners are required. These practitioners work within the public, private and social economy sectors. These areas include; • Cognitive behavioural therapies • Trauma • Bereavement • Mental health • Cancer Support
41	NRC	Retail Best Practice in the Management and Delivery of the Online Foundation Degree in Retail	NRC is the lead partner in an FE/ HE consortium, which delivers the new Foundation degree in Retail. Under CONNECTED 2 NRC plans • to look at the Online FD in Retail at Manchester Metropolitan, i.e. its delivery/management and assessment. • to spend time with some of the large retailers (e.g. Tesco) who provide and support students on this course and also explore how SMEs have engaged with the course This is with the aim of improving the current offering in Northern Ireland, in conjunction with UU, so that it attracts companies that have not worked with the FE/ HE sector before & meets company needs from a skills perspective.

No.	Lead	Project Title	Project Summary
			During the visits, staff will look at: • Retail Master Classes • Induction/assessment of students at assessment centres • Online delivery/management and assessment • Resources • My knowledge Map (software) training • Students/staff - evaluations of course Mentors in Tesco stores in England. Examine the support they and FE Colleges provide to students and the mechanisms in place
42	NRC	Business Up-Skilling and Innovation for the Future	The Business and Hospitality department within NRC has now acquired considerable expertise in the delivery of business related up-skilling programmes (particularly in the retail sector). However there is still a significant need to focus more directly on the skills needs within the SME sector specifically those who have yet to engage with FE/HE.
43	NRC	Programming for the Future	The Computing department at NRC has had limited engagement with Higher Education partners and business/ industry to date. Through engaging with a small number of SME companies it has become apparent there is a clear need for the development of programming skills to support the growth and competitiveness of this sector. This project will largely focus on the development of forming collaborative relationships with other knowledge providers and acquiring knowledge from areas of best practice. This project seeks to: • Research the specific skills needs of the computing SME sector (working with Momentum) and network with the relevant wider business community to identify the skills gaps. • Form a collaborative working relationship with the Faculty of Computing at UU to explore opportunities for knowledge acquisition/ transfer. Explore FE/HE partners that are utilising leading advanced technologies in the area of programming with the aim of a best practice staff exchange visit.
44	NRC	Up-Skilling of Sports Coaching Northern Ireland	The Sports department within NRC has developed considerable expertise in the delivery of sports and sports science related up-skilling programmes to the social economy sector. However there is still a significant need to focus more directly on the skills needs within the coaching sector specifically those who have yet to engage with FE/HE, especially to facilitate the cross pollination of ideas between different sports. This project aims to: • Further research the specific skills needs of the sports coaching sector and network with the wider sports community to identify the skills gaps

No.	Lead	Project Title	Project Summary
			• Continue to further develop and deliver a series of master classes/ seminars that will provide direct up skilling opportunities for the coaching sector particularly within social economy organisations • Continue to work closely with Coaching Ireland and develop other working partnerships with governing bodies of sport • Continue to explore new opportunities for knowledge transfer and innovative mechanisms for communicating with the target audience
46	BMC	Composite Materials	Composite materials are emerging as a viable alternative to traditional engineering fabrication methodologies, particularly at the high value end of the market, for example, in the Aerospace, Automotive, Civil Engineering, Marine and Consumer industries. This project involves the appointment of a member of staff who will be responsible for designing and developing a suite of training courses to support identified employer requirements in the area of Composite Technologies. Working with local employers the project will enable the college to identify and deliver specific training requirements with a particular emphasis on bespoke training and courses/qualifications required for the F&HE sector. Anticipated outcomes include support to current employer through in-house training programmes, short course development and potential delivery and accreditation of dedicated modules/courses for HNC/NVQ level as appropriate. Through the project, the College will also establish an Employers Consortium to meet on a quarterly basis building on the recent success of the Composites Seminar. Working closely with Queen's University and the University of Ulster, the project further aims to identify and commission composites manufacturing equipment that will satisfy both the requirements of the University and the College to use in a shared capacity.
47	BMC	Media	BMET will open a new economic development campus on the Springfield road in spring 2012. it is proposed to enhance the learning and teaching experience of all he students through increased use of industry led projects/placements, innovative assessment techniques and by continuing exposure to benchmarked good practice. The facility will be positioned as a resource for the business community providing support for business incubation backed by access to specialist equipment, support and knowledge transfer from BMC staff and students. Existing businesses will also benefit from the student project based activity and can access applied r&d through the key equipped areas on the campus. The campus will support the delivery of bespoke training for the business community and help to fulfil the potential for the development of social economy businesses in the area. digital media facilities at this new campus will provide fully soundproofed mid-range bbc standard recording facilities to include a recording studio, mixed media and news studio, radio studio, production control room, sound and vision control for each recording space, audio and post production facilities, dressing rooms and a green room. this area will also house a 3d animation suite. This proposal focuses on the development of relationships with businesses, the extension of relationships with local stakeholders and other connected members and the development of full cost training courses to promote the facility that will be within e3 and ensure that college activities meet the demands of the local digital media sector.
48	BMC	Creativity and Innovation	In spring 2012 BMC will open the e3 campus. The new facilities allow Belfast Met to reposition itself as a key provider of innovative solutions to business. A creative thinking approach, FRESH, has been developed by the college and will be used at e3 to develop students core skills and to deliver employer led projects. Earlier in 2012 BMC piloted the delivery of FRESH with 16 businesses. This was a successful pilot and the college is seeking to develop the potential of FRESH for business. Creativity is a behaviour which can encourage innovation in business. A Creative Development Officer will be responsible for designing and developing a suite of training courses, and business interventions to support identified employer requirements in the area of design led creative thinking.
49	BMC	Connected Health and Assisted Living	Belfast Met has established excellent links in Connected Health through its work with health and social trusts, charities, private sector companies and key stakeholders operating in the health, life science, technology and medical fields. The Connected programme will enable the College to position itself as a test bed for trial, validation and implementation of new connected health and assisted living technology and training solutions, whilst establishing best practice visits to ensure solutions remain in line with global health trends. Whilst serving a local market, the College recognises the benefits of connected health on the global community and that global themes and trends in the health arena will impact on the

No.	Lead	Project Title	Project Summary
			development of technological resources and training solutions. In addition, Belfast Met continues to receive interest from companies wishing to work with the College in the area of Connected Health, for example, an innovation voucher to develop a health management system utilising cloud technology is currently being explored. The College is keen to build on this through collaborative working with the Universities and has already developed relationships with key personnel in both Ulster and Queen's.
50	SERC	Sustainable & Renewable Technologies	SERC in partnership with UUJ have been involved in researching and developing Zero Carbon technologies to aid the industry at local, regional and national levels. This has entailed working closely with governmental and industry bodies, engaging with businesses through innovative projects and sharing and exchanging good practice across the sector. SERC will further develop its strong links with CAFRE and AFBI in areas of food, waste, energy and sustainability. To develop this further, the College is keen to build and develop closer links with the professional bodies to upskill the construction and engineering industry. With the introduction of a new 'Environmental Skills Centre' in Newtownards, this proposal will drive forward linkages with businesses, full cost recovery training, research and development for companies, KTPs, Innovation Vouchers and curriculum development. This project will continue to address these issues and provide an effective vehicle to research and embed new developments within the area of sustainable and renewable technologies and their sub groups.
53	SERC	Japanese International Linkages	SERC plans to extend the project proposal set up under Year 1. Year 2 will focus on expanding the established links with Toyama National College of Technology. The second part of this partnership is to develop a relationship with Kosen Kiku (the association of Japanese Colleges of Technology) and two other Japanese colleges with a view to develop a Northern Ireland/Japan network. This will involve exchange visits, international competitions, development of video links and also may branch into renewable technology research. International projects in robotics will be designed and the robotics/automation curriculum will be enhanced. When T Francis, M Malone and K Webb were in Japan the idea of an international robotics competition was floated. The vision was that a design would be agreed and that this would be issued to teams of students in SERC and at the same time in Toyama. A time limit would be set and the teams would construct the robot. The final outcomes would be graded and a trophy awarded to the winning team. A similar type of competition runs within the Colleges of Technology in Japan and this is the model to be used internationally. The first stage of the development of skills is a partnership approach to robotics design where students from SERC work along with students from Toyama on one design, this partnership has already started and Dr Toga from Toyama is visiting SERC on the 10th November to discuss and progress this project. When skills have been assessed the competition will be launched, this will be in 12 months' time. SERC wishes to apply for continuation funding for its Japanese Internationalisation Project. The international linkages between Toyama National College of Technology and Kosen Kiku have been strengthened during the past year following in particular a visit in November 2012 by the Principal and Chief Executive of SERC, Director of Curriculum, SERC, representation from Queen's University Belfast and University of Ulster and Lynn Connaughton from Connected. On this trip it was agreed that the 3rd International Symposium of Expertise in Sustainable Society would be held in Northern Ireland hosted by SERC with key note speakers from Japan and the Universities in Northern Ireland. SERC will organise this conference and ensure all other FE Colleges in NI are invited to participate to give them an opportunity to showcase their work on an international platform.
54	SERC	Developing International Links	Building on the successes of the Japan Internationalisation Project, SERC wishes to explore opportunities which may exist overseas to develop mutually beneficial partnerships, provide consultancy, work on joint research projects with universities, deliver cost-recovery training and benchmark itself against other colleges and universities throughout the world. This fits into the College's 20:20 Vision and overarching strategy to be recognised as a world-class provider of Further Education by 2020. SERC wishes to use the Connected Project to identify and monitor best practice, network with the University of Ulster and Queen's University to learn from and share their international linkages and expertise, identify opportunities in and take part in academic

No.	Lead	Project Title	Project Summary
			exchanges and also take part in Trade Missions to identify and explore opportunities overseas. This could also involve taking part in overseas conferences to review best practice or identify opportunities for partnership.
55	SERC	Environmental Skills Centre	SERC have delivered a Sustainability project over the past 3 years which supported the College's Environmental Skills Centre based at the Newtowanrds Campus. The Centre has gained a reputation for its industry links and specialist knowledge in the areas of renewables. This has been demonstrated in the past year through research partnerships with the Universities, links with sectoral bodies and also carrying out research for businesses and housing associations for example in cavity wall insulation. Going forward into Year 4, SERC would like to build on partnerships already developed, deliver knowledge transfer to industry via seminars and training courses and extend its curriculum provision by seeking accreditation in the areas of Waste Management and Gas training. The staff working on this project will proactively contact businesses to identify skills gaps and give advice on how companies can enhance their skill set to drive their business forward in this difficult economic climate and seek to deliver appropriate training programmes or provide consultancy. SERC staff will also seek knowledge transfer opportunities within the broader renewable / sustainability field to ensure they are kept abreast of any changes. Research and collaborative opportunities with the Universities and sectoral bodies will also be pursued as will opportunities for tapping into European funding, Innovation Vouchers and KTPs
56	SERC	Composites Materials & processing up skilling	Composite materials are quickly emerging as the materials of choice for many product applications due to their enhanced properties over the more traditional materials. Many companies considering the use of such materials may be deterred due to lack of material knowledge and the subsequent processing techniques. Research is still very much on going into these materials and in particular simulation/modelling of their manufacture. The rationale behind this project is to have a composites expert within SERC that can disseminate such information to staff, students and companies interested or already involved in composite manufacture. To this end Trevor Breadon (SERC lecturer) is completing a PhD in the area of composite material. Fees for Trevor's PhD have been funded in previous years through the Connected project through knowledge transfer. SERC proposes to fund Trevor one day a week to make significant progress towards completing this research for the companies and enhance collaboration with the University of Ulster with a view to exploring options for European funding and exploring the viability of establishing a commercial plan within composites through Innovation Vouchers, KTPs or training/consultancy.
57	SERC	Engineering Solutions - Agri-Food scoping project	The agri-food sector is of vital importance to the economy in Northern Ireland both now and in the future. For many years it has been one of the primary drivers of the economy providing many jobs and contributing to the sustainability of the rural sector. Currently SERC has identified that it could service this sector in a more strategic way and wishes to engage with the industry and gather expertise from CAFRE to provide mechatronic business support solutions which will increase the competitiveness of these businesses. In addition, SERC will also be able to provide mentoring, upskilling and consultancy to many of the food businesses located in its immediate catchment area.
58	QUB	Polymer Processing – Connecting People, Processes & Production	This project will focus on strengthening existing relationships and building new relationships between stake-holders to the benefit of the polymer engineering and manufacturing community in NI.
59	QUB	Competence Centre for	This project aligns renewable energy expertise at QUB / UU / AFBI with the research needs of participating companies. It will fund research projects only (but must include plans for technology

No.	Lead	Project Title	Project Summary
		Sustainable Energy	transfer/commercialisation. The need for the development of renewable energy technologies that utilise all available resources efficiently is accepted. The diversity of these resources and the requirement for integration across a range of business sectors necessitates an approach based on a solid foundation of interdisciplinary knowledge. This project aligns renewable energy expertise at QUB / UU / AFBI with the research needs of participating companies It will fund research projects only (but must include plans for technology transfer/commercialisation The need for the development of renewable energy technologies that utilise all available resources efficiently is accepted. The diversity of these resources and the requirement for integration across a range of business sectors necessitates an approach based on a solid foundation of interdisciplinary knowledge.
60	QUB	Innovation Centre for Sustainable Technologies	This SSP will take the research outputs from the QUESTOR Centre at Queen's University Belfast, The Centre for Sustainable Technology (CST) at University of Ulster and the proposed Competence Centre for Sustainable Energy (CCSE) and provide support from FE Colleges, the QUESTOR Applied Technology Unit (ATU), local industry, collaborative networks and government in order to successfully commercialise this research. Additionally, the Innovation Centre will also training and education to the public on the topic of sustainability.
61	QUB	QUESTOR Centre-Connecting Industry and Research	An International Partnership for Environmental Research and Innovation. Organisations benefit from membership of QUESTOR and contribute to the development of new knowledge that will produce environmental technologies for the next generation. Membership of QUESTOR provides an opportunity to access a portfolio of benefits which include: •Direct access to a highly leveraged (40:1) multi-disciplinary research programme •Members both own and direct the research programme •Direct access to an expanding international research base of over 50 scientists and engineers •Application focussed basic environmental research but with a clear focus on technology transfer and commercialisation •Networking with other Members, including large multinational companies, environmental regulators and environmental technology and service providers •The opportunity to recruit exceptional graduate students
62	UU	Green & Sustainable Enterprise Project	To target clusters, companies and the wider community, to lead the development of HE and FE knowledge transfer services. To proactively engage with the diverse Green / Sustainable Industries related disciplines across the Higher Education (HE) and Further Education (FE) sectors. The project also seeks to establish, maintain and develop a network of relevant contacts, at regional, national and international level to support the University's efforts in developing closer links, including commercial collaborations, with the Green / Sustainable Industries Sector and its stakeholders.
63	UU	SME Enterprise and Innovation Development Project	A range of mini outreach projects are involved with this overall project that is focused on developing both innovation and entrepreneurships in students and SME's.

No.	Lead	Project Title	Project Summary
64	UU	Innovation for Life and Health Sciences	The project will focus on developing and supporting current and new projects across Ulster and the FE colleges within Life and Health Sciences. This SSP will draw existing work, currently being undertaken by FE and HE in the Life and Health Science sector, together with new priority areas such as Agri food. This will allow for a strategic overview; reducing the potential for duplication and encouraging further collaborations. Sector skills bodies such as Cogent, Improve/Food and Drink Association and Bio business NI will be central to the proposed outputs of this project. These outputs will be focussed on industry's needs regarding knowledge and skills. They will include networking and knowledge transfer opportunities, the identification of skills gaps and the development of CPD programmes.

Source: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – June 2013)

2.4.2 All Sector Specific Projects (SSP) from Year 1 to Year 4 Quarter 1 – Profile of Lead and Partner Institutions

Table 2.24: Sector Specific Projects x 50

No.	Lead	Project Title	Sector	BMC	NRC	NWRC	SERC	SRC	SWC	QUB	UU	CAFRE	AFBI
1	NWRC	Epi Centre Advanced Engineering	Engineering								X		
2	NWRC	Skills Set Media Academy	Creative Media								X		
3	NWRC	Mental Health Across the Ages	Social Economy								X		
5	NWRC	Creative Collaborations	Non-creative								X		
8	NWRC	Small Companies Or Private Enterprise (SCOPE)	Technology							X	x		
9	NWRC	Software And Gaming Events (SAGE)	ICT							x	x		
10	NWRC	Social Economy Project	Social Economy								x		
12	NWRC	Raising the Steaks for Food Processors to Win New Contracts	Food								x	x	
13	NWRC	Employer Engagement and Business Development	Education							x	x		
14	NWRC	Building STEM Connectivity	Advanced Engineering								X		
15	NWRC	Food Development Business generation & support Unit	Food									x	
17	SRC	Business Innovation	Not specified							X			

No.	Lead	Project Title	Sector	BMC	NRC	NWRC	SERC	SRC	SWC	QUB	UU	CAFRE	AFBI
18	SRC	CERR Project	Construction								x		
19	SRC	R&D in Science Curricular Pathways	Life Sciences							X	x		
20	SRC	Food Technology	Food Technology								x	x	
21	SRC	Integrated Sustainable Building Technology	Construction								X		
22	SRC	Life & Chemical Sciences	Life and Chemical Science								X		
23	SRC	Advanced Engineering / Manufacturing	Advanced Engineering										
25	SWC	Niche Engineering	Engineering							X	X		
26	SWC	Sustainability and Renewable Technology	Renewable Technology							X			
29	SWC	ICT	ICT								x		
31	SWC	Manufacturing Productivity	Manufacturing							X			
34	SWC	Major Infrastructure Development	Construction								x		
35	SWC	Smart Homes	Construction								x		
36	SWC	Digital Visualisation	Creative							X	x		
37	SWC	Creativity design and innovation	Creative	X						X			
38	NRC	E3 - Enhancing Engineering Expertise	Advanced Engineering							x	X		

No.	Lead	Project Title	Sector	BMC	NRC	NWRC	SERC	SRC	SWC	QUB	UU	CAFRE	AFBI
39	NRC	Clean Green Construction	Construction								X		
40	NRC	Counselling for Health	Health								X		
41	NRC	Retail Best Practice in the Management and Delivery of the Online Foundation Degree in Retail	Retail	x		x	x	x	x		X		
42	NRC	Business Up-Skilling and Innovation for the Future	Hospitality / Food								x	x	
43	NRC	Programming for the Future	ICT								X		
44	NRC	Up-Skilling of Sports Coaching Northern Ireland	Sports								X		
46	BMC	Composite Materials	Advanced Engineering							X	X		
47	BMC	Media	Media								X		
48	BMC	Creativity and Innovation	Creative Industries								x		
49	BMC	Connected Health and Assisted Living	Social Economy								x		
50	SERC	Sustainable & Renewable Technologies	Renewable Technology							X	x		
53	SERC	Japanese International Linkages	Robotics							X			
54	SERC	Developing International Links	Various							x	x		
55	SERC	Environmental Skills Centre	Construction							X	x		

No.	Lead	Project Title	Sector	BMC	NRC	NWRC	SERC	SRC	SWC	QUB	UU	CAFRE	AFBI
56	SERC	Composites Materials & processing up skilling	Engineering								x		
57	SERC	Engineering Solutions - Agri-Food scoping project	Engineering									x	
58	QUB	Polymer Processing – Connecting People, Processes & Production	Advanced Materials		x								
59	QUB	Competence Centre for Sustainable Energy	Energy								x		X
60	QUB	Innovation Centre for Sustainable Technologies	Sustainable Technology										
61	QUB	QUESTOR Centre- Connecting Industry and Research	Environmental Technology										
62	UU	Green & Sustainable Enterprise Project	Energy	X	x	x	x	X	x				
63	UU	SME Enterprise and Innovation Development Project	Enterprise	x	x	x	x	x	x				
64	UU	Innovation for Life and Health Sciences	Life and Health Sciences	x	x								
Total			**50**	**5**	**4**	**3**	**3**	**3**	**3**	**16**	**36**	**5**	**1**

Source: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – June 2013)

2.4.3 Sector Specific Projects (SSP) from Year 1 to Year 4 Quarter 1 – Descriptions of those not taken forward x 14

Table 2.25: Sector Specific Projects (not taken forward) x 14

No.	Lead	Project Title	Project Summary
4	NWRC	Apps for Windows Phone 7	On Feb 15 2010 Microsoft introduced the next generation of Windows phone operating system. Phone using the technology will be available by Christmas 2010. The development kit is now available and UU Coleraine and NWRC wish to position ourselves so that we are ready for what Microsoft believes will be the major competitor to IPhone. This will involve a partnership between UU, NWRC and Microsoft, and will involve training of staff and the development of Apps before the new devices are ready. This would help put Northern Ireland in a strong position as developers for this platform.
6	NWRC	Virtual Incubation	The accepted view of business incubation has always had a strong focus on facilities. For some companies particularly in the earliest development phase desk space may not be required. In common with all start-ups however what is most needed is a business and technical support framework to help fledgling businesses to grow. We propose a programme that will initially support our graduates, enabling them to work virtually and to engage virtual business support services.
7	NWRC	Digital City	Derry City Council recently met with Colm Long of Facebook and discussed ways of enhancing the Digital aspects of the City of Culture 2013 bid. The bid explores and celebrates how arts and culture continue to tackle conflict and division in communities by unlocking talent and creativity through core themes of people, place and past to future. DCC feel that 'an original and technology based way to celebrate this cultural journey and effectively educate new generations would be through the development of a 'Cracking the cultural code' game.
11	NWRC	Enhancing HE within FE and Developing collaboration with industry	The College seeks to enhance the higher education ethos within a Further and Higher Education College. This will be developed through a series of best practice visits, expert workshops, attendance at conferences and collaboration with local industry, the University sector and the Higher Education Academy. The main aims will focus on :Curriculum development, Progression pathways, Enterprise and employability, Collaboration with industry
16	SRC	Development of Computer Integrated Engineering Centre of Excellence	The aim of the project is to develop a centre of excellence in the area of computer integrated engineering. The intention is to develop best practice in order to directly support industry in the areas of design, machining, manufacturing and material handling to support cost reduction and competitiveness in the local, national and international marketplace. In addition to this, the method of applying Lean Six Sigma methodologies in order to drive core business improvements in order to drive repeatable and sustainable business improvement.
24	SWC	Creative Technologies	The government's Digital Strategy has identified the creative technology sector as a potential area for NI to develop a knowledge-based economy. This project will, in partnership with UU and industry figures, develop a number of example projects in the creative technology sectors. These will act as good practice examples to firms seeking to enter the industry. From these projects, consultancy support will be delivered to firms and individuals. Supporting curriculum and training will be developed and delivered. [Note: this was merged with Digital Media SSP – see next page]

No.	Lead	Project Title	Project Summary
27	SWC	Digital Mapping/GIS	NI is still a very rural region. The rural economy is suffering from a downturn in the viability of traditional farming models. However, opportunities exist in new sustainability technologies. This project will use state of the art GIS mapping techniques to model resource demand against supply in the rural economy. This will then form the basis for offering this service to firms who wish to use any type of infrastructural analysis.
28	SWC	New Foundation Degree Model	Industry in Northern Ireland comprises largely of small firms. These firms find it difficult to attract highly skilled technician labour. Traditional models of education for technicians are unsuitable for these engineering firms, both in terms of content and delivery methodologies. This project will develop a model for delivering bespoke higher technician training of suitable content and in a suitable manner to firms in Northern Ireland.
30	SWC	Digital Media	The use of digital media as a communications and business tool has exploded in recent years, and many local small firms do not have expertise in house to develop the tools they need to deliver their services in competition. This project aims to provide such firms with access to the most up-to-date tools and techniques for using digital media as a business and communications tool, to the benefit of their business. Examples might include social networking media, cloud based tools, open source etc.
32	SWC	Manufacturing Design Process and Innovation	The construction industry is currently in decline. One area of possible growth is in the introduction of new energy efficient technologies to improve household efficiencies. This project aims to raise awareness of and skills in these technologies among local firms to enable them to increase their market prospects.
33	SWC	Value Added in Manufacturing	Firms and particularly small firms in the west of Northern Ireland, lag the rest of GB in terms of both value added nature of their products and the productivity of the workforce. this project seeks to assist these firms with increasing the value added element to their operations by either assistance with product development to increase the margins in their products or with operations efficiency and waste elimination
45	BMC	ICT Horizon.	Belfast Metropolitan College will open a new economic development campus on the Springfield road in Spring 2011. It is proposed to enhance the learning and teaching experience of all HE students through increased use of industry led projects/placements, innovative assessment techniques and by continuing exposure to benchmarked good practice.
51	SERC	Enhancing business links and developing pathways	SERC Business Innovation and Development Unit (BIDU) is expanding the KTP provision within the college. Connected 2 will focus on expanding the established links with industry and will seek new areas for development. Innovation Vouchers, product development, employee up skilling and providing innovative business solutions will be included in this project. Another aspect of this project will be the promotion of enterprise and innovation within the college which will include the development of SERC student companies. A suite of qualifications will be developed for students and HE pathways will be promoted. The BIDU team will actively promote links to other Connected projects within the HE sector.
52	SERC	Food sustainability Centre	SERC recognises a local need within the Agri-food sector to provide training opportunities locally. Currently, only CAFRE offer training in food specific disciplines to food businesses and this is delivered at its campus in Cookstown; the distance to travel is perceived as a barrier to learning being delivered at levels 1 and 2. Currently the College only offers Food Hygiene training to this sector. The College has identified that in light of the government's strategy 'Focus on Food' which states that the food industry is one of the fastest growing export sectors within Northern Ireland that is must rise to the challenge of providing up skilling opportunities to operatives working within it as typically these employees have low(er) levels of educational achievement.

Source: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – June 2013) and Colleges NI

2.5 Links with AFBI and CAFRE (from Quarterly Progress Reports)

Table 2.26: Links with AFBI & CAFRE

Year	Quarter	Dates	Notes
Year 1	Quarter 1	Apr - Jun 2010	No information
Year 1	Quarter 2	Jul - Sep 2010	The [Connected pilot] evaluation also recommended that: "DEL should liaise with the Connected Central Unit and with DARD to explore the potential of linking AFBI and CAFRE to the Connected Programme. In particular, the scope for collaboration in respect of promotional and awareness raising activities should be considered, with a view to these public sector institutions being included within a map of R&D provision in Northern Ireland as proposed at Recommendation 6". Taking this recommendation forward, the Connected Business Development Manager organised a meeting at Loughry College in August. Queen's University also attended the meeting. The meeting was most informative and it was soon realised that Loughry had little or no knowledge or involvement of the FE sector but was keen to establish and build networks. Various opportunities for Loughry's involvement in Connected were discussed, but it was agreed that a good starting point was to hold the next Knowledge Transfer Team meeting at the Loughry Campus. This meeting will take place in January 2011. The Connected Business Development Manager will set up a similar meeting with AFBI for the next quarter. Both AFBI and CAFRE, as recommended by FGS McClure Watters, will be represented in a map of R&D provision developed by Connected. However, following on from the recent meeting with CAFRE, it is anticipated that such networks may developed beyond just marketing and promotion.
Year 1	Quarter 3	Oct - Dec 2010	The next Knowledge Transfer Team Meeting (KKTM) will take place at Loughry College, Wednesday 23rd February 2011. As section 2.7 explains the KTTM is being held at Loughry as part of Connected plans to develop strong links with both AFBI and CAFRE. Work has begun on the sector expertise map that will include both AFBI and CAFRE however additional links have been created. The next KTTM will be held at Loughry Campus in February 2011. As well as hosting this event a presentation by Loughry and tour of their facilities will be delivered. A follow up meeting with Colleges Northern Ireland and Queen's University has been arranged for Tuesday 8th March 2011. The aim of this meeting will be to develop

Year	Quarter	Dates	Notes
			further the opportunities that arise from the February meeting and discuss further additional promotion opportunities and collaborative projects. Connected has approved funding for three members of Queen's University to complete the Diploma in Packaging Technology delivered at Loughry Campus. The diploma is internationally recognised as the premier qualification for packaging professionals and is an acknowledgement of the high standards of knowledge and skill required in a very large, diverse and important industry. Learners on the Diploma develop a clear understanding of the key principles, processes, and properties of packaging production and use. Furthermore, Connected has made contact with Ronald Gardiner who manages the course and has agreed that the course is promoted in the next Connected Newsletter. Connected staff at the University of Ulster has been active during this quarter in developing closer links with AFBI. The have organised a one day workshop with AFBI to be held on January 26th 2011. Experts from AFBI and the University of Ulster will present their expertise to each other. The workshop will enable initial links to be explored and develop knowledge of each other's expertise. It is anticipated that this workshop will act as catalysis for further links.
Year 1	Quarter 4	Jan - Mar 2011	A Knowledge Transfer Team meeting was held at Loughry College on Wednesday 23rd February 2011. The meeting was very successful and further developed the links between the project partners and Loughry. During the meeting, project partners provided with an overview of the work of Loughry particularly in the area of Knowledge Transfer. There was an opportunity to discuss areas for collaboration. A tour of facilities was provided. Overall, the event was well delivered and received by both the Connected team and the staff at Loughry. As outlined in section 2.5, there is much interest and potential for a collaborative project with Loughry. In addition to being included within the Connected sector expertise map, additional links have been created across the Connected project with both AFBI and CAFRE. The last Knowledge Transfer Meeting was held at Loughry College. As well as learning about the work of Loughry, project partners were given tour of facilities see first-hand Knowledge Transfer projects in progress. A follow up meeting with Colleges Northern Ireland and Queen's University took place on Tuesday 8th March 2011, to discuss areas for further development of meaningful and mutually beneficial relationships. One potential project that is currently being developed is with Loughry and South Eastern Regional College (SERC). SERC have identified that in light of the government's strategy 'Focus on Food' there is a local need within the Agri-food sector to provide more Knowledge Transfer opportunities. SERC are working with the Business Development Manager to write up a Sector Specific proposal that would involve collaborating with Loughry College and SERC's local Agri-food sector. The first stage of project delivery will involve research into the training needs of the agri-food sector

Year	Quarter	Dates	Notes
			through: • developing a partnership approach with CAFRE to deliver some of their training portfolio in the local SERC catchment area • investigate the possibility of setting up a Food Technology Centre at SERC's Newtownards campus • identify the skills and Knowledge Transfer needs of local agri-food businesses • SERC curriculum development and expansion to address future skill needs of the growing agri-food sector at levels 1 and 2 develop career progression routes through to CAFRE Connected staff at the University of Ulster has been continuing to drive collaborations with AFBI. A sustainability workshop at AFBI Hillsborough, was organised by Ulster on the 26th January 2011. The workshops involved presentations from Jim McAdam, Bob Foy and Lindsay Easson from AFBI, with Dario Fornara, Sally Cook and Neil Hewitt from Ulster. Eddie Friel, Head of Business Liaison, Ulster and Fergus Begley, Ulster, were also in attendance. This knowledge exchange has furthered collaboration between AFBI and Ulster on the research front and other knowledge exchange events are planned. One, with food as the theme, is planned for June, with NICHE (Northern Ireland Centre for Food and Health) Ulster, Coleraine, being the prospective hosts.
Year 2	Quarter 1	Apr - Jun2011	Meetings have been organised by the University of Ulster between Sector Skills bodies and with Loughry regarding qualification provision for SMEs in this sector. A mini project has been agreed with AFBI and UU collaborating on an Innovation Voucher for a small food manufacturing company. This is the first such collaboration and was a result of the UUs awareness workshop in January 2011. South Eastern Regional College have begun delivery on and joint project with AFBI and an SSP has been outlined. The project "Focus on Food" is at early stages of delivery.
Year 2	Quarter 2	Jul - Sep 2011	Work with AFBI and CARFE continues across all aspects of Connected, including Internal Knowledge Transfer and upon delivery of Knowledge Transfer projects. During this reporting period Ciaran Prunty and Manus Carey, two members of staff from Queen's University visited the AFBI site at Newforge Lane, Belfast. Colin McRoberts from AFBI provided a tour of their facilities and discussed potential research projects and technology transfer collaborations. The feedback from the visit has since been reported back into QUESTOR at Queen's and discussions are now on-going for possible further collaborations with consultative analytical testing. Also during this quarter, University of Ulster and Queen's University attended the CAFRE Food for Thought event at Loughry College 8th September 2011. This event, organised by Invest NI and DARD showcased innovation support services available to the Northern Ireland agri-food industry, facilitated networking opportunities, and delivered keynote presentations. Enquiries generated from the event

Year	Quarter	Dates	Notes
			are currently being followed by the University of Ulster.
Year 2	Quarter 3	Oct - Dec 2011	Links with AFBI and CARFE continues across all aspects of Connected. An audit of all links and project work with both AFBI and CAFRE commenced during this quarter. Results will be reported in the New Year. The purpose of this audit is to map exactly those links and transfer of knowledge created as a direct result, complemented and or enhanced as a direct result of Connected.
Year 2	Quarter 4	Jan - Mar 2012	In January 2012 and audit was carried out to map the level of collaborative activities with AFBI and CAFRE. It is anticipated that an audit will be carried out at least once a year to keep track of the range of linkages established through Connected with AFBI and CAFRE. A copy of the first audit report is included in appendix three [of the Progress Report]. In summary, through Connected both universities are collaborating with AFBI and CAFRE. Currently, both SERC and NRC are collaborating but at various levels. The range of collaboration varies and includes; use of facilities, staff training, attendance at events, provision of advice, networking and signposting. All colleges have participated in a Food Technology visit to Loughry College. Connected is working with CAFRE and InvestNI to deliver a "Food for Thought" event at Loughry College on Wednesday 4th April. The event is an energy and waste showcase, and aims to reawaken ideas on energy and waste reduction within business. A morning of presentations will be following by an afternoon of workshops with Knowledge Transfer cutting across all aspects of the day.
Year 3	Quarter 1	Apr - Jun 2012	Connected continues to link with AFBI and CAFRE across its project work. NWRC and Northern Regional College have requested funding for two Sector Specific Projects this year that will directly link them with CAFRE. Both these colleges have not previously collaborated with CAFRE. It is anticipated that these projects, both of which are pilot projects, will support both Internal Knowledge Transfer activities, industry lead curriculum development and industry projects. As highlighted in section 2.2 a one-day 'Food for Thought' – an Energy and Waste showcase, was held at Loughry Campus on the College of Agriculture, Food and Rural Enterprise (CAFRE) in Cookstown. The event was organised by a collaborative team, including Connected, the Department of Agriculture and Rural Development (DARD), Invest Northern Ireland, Department of the Environment (DOE).
Year 3	Quarter 2	Jul - Sep 2012	Connected continues to link with AFBI and CAFRE across its project work. There has been no significant developments with AFBI and CAFRE this quarter but work continues to develop and evolve within the SSPs that have

Year	Quarter	Dates	Notes
			specifically earmarked project work with CAFRE.
Year 3	Quarter 3	Oct - Dec 2012	Connected continues to link with AFBI and CAFRE across its project work. A new pilot SSP introduced by NWRC this year *'Raising the Steaks for Food Processors to Win New Contracts'* has been specifically created to develop links with AFBI and CAFRE. This pilot has achieved a number of successful outputs in a short time frame. In particular, it has created two successful Invest NI Innovation Vouchers with food companies, Donegal Prime Fish and Broightergold. Both Innovation Vouchers generated through this Connected SSP have been handed over to AFBI and CAFRE to deliver on the vouchers. This pilot project will continue for another year and it is hope that if funding for Connected3 is secured it will be mainstreamed with NWRC core profile of Connected SSPs. The Innovation Vouchers generated have been reported against targets, but noted that the income will be received by AFBI and CAFRE.
Year 3	Quarter 4	Jan - Mar 2013	Connected continues to link with AFBI and CAFRE across its project work. The new pilot SSP introduced by NWRC this year *'Raising the Steaks for Food Processors to Win New Contracts'* has been specifically created to develop links with AFBI and CAFRE. To date an InvestNI Innovation Voucher has been signposted to both AFBI and CAFRE as a result of this project.
Year 4	Quarter 1	Apr - Jun 2013	An audit has been issued to all project partners to determine the collaborative links with AFBI and CAFRE that have evolved as a direct result of Connected project staff. The reports of the audit will be issued next quarterly report. A new Sector Specific Project has been approved for delivery, being led by South Eastern Regional College, the project aims to establish links to CAFRE. SERC has identified that it could service the agri-food sector in a more strategic way and wishes to engage with the industry and gather expertise from CAFRE to provide mechatronic business support solutions which will increase the competitiveness of agri-food businesses. Initial contact has been made with CAFRE. The SSP is initially being presented as a one year pilot project.

Source:: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – June 2013)

2.6 Project Management incl Management Committee

Table 2.27: Project Systems and Team Meetings

Year	Quarter	Dates	Notes
Year 1	Quarter 1	Apr- Jun 2010	No relevant information
Year 1	Quarter 2	Jul - Sep 2010	A **Knowledge Transfer Team Meeting** took place in September following the Ministerial launch. A second Knowledge Transfer Team meeting will take place in January 2010 at Loughery College. A date for the next Connected **Management Committee Meeting** has been set for Tuesday 14th December 2010.
Year 1	Quarter 3	Oct - Dec 2010	'The Connected Central Unit's monitoring and recording system should be revised to collect a range of information that enables both the Connected Central Unit and DEL to accurately assess progress against objectives and targets'. The next **Knowledge Transfer Team Meeting (KKTM)** will take place at Loughry College, Wednesday 23rd February 2011. As section 2.7 explains the KTTM is being held at Loughry as part of Connected plans to develop strong links with both AFBI and CAFRE. A Connected **Management Committee Meeting** took place at the University of Ulster Tuesday 14th December 2010. All members of the Committee provided an updated on project work to date. Committee members were all pleased with the excellent progress achieved during the first two quarters of Connected2 year one.. There were no concerns that any area of the project was struggling. The next meeting of the **Steering Committee** will take place at Queen's University on Tuesday 15th March 2011.
Year 1	Quarter 4	Jan - Mar 2011	A **Knowledge Transfer Team meeting** was held at Loughry College on Wednesday 23rd February 2011. The next Knowledge Transfer Team Meeting will take place at South West College Dungannon, 16th May 2011. A Connected **Management Committee Meeting** took place at Queen's University 15th March 2011. All members of the Committee provided an updated on project work to date. There were no issues of concern. The next meeting of the **Management Committee** will take place at College's Northern Ireland, 17th May 2011.
Year 2	Quarter 1	Apr - Jun 2011	A Connected **Knowledge Transfer Team Meeting** was held in South West College Dungannon 16th May 2011. All six Colleges and both Universities attended the meeting. These meetings still prove useful for general networking and project development. Various issues were discussed, including the challenges of Knowledge Transfer, preparing

Year	Quarter	Dates	Notes
			Innovation Voucher applications, forthcoming events and international networking opportunities. The Connected **Management Committee** met at the new Colleges Northern Ireland Premises on the 14th May 2011. All project partners discussed the end of year targets and agreed that project continues to exceed targets and grow in strength. Project partners acknowledged the significant developments across a number of Connected projects and how such projects are "in touch" with market forces. The Committee concluded that Connected projects are both focused on high priority areas yet flexible enough to meet local needs. The next meeting of the Management Committee will take place in September 2011. A presentation of the project's achievement to date was given at **Colleges Northern Ireland annual Board Residential**. All six college Directors and Chairs of the Governing Bodies were delighted to hear how well the project is performing and how all six colleges in collaboration with both Universities are playing a key and significant role through Connected in supporting economic and workforce development
Year 2	Quarter 2	Jul - Sep 2011	The next Connected **Management Committee meeting** with take place at Colleges NI on 26th October 2011. The next Connected HE/FE **Knowledge Transfer Team meeting** will take place at SERC on 23rd November 2011.
Year 2	Quarter 3	Oct - Dec 2011	The latest Connected **Management Committee meeting** took place at Colleges Northern Ireland on 26th October 2011. The latest Connected HE/FE **Knowledge Transfer Team meeting** took at SERC on 23rd November 2011.
Year 2	Quarter 4	Jan - Mar 2012	The latest Connected **Management Committee meeting** took place at the University of Ulster, 10th January 2012. The Connected **Knowledge Transfer Team Meeting** was due to take place at the new BMC e3 building 30th March 2012, but has been rescheduled to 2nd May, due to a delay in the opening of the building. An **Internal HE/FE meeting** took place with Belfast Metropolitan College and Invest NI. This event enables BMC to showcase their areas of expertise, develop contacts within Invest and seek guidance on securing Innovation Vouchers. Two similar meetings have been arranged with InvestNI in May with South Eastern Regional College and South West College. FE colleges have all submitted and had project proposals approved for Connected year three. Proposals include a mixture of SSPs developed from year two and a number of new SSPs have been introduced.
Year 3	Quarter 1	April - June 2012	A **Management Committee Meeting** took place at University of Ulster Coleraine, 25th May 2012. All project partners presented an update. Queen's University was attended by Tom Edgar and Michael McCleave who informed the Committee that for the interim period Michael will be managing the project now on behalf of Queen's. The latest Connected **Knowledge Transfer Team** meeting took place at the new E3 building at Belfast Metropolitan

Year	Quarter	Dates	Notes
			College. This meeting was attended by both Universities and five colleges. North West Regional College did not attend the event. Two **Internal Knowledge Transfer Meetings** took place this quarter. The first involved South Eastern Regional College and Invest NI on the 16th May 2012 the second involved South West College, University of Ulster, Department of Culture Arts and Leisure and Invest NI 29th May 2012. Both of these events enabled project partners to showcase current and new areas of expertise. They facilitated the sharing of knowhow and best practice and opened up new networks and contacts. Opportunities for support and collaboration were explored between all project partners. Invest NI were exceptionally supportive and the meetings were well attended by a diverse range of staff and provided both BMC and SWC guidance on the process for Innovation Vouchers.
Year 3	Quarter 2	Jul - Sep 2012	The next **Management Committee meeting** will take place at Colleges NI on the 3rd October 2012.
Year 3	Quarter 3	Oct - Dec 2012	No information on meetings
Year 3	Quarter 4	Jan - Mar 2013	The latest **team meeting** was held at Colleges NI 12th March 2013. A few issues were raised at this meeting by the Business Development Manager surrounding delivery of SSPs across both Universities. An update on HE SSPs was requested and revised for the forthcoming project year. The main concern being that the majority of SPPs are being led by FE. A follow up meeting to discuss the development of HE SSPs and any proposals for Connected3 was arranged for 25th April 2013.
Year 4	Quarter 1	April - June 2013	The latest **Management Committee meeting** took place at the University of Ulster 25th April 2013. No major issues were raised at this meeting. Project plans for Connected3 were discussed. A follow-up meeting with feedback collated from college directors was requested. This feedback requested by Queen's and University of Ulster, to enable HE Connected plans going forward to be aligned with FE expectations and vice versa. It was suggested that Colleges NI Chief Executive liaise with College Directors and present findings to the Management Committee in the new academic year.

Source:: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – June 2013)

2.7 Customer Relationship Management (CRM)

2.7.1 Development of CRM

Taking forward one of the recommendations of the evaluation for Connected 1, a new CRM system was introduced for Connected 2. Various CRM products were explored with Microsoft Dynamics being favoured across the team. In Year 1 Quarter 1, ANIC and the University of Ulster had recently purchased this software for their core CRM functions. The Connected CRM will sit within these overall systems, as a separate application and managed as such. A tender for the development of the system has been issued and the tender will be awarded in September 2010.

The tender for the Connected 2 CRM system was awarded in September 2010 to Metecplus. The company is Dublin based and is involved in a range of IT with solutions for Northern Ireland's FE sector. Development work on the system was to begin in October 2010 with the final product to be in place in and functional early 2011.

In Year 1 Quarter 3, it was reported that a number of meetings with the company had taken place and the majority of design work completed. The system would be operational by the end of January 2011 and tested in February. During March 2011 the system would be populated with all work carried out during the first year of Connected 2. Project partners would be given full access to the system in April 2011.

By Year 1 Quarter 4, The CRM system had been fully designed and tested. Project partners would be given full access to the site during the first few weeks of the next quarter along with a half day training session. Individual user accounts would be set up for all project staff. Quarterly reports would be submitted through the system by all project partners by the end of June. The system will work further to ensure that all additionality is recorded across the project and that any deadweight is stripped out. This will ensure that development of the project and progress against objectives and targets are accurately assessed.

In Year 2 Quarter 1, Colleges NI reported that all project partners had full access to the new Connected CRM. The system was working well with a few information fields needing adopted. However, these were minor issues and would be resolved over the next quarter. All project partners received training on the site and follow-up training will be delivered as and when needed.

By Year 2 Quarter 2 : it was reported that the CRM system was working well and continued to be updated and developed. Project partners were reporting development ideas for the site and this was being fully encouraged. All six colleges and the University of Ulster have fully integrated the site across all their projects. Queen's University have begun using the site but have not fully

integrated it across all projects. The Connected Business Development Manager will be working with Queen's during the forthcoming quarter to ensure that the site is being fully utilised. The CRM is monitored on a weekly basis at Colleges Northern Ireland enabling management and tracking of projects and collaborative working. The system offers a lot in terms of functionality and integration with all project areas.

Further development of the CRM system has taken place during this Year 2 Quarter 3. Queen's University have begun using the site but two units have yet to fully interact with the system. Additional training has been delivered to the Queen's units and the uptake of the system by these units will be monitored closely until fully utilisation of the site is demonstrated.

By Year 2 Quarter 4, it was reported that the CRM continued to work well and was utilised by all project staff.

Source:: HE-FE Collaboration Fund –Quarterly Progress Reports (April 2010 – June 2013)

2.7.2 Overview of CRM

The Connected CRM system provides a central means of capturing data on all engagements within the Connected 2 Programme. Staff in FE Colleges and HE Institutions all have access to the system (each organisation only has access to its own data) and Colleges NI has access to all of the data on the system. The CRM system allows users to work across the following main tabs

- Organisations
  - New organisations may be added on to the database
- Contacts
  - Contacts details may be added
  - Contacts may be assigned to a "parent" organisation
- Enquiries
  - Allows enquiries to be logged (including nature of enquiry)
  - Organisation and contract details also added
  - As with other entities, there is a Notes tab for recording free format notes. There are also links to Activities and History (to record past and present activities for this particular Enquiry).
- Projects
  - Details of projects that have been approved by Lynn Connaughton are stored

- This data is added centrally by Catherine McCoey
- Users in FE / HE institutions can also add other information
- Project Activity Outputs: this section stores targets and outputs for current or previous funded projects. Outputs are logged by Catherine McCoey and at the end or as staff proceed with projects, they are asked to check them off when completed by entering the year and any relevant comments.
- Project Activity articles: Scope to log and attach articles
- Project External Events: includes Events related to the project, both events attended and events organised (External and Internal Events).
- Project Income: Details of Mini Projects are entered here - Innovation vouchers, Full cost recovery projects & KTP, any projects that bring in an income should be recorded in this area. Details of income should only be completed when income has been received.

• Internal Knowledge Transfers

- When proposal forms are submitted to Lynn Connaughton and approved, these are uploaded by Catherine McCoey.

(Source: Adapted from Connected CRM Training Manual Version One)

2.8 Project Finance

2.8.1 Project Budget – Detailed

Table 2.28: Costs – Business Development Unit

Cost Category	Description	Cost (4 yrs)
Unit Manager	Full-time post, non academic, band 9 point 46	£194,300
Clerical Assistant	Full-time post, non academic , band 4 point 19	£79, 200
Promotional Activities (per Option 4 of Economic Appraisal) = £137K in total	Generic Programme Promotion (to included HE general marketing budget)	£15,000
	Marketing materials development	£13,000
	Promotion merchandise	£6,000
	8 Newsletters	£9,000
	32 Events attended (third party events, conferences, showcase and exhibitions, networking events, seminars)	£20,000
	24 Events delivered	£45,000
	40 Editorial and press articles	£11,500
	Internal marketing development and networking events and resources for sectoral projects	£3,500

Cost Category	Description	Cost (4 yrs)
	4 additional HE/FE Clusters developed, possibly including agri-food and rural enterprise (AFBI and CAFRE)	£4,000
	Creation and development of sector expertise map	£5,000
	Sectoral projects material development	£5,000
Website Development	Will enable recommendation 3 of Connected 1 review to be implemented, that is development of content management system to improve reporting and measurement of impact	£17,300
Programme and International Development	Will enable recommendations of Connected 1 review to be implemented Development of international innovation visits Delivery of Knowledge Transfer Team meetings and development activities. Costs to cover stakeholder management events, i.e. Steering Committee Meetings, Management Committee Meetings, HE/FE industrial staff networking events	£20,000
IT/Office Equipment / Consumables	• For the Business Development Unit (Unit Manager and clerical person) • IT and digital media equipment- £4900 • Office furniture - £1500 • Office and stationary supplies for all stakeholder events and meetings - £4000	£10,400
Knowledge Transfer Project Delivery		
Knowledge Transfer Team (FTE)	Knowledge Transfer Team (FTE)	£1,407,704 (HE) £1,744,050 (FE)
IT/Office Equipment / Consumables	• To cover costs of IT equipment, digital media and specialized software packages.	£25,600
Travel/subsistence	• To cover travel by staff to companies, academic partners and relevant stakeholders (for example industry bodies and support agencies) • Based upon each project team travelling 10,000 miles on average each year, with an applied mileage rate of £0.45 per mile (note this level of mileage is not for individuals but the project team) • Allowing for two overnight stays per year by each staff member.	£37,600
Marketing Budget	• To allow each college £800 per annum to	£19,200

Cost Category	Description	Cost (4 yrs)
for FE Colleges	undertake small once off marketing activities at a local level, targeting local SMEs.	
Internal Knowledge Transfer		
Know-how and best practice acquisition	• To cover the costs of national and international networking visits • Costs based upon 10 international visits including the USA and China. 12 visits to Europe and 12 visits within the UK • Anticipated that such visits will be joint between HE and FE hence costs based on two persons per visit • Funds may also be used to bring international experts to Northern Ireland.	£139,376
Staff training and development / exchanges etc	• To cover cost of formal training which will enhance the ability of university and college staff to engage with businesses in the defined strands of collaboration • Training may be by external consultant or through the partners, where provision is already established, at existing commercial rates • Will also allow for the enrolment of staff on existing qualifications, or modules, in particular those existing within HE • Funding will also cover the costs associated with staff exchanges.	£260,128
Total		**£4,091,858**

Source: DEL Higher and Further Education Collaboration Fund Round 2 Proposal for Collaboration "Connected 2" March 2010

2.8.2 Project Spend - Financial Claims

Table 2.29: QUB Actual vs Estimated Expenditure

Year	Quarter	Dates	Estimate	Actual	Difference
Year 1	Quarter 1	April - June 2010	276	276.37	-0.37
Year 1	Quarter 2	Jul - Sep 2010	85,724	84,806.90	917.1
Year 1	Quarter 3	Oct - Dec 2010	51,000	44,437.39	6562.61
Year 1	Quarter 4	Jan - Mar 2011	51,000	66,695.93	-15695.93
Year 2	Quarter 1	April - June 2011	51,000	46,042.91	4957.09
Year 2	Quarter 2	Jul - Sep 2011	51,000	46,888.38	4111.62
Year 2	Quarter 3	Oct - Dec 2011	51,500	53,346.12	-1846.12

Year	Quarter	Dates	Estimate	Actual	Difference
Year 2	Quarter 4	Jan - Mar 2012	51,500	47,499.19	4000.81
Year 3	Quarter 1	April - June 2012	51,500	50,191.99	1308.01
Year 3	Quarter 2	Jul - Sep 2012	51,500	46,089.03	5410.97
Year 3	Quarter 3	Oct - Dec 2012	52,000	43,900.23	8099.77
Year 3	Quarter 4	Jan - Mar 2013	52,000	50,974.49	1025.51
Year 4	Quarter 1	April - June 2013	52,000	55,721.05	-3721.05
Total (Year 1 to Year 4 Quarter 1)			£652,000.00	£636,869.98	-£15,130.02
Year 4	Quarter 2	Jul - Sep 2013	52,000	n/a	n/a
Year 4	Quarter 3	Oct - Dec 2013	48,000	n/a	n/a
Year 4	Quarter 4	Jan - Mar 2014	48,000	n/a	n/a
Total			£800,000.00	£636,869.98	-£15,130.02

** Refers to the cumulative difference from Year 1 Quarter 1 to Year 4 Quarter 1 inclusive*

Source: DEL Summary of Claims forms

The table above details the estimated and actual expenditure of QUB during Years 1 – 3 and Year 4 Q1 of the Programme. It shows that QUB underspent by £15,130.02 and the largest underspend was in Year 1 Quarter 4 (-£15,695.93). It also illustrates that 97.7% of the budget to date (£652,000) has been spent, which equates to 79.6% of the overall budget.

Table 2.30: UU (incl. ANIC) Actual vs Estimated Expenditure

Year	Quarter	Dates	Estimate	Actual	Difference
Year 1	Quarter 1	April - June 2010	92,180	92,180.26	-0.26
Year 1	Quarter 2	Jul - Sep 2010	167,422	173,274.64	-5,852.64
Year 1	Quarter 3	Oct - Dec 2010	210,116	168,091.77	42,024.23
Year 1	Quarter 4	Jan - Mar 2011	231,656	318,333.13	-86,677.13
Year 2	Quarter 1	April - June 2011	210,116	201,400.73	8,715.27
Year 2	Quarter 2	Jul - Sep 2011	210,754	172,782.08	37,971.92
Year 2	Quarter 3	Oct - Dec 2011	211,072	196,089.87	14,982.13
Year 2	Quarter 4	Jan - Mar 2012	232,612	254,167.71	-21,555.71
Year 3	Quarter 1	April - June 2012	211,072	153,472.77	57,599.23
Year 3	Quarter 2	Jul - Sep 2012	211,726	145,081.05	66,644.95
Year 3	Quarter 3	Oct - Dec 2012	212,052	160,606.44	51,445.56
Year 3	Quarter 4	Jan - Mar 2013	233,592	342,396.59	-108,804.59
Year 4	Quarter 1	April - June 2013	212,052	140,216.23	71,835.77
Total (Year 1 to Year 4 Quarter 1)			£2,646,422.00	£2,518,093.27	-£128,328.73
Year 4	Quarter 2	Jul - Sep 2013	213,057	n/a	n/a

Year	Quarter	Dates	Estimate	Actual	Difference
Year 4	Quarter 3	Oct - Dec 2013	213,057	n/a	n/a
Year 4	Quarter 4	Jan - Mar 2014	219,321	n/a	n/a
Total			£3,291,857.00	£2,518,093.27	£128,328.73*

** Refers to the cumulative difference from Year 1 Quarter 1 to Year 4 Quarter 1 inclusive*

Source: DEL Summary of Claims forms

The table above details the estimated and actual expenditure of UU (Incl. ANIC) during Years 1 – 3 and Year 4 Q1 of the Programme. It shows that UU under spent by £128,328.73 and the largest underspend was in Year 1 Quarter 4 - £86,677.13). It also illustrates that 95.2% of the budget to date (£2,646,422.00) has been spent, which equates to 76.5% of the overall budget.

2.9 NPV – completed projects

Table 2.31 NPV – Completed projects

FE / HE	Name of Company	Connected Contribution to the project	NPV (£k)
Queen's University Belfast	3 Sixty Web Design	100%	104.039
	Action Renewables[78]	-	0.000
	AES Ballylumford[78]	-	0.000
	J P Corry	100%	64.240
	Kellys	100%	24.289
	NPV Langford Lodge	100%	16.060
	AB Pneumatics	8%	274.608
	Canyon Europe	100%	40.980
	Creative Composites	100%	-0.160
	Green Energy	60%	329.380
	Kedco Energy NI	20%	159.527
	Sepha Ltd	25%	240.064
	Ulster Carpet Mills	100%	3.431
	Viltra Waste Water	100%	17.429
	Regen Waste	100%	146.983

[78] QUB / Colleges NI records state Information on potential income benefits not made available and so not possible to declare a NPV for this project

FE / HE	Name of Company	Connected Contribution to the project	NPV (£k)
	Schrader Electronics	100%	7.382
University of Ulster	Just Mobility	Not specified	0.000
	IPT Solar	Not specified	8,578.201
	BJ Foods	Not specified	17.034
	Facilities and Energy Mgt	Not specified	228.979
	Crossen Eng.	Not specified	111,962
	Banah	Not specified	0.000
	Cúnamh ICT	Not specified	381.310
	Opt2Vote	Not specified	0.000
FE	Ashgrove Engineering	100%	2.745
	BlueBuild Energy	100%	478.862
	BO'Hare Contracts	100%	-1.280
	CSA	10%	2,037.520
	FMB	100%	50.795
	Garlester Ltd	100%	46.333
	Holywell	10%	-32.000
	J P Corry	30%	150.540
	Kelly's	100%	80.456
	Montupet	100%	9.701
	Newry and Mourne Carers	100%	57.318
	Omey	100%	0.000
	QPNI	50%	-4.400
	Schrader	100%	11.762
Total	**38 companies**		**125,484.128**

Source: Colleges NI

3 MAPPING OF KNOWLEDGE TRANSFER SUPPORTS IN NI

3.1 DEL, DETI and Invest NI Supports for Knowledge Transfer

3.1.1 DEL – NI HEIF

Table 3.1: DEL – NI HEIF

Aspect of Programme	Detail of Programme
Name of Programme / Support	The Northern Ireland Higher Education Innovation Fund – Round 4 (NI HEIF 4)
Target Group / Eligibility	Queen's University Belfast and the University of Ulster to enable them to support and provide services to businesses (including companies of all sizes) and the wider community, plus to exploit the academic research base through Intellectual Property and spinning out companies.
Purpose / Aims / Objectives	The long term aim of the NI HEIF Programme is to improve Northern Ireland's innovation performance as a key element in raising productivity and delivering economic growth. It is the primary Knowledge Transfer Stream in Northern Ireland providing the core funding for the Universities, business and community facing activities The underlying objective is to encourage Queen's University Belfast and the University of Ulster 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 fund's specific objectives are to: • Release the potential social and economic benefits of the work of NI's universities; • Help the universities to develop their mission in engagement with business and the community; • Ensure a lasting culture shift in the universities by making Knowledge Transfer an integral part of the universities' portfolio of activities; • Develop the responsiveness of the universities to the needs of business; and • Improve the exploitation of the NI science base.

Aspect of Programme	Detail of Programme
	• The key benefits to the universities are: • Creation of a platform to successfully transfer knowledge and technology to businesses, to generate new wealth and to progress towards a knowledge-driven economy; • Recruitment and training of new technology transfer officers and provision of financial assistance to protect intellectual property; • Support for the creation and continuation of links with the community and voluntary sectors and public bodies; and • Networking and interaction between the universities and businesses.
Support Offered	Some of the Support offered through the NI HEIF 4 includes: • Patent Support Services • Licence Support • Use of Facilities and Equipment; • Research Support; • Consultancy Support; • Establishment of Knowledge Transfer Partnerships; • Student work Placements • Knowledge Clubs; and • Marketing and Sales Support. The Programme is delivered through monthly formula driven payments paid out alongside the Universities' Block Grant.
Scale of Support	The budget for the programme amounts to £11.68 million over three years from Academic Year (AY) 2013/14; this is 100% funded by DEL. The funding for NI HEIF 4 consists of two main elements: • 20% - Foundation Funding split equality between the two institutions and focused on strategic / longer term planning; and • 80% Formula funding spilt on the bias of the un-weighted, average performance metrics over the three most recent academic years for which published data is available i.e. AY 09/10, AY 10/11 and AY 11/12. As a condition of DEL funding, both HEIs are required to produce 3 year Institutional KT Strategies plus annual reports against the agreed targets in the KT Strategies.

Aspect of Programme	Detail of Programme
	To date, approximately 1,700 SMEs received Knowledge Transfer Support / services in AY 11/12 according to the HE-BCI.
Impacts and Outputs	The outcomes of this funding are measured (primarily) by the universities' performance in the UK-wide Higher Education – Business and Community Interaction (HE-BCI) survey published annually by HESA. Under the latest survey for AY 11/12, Queen's University's and the University of Ulster's income from business and community interaction was circa £87 million, representing some 2.5% of the UK total - a positive outcome considering the Northern Ireland economy currently represents 2.2% of UK economic output or Gross Value Added and accounts for 2% of full time equivalent academics in the UK.

Source: DEL, HE-BCI

3.1.2DEL – Employer Support Programme 2011/2012 – 2014/2015

Table 3.2: DEL– Employer Support Programme 2011/2012 – 2014/2015

Aspect of Programme	Detail of Programme
Name of Programme / Support	Employer Support Pilot Programme (ESPP) 2011/2012 – 2014/2015
Target Group / Eligibility	The target audience for this programme is as follows: • Principals / Directors of Further Education Colleges; • Chairs of Governing Bodies; • FE College Finance Officers; • College Economic Engagement Officers; and • Inter College Working Group on Economic Engagement Members.
Purpose / Aims / Objectives[79]	The new ESP programme concentrates on the provision of up-skilling to support development and innovation within businesses with less than 50 employees. The Employer Support Programme will focus on: • Supporting colleges in the development of a 3-year strategic plan, comprising projects which will comply with DEL Policies; • Encouraging the development of new and innovative projects, which provide the skills to support MATRIX, Priority Sector Skills for Northern Ireland and any skills market failures; and • Delivering projects which demonstrate Value for Money (VfM) costs and increased collaboration across colleges or by colleges with other stakeholders. The Programme has three key aims. These are as follows: • Improve the FE Sector's responsiveness, capacity and expertise to deliver skills support to companies for R&D and innovation;

[79] Employer Support Programme 2011/2012 – 2014/2015 – Circular Paper Number FE 14/11 – 19th October 2011

Aspect of Programme	Detail of Programme
	• Enhance the FE Sector's ability to provide support to industry, particularly in priority sectors; and • Support entrepreneurial activity in companies in priority areas. The Programme's Objectives include: • Address internal skills gaps within participating companies; • Encourage entry into developing / new markets; • Improve processes within participating businesses; • Increase entrepreneurial activity in participating businesses; • Improve customer services within participating businesses; and • Increase participating companies' competitiveness.
Support Offered	Revised programme provides upskilling to SMEs/micro-business to support development & innovation only A Proposal had to be submitted to DEL. There was a two stage approach to proposal submission: • Stage 1 - Proposals for year 1 of the ESP were to exclusively focus on continuing the best practice FE exemplars identified in the evaluation, namely: InnoTech Centre, carbon Zero NI, Advancing Enterprise and Open Source Solution Centre. - All the project were to be sector wide and include proposals for sustainability through the introduction of charging policies based on clients' ability to pay for projects and services - Year 1 proposals were to be comprehensive and include information on: > Rationale; > Sustainability; > Delivery Mechanisms; > Targets and Outcomes; > Measurable Impacts; > Stakeholder Engagement; and > Budget. • Stage 2 - For the remaining three year period of the programme (financial years 2012/13 – 2014/15) a sector wide 3-year strategic

Aspect of Programme	Detail of Programme
	plan was to be developed in conjunction with local stakeholders. - All proposals should > Focus Specifically on providing the skills to support MATRIX, Priority Skills for NI, STEM or any skills market failures in the colleges' own regions or areas; > Aim to meet companies' needs; and > Be designed to become self-sustaining, with funding allocated on a tapered basis through the introduction of charging policies, based on clients' ability to pay for projects / services.
Scale of Support	The Department has been allocated £6.9million funding through the recent Comprehensive Spending Review (CSR) to fund the Employer Support Programme (2011/12 approximately £1.2m, 2012/13 £1.8m, 2013/14 £1.9m and 2014/15 £2m) The budgetary figures beyond 2011/2012 are projects only and may be subject to significant change / revision dependent on the Department meeting its wider pressures going forward over the next four years. As calls for first proposal were only made in 2011/2012 there is no data available on the scale of the support provided so far. This will be available after the evaluation of the programme is completed.

Source: Evaluation of Innovation Fund – Employer Support Pilot Programme (RSM McClure Watters, 2011), DEL

3.1.3 EU Framework (HORIZON 2020) and DEL, DETI supports to access Horizon 2020 funding

Table 3.3: EU Framework - Horizon 2020

Aspect of Programme	Detail of Programme
Name of Programme / Support	EU Framework (HORIZON 2020) and DEL, DETI supports to access Horizon 2020 funding
Target Group / Eligibility [80]	Geographic Focus The following participants are eligible for funding: • Any legal entity established in a Member State or associated country, or created under Union law; • Any international European interest organisation; and • Any legal entity established in a third country identified in the work programme.
Purpose / Aims / Objectives	Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Running from 2014 to 2020 with a €70 billion budget, the EU's new programme for research and innovation is part of the drive to create new growth and jobs in Europe. It will combine all research and innovation funding currently provided through the Framework Programmes for Research and Technical Development, the innovation related activities of the Competitiveness and Innovation Framework Programme (CIP) and the European Institute of Innovation and Technology (EIT). Horizon 2020 will **tackle societal challenges by helping to bridge the gap between research and the market** by, for example, helping innovative enterprise to develop their technological breakthroughs into viable products with real commercial potential. This

[80] http://www.instm.it/test_new_version/allegati/instm/Rules_for_Participation.pdf

Aspect of Programme	Detail of Programme
	market-driven approach will include **creating partnerships with the private sector and Member States to bring together the resources needed**[81]. Horizon 2020 will raise the level of excellence in Europe's science base and ensure a steady stream of world-class research to secure Europe's long-term competitiveness. It will support the best ideas, develop talent within Europe, provide researchers with access to priority research infrastructure, and make Europe an attractive location for the world's best researchers. Horizon 2020 will: • support the most talented and creative individuals and their teams to carry out frontier research of the highest quality by building on the success of the European Research Council (ERC); • fund collaborative research to open up new and promising fields of research and innovation through support for Future and Emerging Technologies (FET); • provide researchers with excellent training and career development opportunities through the Marie Curie Actions; and • ensure Europe has world-class research infrastructures (including e-infrastructures) accessible to all researchers in Europe and beyond[82]. Horizon 2020 will have a **strong focus on developing European industrial capabilities in Key Enabling Technologies (KETs)** with a budget of € 5894 million in constant 2011 prices. These include: • Micro- and nano-electronics; photonics; • Nanotechnologies; • Advanced materials; • BIO; • Advanced manufacturing and processing; and • Development of these technologies requires a multi-disciplinary, knowledge and capital-intensive approach[83]. Horizon 2020 reflects the policy priorities of the Europe 2020 strategy and addresses major concerns shared by citizens in Europe and elsewhere. A **challenge-based approach will bring together resources and knowledge across different fields, technologies and**

[81] http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=h2020
[82] http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=excellent-science
[83] http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=competitive-industry

Aspect of Programme	Detail of Programme
	disciplines, including social sciences and the humanities. This will cover activities from research to market with a new focus on innovation-related activities, such as piloting, demonstration, test-beds, and support for public procurement and market uptake. It will include **establishing links with the activities of the European Innovation Partnerships (EIP)**. Funding will be focussed on the following challenges: • Health, demographic change and wellbeing; • Food security, sustainable agriculture, marine and maritime research, and the bio-economy; • Secure, clean and efficient energy; • Smart, green and integrated transport; • Inclusive, innovative and secure societies; and • Climate action, resource efficiency and raw materials84
Support Offered	The DETI have developed a Northern Ireland Action Plan to secure funding under the Horizon 2020 Initiative. Within this action plan they have identified ten key actions: • Creation of an NI Horizon 2020 Contact Point (NICP) network (jointly funded by DEL / DETI / DARD) • Development of a Horizon 2020 communications strategy • Development of an NI Horizon 2020 website • Development of an NI specific guide to Horizon 2020 • Appointment of an NICP with specific responsibility for SMEs (based in Invest NI) • Organise at least 10 Horizon 2020 workshops • Increase the number of Horizon 2020 evaluators from NI • Examine the feasibility of establishing an alternative funding mechanism(s) for organisations not currently eligible for application support • Increase NI representation on EU groups/committees • Development of strategies to increase European Research Council (ERC) and Marie Curie funding • Production of a report on FP7 performance to date

[84] http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=better-society

Aspect of Programme	Detail of Programme
Scale of Support[85]	First **calls for proposals** will be 1/1/2014. The proposed support for research and innovation under Horizon 2020 will: • Strengthen the EU's position in science with a dedicated budget of €24,341 million. This will provide a boost to top-level research in Europe, including the very successful European Research Council (ERC); • Strengthen industrial leadership in innovation with a budget of €17,015 million. This includes major investment in key technologies, greater access to capital and support for SMEs; and Provide €30.956 million to help address major concerns shared by all Europeans such as climate change, developing sustainable transport and mobility, making renewable energy more affordable, ensuring food safety and security, or coping with the challenge of an ageing population.
Impacts and Outputs	This major European Strategy has not officially commenced yet so there is currently no impact or output assessments completed.

Source: Horizon 2020 Website, Horizon 2020: Northern Ireland Action Plan (Department of Enterprise, Trade and Investment)

[85] http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=h2020

3.1.4 Knowledge Transfer Partnerships (KTP)

Table 3.4: Knowledge Transfer Partnership (KTP)

Aspect of Programme	Detail of Programme
Name of Programme / Support	Knowledge Transfer Partnerships (KTPs)
Target Group / Eligibility	KTPs are open to all businesses in the UK although, in NI, companies of all sizes across all industry sectors can participate. The Invest NI's criteria for a sKTP application are more stringent: sKTPs are only open to micro-organisations and SMEs (although the TSB has now indicated that it will sponsor large companies for sKTPs in NI). In addition, the following criteria[86] apply to Northern Ireland sKTPs: • "The project must provide the Associate with an intellectually challenging learning experience appropriate to his/her background and experience. • If training costs are submitted there must be a clear and appropriate training plan for the Associate. • There must be an appropriate level of company support and academic support available to the Associate. • The potential outcomes/benefits for all partners will not occur to the same extent without the shorter-KTP (additionality). • The company partner must be regarded as being financially stable based upon their latest annual accounts. • The company partner must be an Invest NI client, or have the potential to become an Invest NI Client. • The company partner must be an SME and capable of exploiting the knowledge skills or technology to be transferred. • The proposed project must aim to meet specific needs or solve an identified problem of tactical importance to the company. • There must be a clear need for the knowledge, skills or technology input from the knowledge base to the proposed project. • There must be evidence of commitment to the proposed project by the Knowledge Base and the company. • There must be clear benefits for the Knowledge Base partner including target outcomes. • The stated potential benefits for the Knowledge Base and the Company partners are likely to accrue".

[86] source: Invest NI website – document entitled: Northern Ireland Criteria for Shorter KTP

Aspect of Programme	Detail of Programme
	The Evaluation of the Higher and Further Education Collaboration Fund, Final Report (September 2009) noted that: "Invest NI anticipates that sKTPs will appeal to the FE sector as they are easier to manage than Classic KTPs, and facilitate the delivery of 'short – sharp' tactical projects that are more aligned to FE delivery. However to date uptake and interest in sKTPs has been slower than anticipated with only one sKTP currently operational in Northern Ireland (Queen's University)."
Purpose / Aims / Objective	Knowledge Transfer Partnerships (KTP) is a UK-wide graduate placement programme that encourages collaboration between businesses (company partners) and academic institutes (knowledge base partners) including higher education institutes, further education institutes, research and technology organisations and public sector research institutes. Under a KTP each partnership employs one or more recent graduates, called Associates, for a period of up to three years (therefore also includes the 10-40 weeks of shorter KTPs) on a project that will transfer knowledge from the higher and further education sectors into business. KTPs have become an important part of the Northern Ireland regional innovation system and culture. KTPs are particularly important in a region where there are few firms of sufficient scale to maintain their own, independent research and development capability. Invest NI is also piloting short KTPs (sKTP – known throughout the sector as shorter KTPs). sKTPs are designed to be more flexible than Classic KTPs and assist small firms who may not have worked with higher or further education institutes before. sKTPs were launched in Northern Ireland in November 2008 with the first call for applications in January 2009. They are operating as a three year pilot initiative in Northern Ireland although they have gone live in the rest of the UK. The aim of KTP is to facilitate the transfer of skills, knowledge and technology from knowledge bases to businesses in order to improve productivity and competitiveness. The overall aim of sKTPs is to encourage more innovation in SMEs in Northern Ireland. It is hoped that sKTPs will build capacity within the company and increase the uptake of classic KTPs. sKTPs have a short-term tactical focus, compared to the classic KTP (which is strategic), and are shorter in duration lasting between 10 to 40 weeks.
Support Offered	KTPs are part financed by a government grant made to the Knowledge Base. The size of the grant depends on the size of the company and how many KTP associates are employed. A SME participating in a KTP for the first time will typically contribute 40% of the project costs, which is on average £17,000 - £31,000 per annum (these figures are specific to NI), depending on which Knowledge Base partner is involved in the project. The proposed project should be of either strategic or tactical importance to the company partner and clearly demonstrate the potential to

Aspect of Programme	Detail of Programme
	improve productivity and competitiveness. (Depending on whether the project is of strategic or tactical importance, either a KTP or a SKTP is adopted.) Projects are assessed against the following criteria[87]: • Relevance to the strategic plans of the business; • Demonstration of a clear need for the knowledge or skills of the knowledge base; • Intellectual stimulation for the Associate; • Academic Benefits; • Demonstration that the company partner is financially sound; and • Potential to be an Invest NI client. Any business can approach a Knowledge Base (this may have a KTP office or a specific individual within the organisation – all NI Knowledge Bases have at least one person who is responsible for KTP) - or they may approach Invest NI who can refer them to the appropriate contact - to discuss the feasibility of its project idea. If the Knowledge Base's academics don't have the skills to match the project, they may refer the company to another potential Knowledge Base partner that does. Once a prospective knowledge base partner is identified, the Partnership Proposal Form and Grant Application are jointly completed. The Proposal is submitted for consideration. If successful, a Grant Offer Letter is issued on behalf of the Technology Strategy Board to the knowledge base partner with a copy going to the Company Partner. Both Partners are responsible for recruiting the KTP Associate(s) who is the individual responsible for carrying out the work. The Associate's contract is with the knowledge base partner but they are based at the company's premises for the duration of the project (and therefore are working under the terms and conditions of the Company.). Each KTP is bespoke to the company partner's needs and can range in duration from 10 to 40 weeks to 1 to 3 years. Two KTP Advisers operate in Northern Ireland - the Advisers act as project champions and are there to provide advice and guide the process; they also represent government to ensure appropriate use of funding. They work closely with invest NI Client Executive & Client Managers to identify good KTP projects. Over the past 12 months 70% of KTP projects originated through a referral from an Invest NI company contact.
Scale of Support	KTP is funded by some 21 sponsors representing Research Councils, Research Development Agencies and Devolved Administrations led by the Technology Strategy Board (an executive non-departmental public body of BIS). Invest NI commits up to £1m per annum to part fund

[87] Invest NI (January 2007): Knowledge Transfer Partnership brochure.

Aspect of Programme	Detail of Programme

KTP projects in Northern Ireland. KTPs are part-funded (60% for SMEs) by a Government grant (Invest NI pay up to 50%, another funder pays the remainder. This other funder may be a government funder and depending on the project there may be more sponsors, for instance the Research Councils may also part sponsor a project.). The remaining cost (40%) involved is covered by the company partner.

KTP activity in Northern Ireland, Scotland and Wales (i.e. the devolved administrations) is, in part, supported by the funding provided by Invest Northern Ireland, the Scottish Government and the Welsh Assembly Government respectively. At the end of the 2011/12 year, the UK Knowledge Transfer Partnerships portfolio comprised 845 Partnerships, facilitating the exchange of knowledge between the UK knowledge base and business (see Table 3.4.1). Despite the recession, portfolio numbers have been maintained.

Northern Ireland is particularly successful in initiating KTPs, representing 6% of the UK's total KTPs, well above its share of UK GDP.

Table 3.4.1 Geographic distribution of businesses participating in Knowledge Transfer Partnerships (2005 - 2012)

At March...	Total KTPs (No.)	England (%)	Scotland (%)	Wales (%)	NI (%)
2005	858	75%	11%	9%	6%
2006	1002	74%	11%	10%	6%
2007	1048	74%	12%	8%	6%
2008	975	73%	13%	7%	7%
2009	977	72%	12%	10%	7%
2010	1055	75%	12%	7%	6%
2011	1025	78%	10%	7%	5%
2012	845	74%	12%	8%	6%

Source: KTP Annual Reports (2008-2012) .

<table>
<tr><th>Aspect of Programme</th><th>Detail of Programme</th></tr>
<tr><td></td><td>
Invest NI has indicated that KTPs are primarily taken up by the HE sector (split 84% HE KTPs and 16% FE KTPs). Table 3.4.2 shows the number of active KTPs in Queen's University Belfast, University of Ulster and FE Colleges at 31 September 2013. Queen's University Belfast has almost four fifths (78%) of all active KTPs while the University of Ulster is responsible for one fifth (20%). One of the FE Colleges is currently engaged in KTPs, accounting for 2% of the NI total.

Table 3.4.2 Active KTPs in NI by Knowledge Provider (September 2013)
<table>
<tr><th>Knowledge Provider</th><th>Frequency</th><th>Percentage</th></tr>
<tr><td>Queen's University Belfast</td><td>32</td><td>78%</td></tr>
<tr><td>University of Ulster</td><td>8</td><td>20%</td></tr>
<tr><td>Belfast Metropolitan College (BMC)</td><td>0</td><td>0%</td></tr>
<tr><td>Southern Regional College (SRC)</td><td>0</td><td>0%</td></tr>
<tr><td>South Eastern Regional College (SERC)</td><td>0</td><td>0%</td></tr>
<tr><td>South West College (SWC)</td><td>1</td><td>2%</td></tr>
<tr><td>Total</td><td>41</td><td>100%</td></tr>
<tr><td colspan="3">Source: www.ktponline.org.uk – Quarterly Statistical Report on Current KTPs (September 2013)</td></tr>
</table>
In NI, KTP projects are funded jointly by TSB and Invest NI. In the main, the funding split is generally a 50:50 split. In some cases, if a project does not meet with invest NI eligibility criteria, the TSB (or one of the UK Research Councils) may fund the project @ 100% of the Government contribution). At no point was there ever no funding available for NI KTP projects. Over the period of the recent review, Invest NI had reached agreement that the TSB would solely fund all projects (in the absence of Invest NI match funding)
</td></tr>
<tr><td>Impacts and Outputs</td><td>
It is difficult to calculate the outputs from KTP as the projects vary to such a degree. The information shows that, on average, the benefits a company partner can expect to gain from a KTP are:

An increase of over £220,000 in annual profits before tax;
The creation of three genuine new jobs;
An increase in skills of existing staff;

</td></tr>
</table>

Aspect of Programme	Detail of Programme
	• The creation of a long-term strategic relationship with the higher/further education sectors; and • The fostering of a culture of innovation within the company. The graduate employed on the project gains business-based experience and skills. A more tangible output can be a professional qualification related to the subject area in which they work. An Associate typically spends 10% of his/her time in training and personal development. During the duration of the project they complete an Associate Development Course and are given the opportunity to complete a Level 5 Diploma in Management & Leadership. They are also given a personal training budget of £2,000 to manage and can decide in which courses to enrol, subject to agreement from all partners. In the 2009 Evaluation of the Connected Programme carried out by FGS McClure Watters it was reported that Connected had successfully supported the development of three joint KTPs involving FE leads, these where the first ever FE led KTPs in Northern Ireland. (2 SRC and 1 BMC).

Source: Evaluation of HEIF2 (RSM McClure Watters, 2010), KTP website and Invest NI

3.1.5 Invest NI - Innovation Vouchers Initiative

Table 3.5: Invest NI - Innovation Vouchers Initiative

Aspect of Programme	Detail of Programme
Name of Programme / Support	Invest NI Innovation Vouchers Initiative
Target Group / Eligibility	The Initiative is available to all registered small enterprises in Northern Ireland and the Republic of Ireland (excluding those in the transportation and agricultural sectors in line with specific State Aid guidelines). For this purpose, a small enterprise is defined as a company or (if part of a group) a group of companies where the total number of full-time employees in the company (or the entire group) is less than 50 and has either an annual turnover and/or an annual Balance Sheet total not exceeding €10m. Sole traders and Partnerships cannot apply. An enterprise can only have one 'active' voucher at any one time. Enterprises can apply for up to three vouchers for different projects. A 2nd or 3rd voucher can be applied for once the previous project is completed and the voucher has been redeemed. The level of assistance varies for each voucher: • 1st voucher (£4000) - The company pays the VAT associated with the project and any project costs which exceed the voucher value (of £4000). - A first voucher is intended to stimulate a new collaboration with the knowledge base and therefore a 1st voucher cannot be awarded if the business has worked with a specific department of any Knowledge Provider before on a formal knowledge transfer project. • 2nd voucher (£4000) - The company pays the VAT associated with the project and any project costs which exceed the voucher value (of £4000). - If the company uses the same individual Knowledge Provider as used for the 1st voucher then the voucher is worth 90% up to a maximum of £4000 of the project cost and the company must contribute 10% of the cost and the VAT. • 3rd voucher (£4000)

<table>
<tr><th>Aspect of Programme</th><th>Detail of Programme</th></tr>
<tr><td></td><td>- The voucher is worth 80% up to a maximum of £4000 of the project cost and the company must contribute 20% of the cost and all of the VAT.</td></tr>
<tr><td>Purpose / Aims / Objective</td><td>The Innovation Voucher Initiative is jointly administered by Invest Northern Ireland and Enterprise Ireland. The Initiative was launched in May 2008 based on the recognition that the level of innovation in small businesses in Northern Ireland was relatively low in comparison with other regions. On this basis, Invest NI decided to test a form of motivation to get small enterprises (i.e. those with less than 50 employees and under £10m on their balance sheet) to engage in innovation and R&D.
The Initiative provides a voucher of up to £4,000 for small enterprises to access expertise from knowledge providers (academic institutes such as universities, FE colleges or publically funded research organisations) in Northern Ireland and the Republic of Ireland.
The initiative is managed by Invest NI in conjunction with Enterprise Ireland allowing access to 38 knowledge providers throughout Ireland. The budget over the period between October 2009 and March 2012 is £2.7 million.
The aim of the Innovation Vouchers Initiative is to encourage Knowledge Transfer between the knowledge provider and the small enterprise in order to solve knowledge problems and encourage innovation.</td></tr>
<tr><td>Support Offered</td><td>Small enterprises can apply for Innovation Vouchers up to a value of £4,000 (or €5,000 if they choose a knowledge provider in the Republic of Ireland). An additional £1,200 is given to the provider to cover overheads (use of equipment, electricity, admin etc.).
The vouchers can only be redeemed against work activities that are eligible under the initiative and provided by any of the 10 approved knowledge providers in NI or the 28 knowledge providers in the Republic of Ireland. Table 3.5.1 details eligible and ineligible activities:
Table 3.5.1 Innovation Voucher Initiative – Eligible & Ineligible Activities
<table>
<tr><th>Eligible activities</th><th>Ineligible activities</th></tr>
<tr><td>Innovation or technology audits with your business</td><td>Achieving compliance with statutory regulations or legislation</td></tr>
<tr><td>Tailored training in innovation management</td><td>Standard training courses</td></tr>
<tr><td>New business model development</td><td>Software purchases and software development</td></tr>
<tr><td>New service delivery and customer interface</td><td>Aid that would promote/subsidise the cost of exports</td></tr>
<tr><td>New service development</td><td>Internships for students of knowledge institutions</td></tr>
</table></td></tr>
</table>

Aspect of Programme	Detail of Programme
	Product and service testing and economic impact assessment / Design and production of advertising material Efficiency audits and process change / Sales activities Supply chain management and logistics / Website development and online optimisation Business plans and economic appraisals Activities that might be supported by other Invest NI mainstream support mechanisms Source: Invest NI
Process of Delivery	Small enterprises access either a word version of the application form or an online application from at: www.innovationvouchers.com / www.innovationvouchers.ie and are issued with a £4,000/€5,000 Innovation Voucher if successful. All projects are assessed by an independent panel, following a call for applications. Upon finding a suitable Knowledge Partner, the work plan is agreed and the project must be completed a minimum of six weeks before the Voucher expiry date. Upon completion, the Knowledge Provider is given the Voucher in lieu of payment. If the project costs exceed the Voucher value, the small enterprise must pay the remaining amount in addition to the VAT on the entire project cost.
Scale of Support, Impacts and Outputs	Since October 2009, Innovation Vouchers have been issued to 927 companies.[88] The University of Ulster is the largest provider of Innovation Vouchers in Northern Ireland having delivered over 300 projects.[89]

Source: Invest NI and Innovation Vouchers website

[88] http://www.innovationvouchers.com/vouchers_awarded.asp
[89] http://oi.ulster.ac.uk/information-for-business/support-for-business/innovation-vouchers

3.1.6 Invest NI - Technical Advisory Unit

Table 3.6: Invest NI - Technical Advisory Unit

Aspect of Programme	Detail of Programme
Name of Programme / Support	Technical Advisory Unit
Target Group / Eligibility	Invest NI's advisory support is open to all businesses in Northern Ireland regardless of size. If appropriate the advisory team may signpost companies to other supports provided by Invest NI.
Purpose / Aims / Objective	The Technical Advisory Unit (TAU) provides a range of free advice and services to help businesses solve technical, energy and environmental problems. The unit also provides support for implementing best practice in these areas to help businesses achieve sustainable development. Assistance and advice from TAU will enable you to: • Meet regulatory responsibilities in environmental issues, product registration and health and safety; • Be aware of intellectual property, patents and trademark needs for products and processes; • Keep up to date with European and British Standards; • Understand innovative product and process development; and • Benefit from engineering assistance, including in the areas of CE marking, failure analysis and corrosion investigations.
Support Offered	The Invest NI Technical Advisory Unit offer support to companies in the following areas: • Engineering and manufacturing including materials selection, technical requirements, product testing, approval and performance • Production line including raw materials, quality control, packaging, regulation and compliance • Technical information - industrial and manufacturing standards • Health and safety - legislation, risk assessments, control measures • CE Marking • Quality management systems

Aspect of Programme	Detail of Programme
	• Building commercial, technical and R&D partnerships across Europe • R&D funding opportunities in the UK and European Union • Environment - regulation, compliance and resource efficiency processes. The unit can also organise a technical audit, which is a health check on a company's energy, environment and resource efficiency. In addition, the TAU also run seminars and events in conjunction with the UK Intellectual Property Office, The British Library and The European Patent Office. They have three such events scheduled for 2013.
Funding	The Technical Advisor Unit does not provide any funding directly to companies. The unit is a source of advice and guidance for companies. However if the advisors believe a company is applicable for further Invest NI support including financial support they will sign post them to this support.

Source: Invest NI Website

3.1.7 Invest NI – Design Service

Table 3.7: Invest NI – Design Service

Aspect of Programme	Detail of Programme
Name of Programme / Support	Design Service
Target Group / Eligibility [90]	The Design Services offered are available to companies in Northern Ireland that meet the following criteria: The applicant business must show that it intends to sell outside Northern Ireland, that it is actively pursuing growth plans and will contribute to increasing productivity and innovation in Northern Ireland. Because Invest NI resources are limited they must use them to support those businesses that can make the biggest contribution to the economy. Currently the criteria for qualifying for financial support are: A company will need to demonstrate that now, or over the next three years, your business will have: • Total sales of over £100,000 per year; and • Sales outside Northern Ireland greater than 25 per cent of turnover, or greater than £250,000 a year. Companies in the tradeable services sector, that is, those that can sell their services internationally, must also: • 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 per cent.
Purpose / Aims / Objective [91]	Invest Northern Ireland's Design Service aims to help companies access design expertise to make their business more competitive. While design can be used to improve many product characteristics, and many aspects of a business's operations, some key themes continue to emerge when companies are asked about the benefits of design. These include: • Product development makes products more competitive. It keeps production costs down but allows higher prices to be passed onto the customer. • Effective design keeps your customer satisfied and encourages them to recommend the products or services to others.

[90] http://www.investni.com/index/about/what_we_do/qualifying_for_financial_support.htm
[91] http://www.investni.com/design_service.pdf

Aspect of Programme	Detail of Programme
	• A strong brand identity delivered through effective design provides a consistent message to the customer about your business.
Support Offered[92]	The Design Service consists of: • **Design Clinics** - free design advice clinics held throughout Northern Ireland and open to all businesses. • **Design Advice Service (DAS)** - free advice service open to all Invest NI clients. • **Mini Design Development Programme (Mini DDP)** - expert design support for small-scale and group projects. • **Main Design Development Programme (Main DDP)** - expert design support for larger scale projects. • **Design Manager Resource (DMR)** - expert Design Managers are placed in businesses over the medium term (usually 6-24 months) to facilitate senior management teams to shape new directions and encourage fresh thinking to stimulate innovation activity throughout the business. • If the company meets the criteria listed above then it may also avail of the following: - Three days of specialist consultancy from a design consultant who will work with your business on a small-scale project. The company will be charged a fee of £250 for these small-scale consultancy projects which also include workshops and networking opportunities. - Seven days of consultancy from an experienced design consultant to help your business develop concepts based around your design need. This support includes interactive sessions, a mid-term review, a residential session, a final exhibition of work and a six-month evaluation review. However the company will be charged a fee of £500 for these larger scale consultancy projects.
Funding	The Design Services Programme offers companies free advice through the Design Clinics. However other forms of advice are only available to Invest NI Client Companies. For some of the supports a fee is charged to the company.
Scale of Support	In the Evaluation conducted by FGS McClure Watters in 2011 the scale of the programme was reported as: • The Programme held 78 Awareness Events / Sector Based Presentations; • The Programme conducted 27 Case Studies demonstrating how businesses who have participated have gained added value benefits • The Programme held 892 Design Advisory Visits including DAS, Clinics and Awareness Events;

[92] http://www.investni.com/design_service.pdf

Aspect of Programme	Detail of Programme
	• The Programme provided expert design support via the Mini DDP and the Main DDP to 305 companies; • The Programme generated £124,000.
Impacts and Outputs	As part of the 2011 evaluation a consultation was conducted with participant companies. During the period of this evaluation (September 2008 – December 2010), the most common economic impacts cited by participating companies were: • For around one third of companies surveyed: new sales (33%); improved skills levels (32%); entry into new markets (31%); • For around one quarter of companies surveyed: existing jobs safeguarded (26%); increased overall value of the company (26%); existing sales retained (25%); and • For around one fifth of companies surveyed: improved management skills (22%) and achieved new quality standards (19%). Where possible, respondents have quantified these economic impacts as follows • **New Jobs created**: 10 respondents specified 14 new jobs created: • **Existing Jobs safeguarded**: 24 respondents specified 218 existing jobs safeguarded: • **New sales**: 17 respondents specified £3,607,500 new sales: • **Existing sales retained / safeguarded**: 8 respondents specified sales retained of £4,940,000; • **Cost savings achieved**: 5 respondents' specified savings – those which were quantified amounted to £14,000; other responses included: halved running costs and 5-7%.

Source: Invest NI Website, Evaluation of the Invest Northern Ireland Design Service FGS McClure Watters 2011

3.1.8 Invest NI – Grant for R&D

Table 3.8: Invest NI – Grant for R&D

Aspect of Programme	Detail of Programme
Name of Programme / Support	Grant for R&D programme.
Target Group / Eligibility	The Suite of Research and Development supports is offered to companies in Northern Ireland that meet the following criteria: The applicant business must show that it intends to sell outside Northern Ireland, that it is actively pursuing growth plans and will contribute to increasing productivity and innovation in Northern Ireland. Because Invest NI resources are limited they must use them to support those businesses that can make the biggest contribution to the economy. Currently the criteria for qualifying for financial support are: A company will need to demonstrate that now, or over the next three years, your business will have: • Total sales of over £100,000 per year; and • Sales outside Northern Ireland greater than 25 per cent of turnover, or greater than £250,000 a year. • Companies in the tradeable services sector, that is, those that can sell their services internationally, must also: • 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 per cent.
Purpose / Aims / Objective[Error! ookmark not defined.]	The purpose of the support available is to encourage NI business to undertake R&D to help differentiate them from the competition and retain their market share. Invest NI's **Grant for R&D** can provide assistance to support:[93] • **Industrial Research:** Planned research to acquire new knowledge and skills to develop new (or significantly improve existing) products, processes or services (excluding prototypes); and • **Experimental Development:** Existing knowledge/skills used to plan/design new or improved products, processes or services.

[93] http://www.qub.ac.uk/directorates/EnterpriseDevelopment/ConsultancyServices/FinancialsupportavailableforRDprojectswithNICompanies/

Aspect of Programme	Detail of Programme
Support Offered	For companies new to R&D Invest NI offer support to: • Investigate or plan the innovative idea; • Make and test a prototype; • Experiment and refine the design; and • Define Intellectual property costs. A grant is also available to companies who meet the criteria of up to £50,000 towards the R&D project. For companies who have undertaken R&D Projects before Invest NI: • Run workshops on issues related to research and development. • Can signpost you to other sources of advice and assistance. • Offer one-to-one advice on planning an R&D project. Invest NI may also be able to 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
Funding	The Invest NI Corporate Plan 2011-2015[94] identifies 6 key drivers of economic growth. The first is 'Stimulating Innovation and Creativity' and includes R&D grants. The allocated budget for this element is £166.6m.
Scale of Support	The Boosting Business through R&D support for SMEs Scheme provides up to a maximum of £50,000 assistance for R&D projects – based on a maximum grant rate of 45% or 75%[95] of agreed and eligible project costs.[96]

[94] http://www.investni.com/corporate_plan_2011-2015.pdf
[95] The 75% support rate applies only to 'New to R&D' companies – i.e. those companies who have not received assistance through Invest NI's R&D programmes in the past five years and have not exceeded the de minimis aid ceiling of €200k. **Note**: Up to three applications will be considered from the same company in any 12 month period (n.b.

Aspect of Programme	Detail of Programme
Impacts and Outputs	The corporate plan highlights the following aspirational targets for the 'Stimulating Innovation and Creativity' driver: • Provide a continuum of support from building innovation readiness to global Centres of Competence. • Secure £300 million investment in R&D (with at least 20% from SMEs). • Support 500 businesses to engage in first time R&D and 120 Collaborative R&D projects. • 1,200 businesses to complete Design Programme and a further 200 to undertake strategic design interventions. • Support 40 Proof of Concept projects (University based). • Deliver 800 Innovation Vouchers. • Support 600 e-business projects to assist SMEs to increase innovation & productivity through implementation of appropriate ICT. • Support SMEs to identify £60 million of resource and waste prevention savings.

Source: Invest NI Website.

where a company hasn't received Invest NI R&D support in previous five years, only the first project submitted will be eligible under the "New to R&D" support category (i.e. up to max 75%), subsequent projects will be eligible for support up to maximum of 45%

[96] Boosting Business through R&D support for SMEs Application Guidance Notes

3.1.9 Invest NI – Framework Mentoring Scheme (FP7)

Table 3.9: Invest NI – Framework Mentoring Scheme (FP7)

Aspect of Programme	Detail of Programme
Name of Programme / Support	Invest NI – Framework Mentoring Scheme (FP7)
Target Group / Eligibility	Businesses and University Researchers seeking to access FP7 funding
Purpose / Aims / Objective[97]	FP7 is the short name for the Seventh Framework Programme for Research and Technological Development. This is the EU's main instrument for funding research in Europe and it will run from 2007 to 2013. The EC budget for these seven years is €50.5 billion and the Euratom budget for the next five years is €2.7 billion. Overall, this represents a 41% increase from FP6 at 2004 prices and 63% at current prices. FP7 is made up of 4 main blocks of activities forming 4 specific programmes: **Cooperation** - Collaborative research • Health • Food, Agriculture and Biotechnology • Information and Communication Technologies • Nano-sciences, Nanotechnologies, Materials and new Production Technologies • Energy • Environment (including climate change) • Transport (including Aeronautics) • Socio-economic sciences and Humanities

[97] http://ec.europa.eu/research/fp7/pdf/fp7-factsheets_en.pdf

Aspect of Programme	Detail of Programme
	• Security • Space **Ideas** - European Research Council • Frontier research actions **People** - Human Potential, Marie Curie actions • Initial training of researchers - Marie Curie Networks • Life-long training and career development - Individual fellowships • Industry-academia pathways and partnerships • International dimension - outgoing and incoming fellowships, international cooperation scheme, reintegration grants • Excellence Awards **Capacities** - Research capacities • Research infrastructures • Research for the benefit of SMEs • Regions of Knowledge • Research Potential • Science in Society • Support to the coherent development of research policies • Specific activities of international cooperation
Support Offered[98]	Successful applicants will generally receive Commission support of up to 50% of the total budget for their project, which will be paid out over the lifetime of the project. When responding to a Call for Proposals, applicants will be required to produce an outline implementation plan for the project together with a detailed work plan and financial proposal covering the first 18 months of activity. Projects that are selected for support will, at the start of the contract, receive 85% of the Commission contribution towards the agreed budget for this first 18 months period. Further payments (including the balance of the Commission contribution towards the previous period's budget) will be

[98] http://www.investni.com/seventh_framework_programme_fp7_faqs_2007-2013_iptsomt-2008.pdf

Aspect of Programme	Detail of Programme
	made upon receipt and approval of annual activity & financial reports and updated implementation & financial plans covering the next 18 month period. FP7 provides competitive funding for R&D. Invest NI has no control over these Commission funds but actively encourages collaboration amongst NI companies to facilitate NI participation. Invest NI's collaborative R&D team operate 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.[99]. Because it takes a long time to prepare an application for FP7 — it is competitive to transnationals — Invest NI provides support to prepare the applications.
Funding; Scale of Support; Impacts and Outputs	The NI Executive published its 2012-13 European Priorities in May 2012. These maintained the thematic approach established in previous years, identifying 55 objectives to be pursued by the four cross-departmental sub-groups of the Barroso Taskforce Working Group (BTWG): Competitiveness and Employment; Innovation and Technology; Climate Change and Energy; and Social Cohesion. These objectives were translated into 125 individual targets for delivery across the year; and published as the 'European Priorities 2012-13 Implementation Plan'. Key Achievements[100] in relation to funding and FP7 in particular include: • Secured a regional drawdown total of €55,739,264 from Framework Programme 7 (FP7) since the commencement of the current funding period. • Latest available FP7 figures (November 2011 to July 2012) reveal an additional 19 successful North/South FP7 applications in this period. These have a total value of €20.5m (representing a 51% increase in this short time). • Provided partnership/support for a programme of 9 significant EU funded projects (INTERREG IVB, LIFE+, FP7 and DG MARE) with a total value of some £12m of which £3.3m will be directly drawn down over the next 3-4 years by partners in NI; • Secured an FP7 research project on Smart Specialisation in 2013; In the European Priorities 2012-13 Implementation Report, there are 2 targets for DETI of particular relevance to Invest NI support for

[99] Northern Ireland Assembly, *Committee for Enterprise, Trade and Investment Official Report: Inquiry into Developing the Northern Ireland Economy through Innovation, Research and Development: Invest NI* (2012)

[100] European Priorities 2012-13 Implementation Report - http://www.niassembly.gov.uk/Documents/RaISe/Deposited-Papers/2013/dp1204.pdf

Aspect of Programme	Detail of Programme
	FP7: • Provide advice, guidance and, where necessary, financial support to encourage greater participation in the final FP7 call in July 2012, with an increase in participation by the closing dates in 2013. • Secure €50m of FP7 funding by 31 March 2013 Performance to date as follows: • Invest NI had 164 meetings with stakeholders regarding participation in EU R&D programmes. 12 applications for financial support for proposal preparation were funded at a total cost of £162k. This should result in increased participation rates, Invest NI will not know the definitive position with respect to participation levels until appraisals conclude and the successful projects are known . This is unlikely to be known until 2014. • €55.7m secured by the end of March 2013.

Source: Invest NI, European Priorities 2012-13 Implementation Report and http://www.niassembly.gov.uk/Documents/Official-Reports/ETI/2011-2012/120329_InquiryintoDevelopingtheNorthernIrelandEconomythroughInnovationResearchandDevelopmentInvestNI.pdf; and http://www.niassembly.gov.uk/Assembly-Business/Official-Report/Committee-Minutes-of-Evidence/Session-2012-2013/September-2012/FP7Horizon-2020-Invest-NI-Briefing/

3.1.10 Invest NI – Innovation Advisors

Table 3.10: Invest NI – Innovation Advisors

Aspect of Programme	Detail of Programme
Name of Programme / Support	Invest NI Innovation Advisors
Target Group / Eligibility	General Innovation advisor support is available to all businesses.
Purpose / Aims / Objective	The purpose of the Innovation Advisors is too signpost companies to the other supports in Invest NI which they could benefit from. Innovation Advisors were appointed to identify and encourage NI companies to consider undertaking R&D (specific focus is on companies who have never previously engaged in R&D activities). In the main, these advisors activities lead through to an application for Invest NI Grant for R&D support.
Support Offered	Support and advice on the suite of Invest NI supports for companies in Northern Ireland. Innovation Advisors offer expert advice, either on a one-to-one or a group basis, on planning an R&D project or applying for R&D support. Workshops on issues related to research and development are also provided on occasion.

Source: Invest NI and https://www.gov.uk/innovation-advisors

3.1.11 Invest NI – Collaborative Networks Programme (CNP)

Table 3.11: Invest NI – Collaborative Networks Programme

Aspect of Programme	Detail of Programme
Name of Programme / Support	Invest NI Collaborative Networks Programme (CNP)
Target Group / Eligibility	Invest NI's CNP supports companies working together for a common business benefit. This potentially involves engaging with other partners including, but not limited to, academia and training providers. The collaborative network must include at least 4 private sector companies that are clients (or potential clients) of Invest NI or other Northern Ireland based economic development bodies. The collaborative network must also demonstrate they have potential to engage with the relevant stakeholders and include those organisations necessary to extend the value chain such as academia, trade associations and suppliers. This fund is not available directly to: • Trade Associations; • other public bodies; • Voluntary sector organisations. However this does not exclude those bodies listed above (along with organisations based outside NI) from participating as a network member and / or stakeholder. Invest NI would encourage academia to present applications in partnership with the private sector network. The network must consist of at least four NI-based companies, but can also include other stakeholders, both within NI and beyond.
Purpose / Aims / Objective	The Invest NI CNP was set up in 2007 to support business-led collaborative networks and stimulate economic development within Northern Ireland. Evidence suggests that working collaboratively may improve the company's efficiency, market position and profitability, often resulting in new products or processes. Common themes for collaboration include: • Training; • Marketing;

<table>
<tr><th>Aspect of Programme</th><th>Detail of Programme</th></tr>
<tr><td></td><td>

Logistics;
Sales; and
Research and development.

The objective of CNP is to develop the capability and capacity of regional clusters/networks by attracting private sector companies, investors, researchers and academia to maximise collaborative opportunities in the development of new products, processes or services.

The programme supports network development at various stages of development: embryonic - early stage of growth with no formal structure in place; established with further growth potential; mature – but with growth possibly stalled; and declining – but with the potential for renewal.
</td></tr>
<tr><td>Support Offered</td><td>
The CNP is aimed at developing business-led collaborative networks. These networks must have an interest in undertaking time limited collaborative initiative/s that will achieve measurable benefits for the members of the network.

The initial pilot fund is limited and once funding is fully committed no additional funding for Feasibility Study and / or Network Facilitation is available during the pilot period. Funding is available for the period December 2007 to March 2010. Funds are provided through the European Regional Development Fund, but are partly subject to the De Minimis rule.

Table 3.11.1 Invest NI – CNP – Eligible Activities, Costs and Levels of Support by Phase
<table>
<tr><th>Phase</th><th>Eligible Activities</th><th>Eligible Costs</th><th>Levels of Support Available</th></tr>
<tr><td>Phase 1 – Feasibility Study</td><td>Scoping activity;
Development of a Business Plan;
Developing of Marketing Plan; and
Development of a Project Plan.</td><td>Facilitation and consultancy fees; and
Travel and subsistence.</td><td>The Feasibility Study phase is supported at 75% of eligible cost up to a maximum of £15,000.</td></tr>
<tr><td>Phase 2 – Facilitation Funding</td><td>Project management; and
Facilitation of the network:
Organisation of workshops/ seminars/ best practice events & study visits;
Management of the shared web-based community; and
Marketing of the network.</td><td>Facilitation labour costs;
Travel and subsistence;
Salaries and wages of staff directly involved with the collaboration project (must be verifiable);
Overheads and administrative costs directly involved with the collaboration project (must be verifiable); and
Consultancy costs</td><td>The maximum levels of aid available in this phase are £250,000 or 50% of eligible costs, whichever is the lesser. Furthermore the facilitation labour costs must not exceed 50% of the overall project costs.</td></tr>
<tr><td colspan="4">Source: Invest NI</td></tr>
</table>
</td></tr>
</table>

Aspect of Programme	Detail of Programme
	Companies in receipt of CNP support may also be eligible to apply for other financial assistance such as aid under the Regional Aid Guidelines for other projects. Due diligence is carried out by Invest NI to ensure that the cumulation of aid does not exceed the maximum allowable. Applicants are required to provide signed declarations that all state aid rules including cumulation are being adhered to. The programme supports a range of activities: • Lead facilitators - support for individuals to galvanise a network with a key theme • Support for lead facilitators - administrative, training, information support for Leaders to allow them to develop the collaborative network at a faster rate than otherwise would be possible. • Training lead facilitators, network members and the wider business community to enable participants to contribute fully to the network. • Tools for collaborative networks - analytical and developmental tools that can be used by lead facilitators across NI • Facilitation of networks through activities such as facilitated workshops, study visits etc. Promotion of networking and clustering - use of targeted workshops market or sector specific events to raise the potential for innovation or risk reduction by participating in a network[101]
Process of Delivery	As this is a pilot initiative the funds available are limited and awarded through an open call to those networks that can demonstrate additionality and / or feasibility. Applicants for the CNP have to complete an application form and present the signed version to be submitted for formal consideration. Further to this Invest NI require a signed declaration from all participants that they concur with the aims/objectives and targets of the application (to accompany the signed application). The CNP will be available in two phases. Phase 1 – Feasibility Study • Invest NI will provide funding for a feasibility study to identify and scope out a collaboration project. Support will be available at 75% up to a maximum of £15,000. Phase 2 – Facilitation Invest NI will support a collaborative project which is: • industry-led;

[101] http://www.detini.gov.uk/innovation_-_summary_report.pdf

Aspect of Programme	Detail of Programme
	• project focused; and • of a duration between 2 & 5 years. Support can only be given to either the network directly (if it is a legal entity) or the lead partner. Collaborative Network proposals need not avail of Phase 1 support in order to apply for funding under Phase 2. Project Assessment and Approval Companies that apply for aid under phase 2 must provide clarification of the feasibility of the projects in this network, including relevant baseline data on all participants, such as: • Capabilities and core competencies (including skills); • Technological specialisation; • Current market share; • Identified need & opportunity. Invest NI will operate an approval process and each Collaborative Network proposal will be subject to appraisal by an Approval Committee. The proposal must satisfy the following criteria: • Strong business and economic benefits for the majority of network participants and wider sector; • Demonstrate the need for financial assistance to satisfy Invest NI additionality; • Ability to achieve measurable economic improvements or benefits to participating companies in terms of regional development, product innovation, and export growth; • Evidence that the project is additional to any existing work already being undertaken by the participants; • Contributing to sustainable network development; and • Demonstration of participants' commitment to the project, including in-kind costs. The CNP is awarded to business-led collaborative networks that will do most to achieve the objectives and offer the best value for the funds available. In appraising the projects Invest NI will examine project size, level of risk, strategic impact and funding. Monitoring and Evaluation All projects in receipt of CNP aid are subject to regular monitoring throughout the life-cycle of the project by Invest NI. An evaluation of each project takes place within 18 months of completion of the project.

<table>
<tr><th>Aspect of Programme</th><th>Detail of Programme</th></tr>
<tr><td>Funding</td><td>Grant funding is limited to 50% of eligible costs up to a limit of:
£25 thousand for a Phase 1 scoping study
£250 thousand for a Phase 2 full facilitation network
The 50% of funding coming from the private sector may take the form of cash or salaried contribution (based on actual salaries)[102]</td></tr>
<tr><td>Scale of Support, Impacts and outputs</td><td>Examples of some of the Collaborative Networks include:
Table 3.11.2 Invest NI – Collaborative Networks Summary
<table>
<tr><th>Cluster</th><th>Network</th><th>No. of Network Members</th></tr>
<tr><td>Life & Health Technologies Cluster</td><td>Medical Devices</td><td>12</td></tr>
<tr><td></td><td>Functional Foods</td><td>8</td></tr>
<tr><td></td><td>INSPIRE</td><td>11</td></tr>
<tr><td></td><td>Connected Health</td><td>25</td></tr>
<tr><td>Digital Content Cluster</td><td>E-Learning</td><td>11</td></tr>
<tr><td></td><td>NISINE</td><td>11</td></tr>
<tr><td></td><td>Project Kelvan</td><td>13</td></tr>
<tr><td></td><td>Digital Content</td><td>349 Social network members, 149 voting members</td></tr>
<tr><td>Sustainable Energy Cluster</td><td>Biotecture</td><td>20</td></tr>
</table></td></tr>
</table>

[102] https://www.gov.uk/collaborative-network-programme

Aspect of Programme	Detail of Programme

	Biomass O&M	5
	Biomass Mfr	4
	Global Marine Alliance	11
	Global Wind Alliance	14
	Smart Grid Network	17
	Plastics & Polymers	47
	Waste water	6
Source: Invest NI – Members of Collaborative Networks Summary, March 2010		

Recognised benefits of Collaborative Networks include:

- Improved productivity - associated with ease of access to suppliers, technology, partners, support organisations etc.;
- Public sector and University support - because of increased pooling of resources and enhanced lobbying capacity;
- Improved access to employees - reduced recruitment and relocation costs due to close proximity and provision of specialized skills and training from local education providers;
- Reduced transaction costs - due to shorter supply chain;
- New business formation - new companies tend to grow in close proximity to other companies rather than in isolation; and
- Enhanced Innovation - better visibility of the activities of suppliers, competitors and customers leads to early identification of new opportunities.

Source: Invest NI Website, RSM McClure Watters HEIF 2 Report 2010

3.1.12 Invest NI – Proof of Concept Programme

Table 3.12: Invest NI – Proof of Concept Programme

Aspect of Programme	Detail of Programme
Name of Programme / Support	Invest NI Proof of Concept Scheme
Target Group / Eligibility	The Proof of Concept programme is available to academics at QUB, UU, AFBI and Health and Social Care Trusts. Businesses are not eligible for support.
Purpose / Aims / Objective	Launched in December 2003, the Proof of Concept (PoC) programme supports the pre-commercialisation of leading-edge technologies emerging from Northern Ireland's Research Organisations. It helps researchers to export their ideas and inventions from the laboratory to the global marketplace. The programme supports the development of early-stage ideas, which will normally have secured, or be in the process of securing, patent protection or other appropriate forms of protection. It is not simply another source of research funding. Successful bidders must demonstrate that their ideas have originality and true commercial potential. Projects will therefore ideally result in one or more of these possible outcomes: • Working prototype/demonstrator; • IP; • Documented Process/Methodology; • Collaborative Research; • Commercial Partners; and • Additional funding. PoC represents a strong commitment to exploiting research advances and encouraging innovation within Northern Ireland's Research Organisations. The key objective of the PoC programme is to improve the level and quality of commercialisation from within Northern Ireland's Research Organisations through the provision of funding for early stage development activity.

Aspect of Programme	Detail of Programme
Support Offered	The programme focuses on a model where individuals or small groups work on short applied projects to develop an idea through to a stage where a route to commercialisation is clear, either as a spin-out or by licensing to an existing company. The funding is aimed at supporting and developing new ideas, which would normally have secured, or be in the process of securing, patent protection or other appropriate forms of intellectual rights, but which have not reached full laboratory-scale demonstration, or "proof of concept". Because of the embryonic nature of the ideas to be supported, they are generally not capable of securing funding from commercial sources, such as venture capital funds. The Proof of Concept programme allows the development of intellectual property to take place in a way which: • Extends protection of that property; • Extends applicability of that property; • Improves confidence in its anticipated commercialisation; and • Underpins the validity. To maximise impact in this important area of economic growth, eligible projects will attract 100% funding. Funding for a Proof of Concept project is capped at 100% of eligible costs up to a maximum of **£100,000** of assistance. There are two strands to the funding: • A ***technology strand*** of 12 months duration with maximum assistance of up to **£80,000** (Includes Staff costs; Overheads (@ 40% of staff costs); Consumables; Patent costs; Subcontracting; Equipment; Other (i.e. Trials and testing); and Audit Fees (Mandatory); and • A ***commercialisation strand*** of 15 months duration with maximum assistance of up to **£20,000,** which overlaps with the technology strand (includes Market Assessment Consultancy; and Travel and Subsistence).No additional forms or proposals need to be submitted to receive the commercialisation funding – it is automatically allocated if a project is approved for funding by the Proof of Concept Assessment Panel.
Process of Delivery	**Application Procedure** Application Guidelines and Application Form are available from the webpage. All applications to the programme must be fully vetted & formally approved by: a) The Research Office; and b) The Research Organisation's Technology Transfer Office prior to submission to Invest NI. All applications are assessed to ensure that the following basic eligibility requirements are met (as specified in the Invest NI PoC brochure

Aspect of Programme	Detail of Programme
	(2009)): • "The application has been signed by the relevant Research Organisation authorities; • The project is not curiosity or strategic driven; • The Research Organisation is not seeking an alternative source of research funding; and • State aid rules are not breached." Projects that are deemed to meet these requirements will be forwarded marketing and patent assessments. **Selection Criteria** The PoC Assessment Panel reviews, assesses and decides on the appropriateness of the project for funding under the PoC programme. The Panel considers the following for each application in their decision making process: • Economic impact on Northern Ireland; • Fit with Proof of Concept programme; • There is existing or near-future IP potential; • Competitive advantage through innovation; • Market potential; and • Technical work programme. **State Aid** Financial support from Invest NI must comply with State Aid Rules which means that it cannot be used in any way which could be deemed as anti-competitive. As the funding is 100% grant, it cannot be used to fund company research. Research Organisations must not therefore involve industrial partners in the project. **Project Managing and Monitoring** Each project supported under the programme has an associated Project Management Panel, comprising the Research Organisation's Project Technical Team (led by the Principal Investigator), a representative from the Research Organisation's Commercialisation Office and the Invest NI Technology Executive. The remit of the Panel is to review technical progress on the project, as well as monitor costs. The Principal Investigator records, on a standard Project Management Panel Report provided by Invest NI, technical progress and financial spend. A separate written report is not required.

Aspect of Programme	Detail of Programme
	Duration of Project As a general rule, projects will be up to 12 months duration, although this may be extendable to up to 18 months by mutual agreement between the Research Organisation and Invest NI.
Funding	Funding for the PoC Scheme was capped at £100,000 of eligible costs. There are two strands of funding a technology strand of 12 months duration with a maximum assistance of up to £80,000 and a commercialisation strand of 15 months duration with a maximum assistance of up to £20,000, which overlaps with the technology strand.
Scale of Support	The PoC programme was evaluated at the end of a three-year pilot in 2006: over four funding rounds, grants of £5.2m were given to 40 projects. The evaluation established strong demand for the programme from both universities proving that the programme filled a gap between early stage funding and commercialisation. A new PoC programme (£6m) was launched in 2008 and Invest NI has committed £2.6m arising from 28 offers to QUB and seven offers to UU (35 projects approved in 2008). A second PoC funding round was announced in February 2009 and 25 projects have been approved. Overall, a total of 60 projects has been approved over the 2 funding rounds and Invest NI has now fully committed its budget. Invest NI then went through the necessary evaluation, economic appraisal and casework to access more funds.
Impacts and Outputs[103]	An evaluation of the programme was conducted by BDO in 2011. In terms of economic impact, it reported the following: • 6 spin outs to date with revenues estimates to be £20million and circa 200 employees; • 5 licensing deals; • Investment in patent protection totals £648,000 • The Universities and AFBI have identified 55 projects stated to have commercial potential; and • The PoC Programme has leveraged £3.618 million with a further £2.66 million anticipated.

Source: Evaluation of the NI HEIF 2 Programme (RSM McClure Watters, 2010), Evaluation of the Proof of Concept Scheme (BDO, 2011)

[103] http://www.investni.com/proof_of_concept_programme_evaluation_final_report_jan-2011_cs.pdf

3.1.13 Invest NI – Competence Centres

Table 3.13: : Invest NI – Competence Centres

Aspect of Programme	Detail of Programme
Name of Programme / Support	Invest NI Competence Centres
Target Group / Eligibility	• Any Northern Ireland based company with an R&D strategy or vision that is open to working with like-minded companies and prepared to collaborate with research performers; • Other companies that can demonstrate that they will strengthen the consortium and bring technical and economic benefits to Northern Ireland; and • Northern Ireland's research organisations. The project must demonstrate that it is industry led and has industry commitment and therefore the lead partner is in general expected to be an industry organisation although applications may be stimulated by an academic organisation. There must be at least four partners in a consortium. In principle, spin-out companies from universities, start-up businesses and sole-traders and partnerships can apply to be part of a consortium. A key aim of Competence Centre support is to help improve NI's innovation performance. Collaborators outside NI – EU and non EU – are acceptable, but there must be a clear and substantial gain for NI brought about by their involvement. They will not, however, receive funding from the programme, although their project costs may be included when calculating total eligible project costs.

Aspect of Programme	Detail of Programme
Purpose / Aims / Objective	To support industry led collaborative research entities to conduct market focused strategic research. Competence Centres offer groups of companies the opportunity to collaborate together with the local universities to undertake high risk, long term, strategic research work that will focus on the future needs of their markets. They bring together the experience, expertise and resources of industry and academia to achieve common research goals.[104]
Support Offered	Member companies will have a long term commitment to work together as a group, engaging in higher-risk, longer-term research. In return, companies will have early access to the Intellectual Property produced and engage in extended networks of companies and researchers stimulating further collaborations.
Process of Delivery	The first step in the process is Invest NI's call for Expressions of Interest from groups of companies. Applicants are required to outline their common research interest and the likely impact of a Competence Centre on their business area. Interested groups of companies are encouraged to consult with Invest NI on the best approach to submitting an Expression of Interest. If the company is already part of an established consortium that has well developed research plans identifying resources, timelines, costs, benefits, and governance, it can apply directly for support by registering the Expression of Interest. If the applicant is not already involved in a consortium, Invest NI offers advice and facilitation to help them set up a consortium and carry out a detailed planning exercise to define their consortium's research agenda. It is anticipated that some of the Expressions of Interest may lend themselves to the merging of groups. Applicants may also be redirected towards other more appropriate initiatives such as the Collaborative Networks Programme as a preparatory stage. An evaluation panel assesses the Expressions of Interest. Priority is given to those groups whose Expressions of Interest indicate the highest potential impact and Invest NI works closely with these groups to develop their detailed "Description of Needs". This may involve Invest NI providing external facilitators or consultants as part of this process. The Detailed Description of Needs will be likely to include some of the following: • numbers of companies involved; • commercial and economic impacts; • research and training plans;

[104] Invest Northern Ireland Corporate Plan 2011 – 2015

Aspect of Programme	Detail of Programme
	• description of structure; • location; • intellectual property rights agreement; • proposed funding model; • mechanisms to develop an international reputation; and • collaborative agreements. The Detailed Description of Needs is assessed on the basis of Invest NI's recognised R&D assessment criteria including strategic fit, Centre viability, degree of innovation, potential commercial benefit, technical viability and wider economic benefits. There are additional Centre-specific considerations including significance and expansion of consortium membership, IP and commercialisation arrangements and governance, etc.
Funding	Funding reflects the unique requirements of each Competence Centre. It is expected that participants make a meaningful contribution reflecting their commitment to the Centre. The combined industry contribution should represent at least 25% of total costs, some of which can be made up of in-kind contributions. Research providers are expected to increase their cadre of research staff to fulfil the Centre's requirements. Continued funding depends on a range of metrics such as increasing industry research funding, growing the number of companies involved, the level of international collaboration and level of knowledge transfer, licences and the revenue from them and spin-offs, and new products and processes leading to increased export sales.
Scale of Support	The target stated in the NI Economic Strategy[105] is to have 4 Competence Centres established by March 2015. At 31 March 2013 (2011-2013) No competence centres had been established. However one Competence Centre has been approved to date for 2013/14.[106] Most recently The Centre for Advanced Sustainable Energy (CASE) has been set up under the Invest NI competence centre programme with an industry driven research agenda across four main themes : turbines, grid integration and storage, energy efficiency and energy from biomass.[107]

[105] Northern Ireland Executive, *Northern Ireland Economic Strategy: Conservative Action Plan* (2012)
[106] Northern Ireland Executive, *Northern Ireland Economic Strategy: Conservative Action Plan: Progress Against Actions – To March 2013 (2013)*
[107] http://questor.qub.ac.uk/News/

Aspect of Programme	Detail of Programme
Outputs and Impacts	The Invest NI Competence Centre Information Booklet describes the following expected benefits of participation in these: Companies benefit from: • the opportunity to engage in higher-risk, longer- term research into market problems that, once solved, can offer them a competitive edge; • having direct input into the strategic direction of the Centre's research; • being able to access intellectual property and have an early influence on its exploitation; • networking with senior and influential researchers that could lead to involvement in EU and other R&D initiatives. Researchers benefit from; • dynamic interaction with industry that will ensure research will deliver economic benefits; • a longer term funding mechanism allowing time to bring their research to fruition; • the possibility to spin-out new commercial entities and exploit intellectual property; • being able to access larger streams of funding to develop the research infrastructure by leveraging other research schemes. Impacts expected to come from Competence Centres include: • commercialisation of innovative products and processes; • increased company expenditure and involvement in R&D, including leveraging other R&D funding streams such as EU Framework Programme; and • exports, spin-outs, patents and licences. Additional less tangible impacts are expected in: the two-way transfer of knowledge between the markets and academia, training of researchers, transferring research into industry and improved skills and networks.

Source: Invest NI Website, Evaluation of HEIF 2 (RSM McClure Watters, 2010)

3.1.14 Invest NI – Intellectual Property

Invest NI can provide advisory and in some cases possible financial support to help protect and exploit intellectual property (IP). IP can include a new product, service, brand or process. Advisory support includes a comprehensive IP starter pack or an Intellectual Assets Audit. Specialist advisors can help with:

- International patents, including patent searches;
- Trademarks, including trademark searches;
- Designs and copyright; and
- Carrying out an Intellectual Asset Management Audit to establish what elements of your business may need intellectual property protection, and advice on how to get the appropriate protection
- Invest NI assesses applications for financial support on a case by case basis and the business will be expected to pay a proportion of the cost of the assistance.[108]

[108] http://www.investni.com/index/already/product/intellectual_property.htm

3.1.15 Invest NI - Technical Development Initiative (TDI) Scheme

Table 3.14: : Invest NI - TDI Scheme

Aspect of Programme	Detail of Programme
Name of Programme / Support	Technical Development Initiative (TDI) Scheme
Target Group / Eligibility	At present the Scheme is open to small and medium sized enterprises (SMEs) (i.e. those with less than 250 employees). The businesses must be an Invest NI client or have the potential to become an Invest NI client[109].
Purpose / Aims / Objective	The TDI was introduced, initially as a one-year pilot in April 2007, to provide financial support to small enterprises in respect of technical, process and product development, aiming to solve problems or address those issues preventing companies from fully realising their development plans. The Scheme seeks to support businesses to overcome these technical issues by providing financial support towards the costs of an external Technical Service Provider (TSP). It seeks to complement the advisory services of Invest NI's Technical Advisory Unit (TAU) by enabling Invest NI to offer a complete technical solution based package where advice and guidance could be backed up by a tailored financial support scheme.
Support Offered	Specific areas that can be supported (subject to TAU eligibility assessment) include: • Investigating new technologies or processes; • Product & process problem resolution; • Product approval/global technical compliance; • Implementation of process and quality management schemes

[109] To qualify as an Invest NI client company, your business must be from the manufacturing or internationally tradable services sectors and be able to demonstrate that currently, or over the next three years, your business will have: total sales of over £100,000 a year; sales outside Northern Ireland worth more than 25 per cent of turnover or greater than £250,000 a year; and the capability and willingness to work with Invest NI.

Aspect of Programme	Detail of Programme
	• Protections and exploitation of Intellectual Property (IP); and • Improved product design & performance.
Process of Delivery	Typically, a business will engage in a 6-stage process between applying to Scheme for support and ultimately completing their TDI Project: • Enquiry Initiation • Identification of a TSP and Project Application • Submission of TDI Application • Technical Appraisal • Project delivery • Completion of claim and post project evaluation
Funding	Total support allocated to the TDI Scheme 2008 – 2011 was £240,000. This is broken down as follows: • 2008/09: £40,000 • 2009/10: £90,000 • 2010/11; £110,000
Scale of Support	At present[110], businesses are typically able to claim up to £5,000 (or 50% of project costs, whichever is the lesser) towards a single TSP's costs. Normally projects with a cost of between £1,000 and £15,000 will be considered for support. Businesses can normally avail of up to three offers and these projects must be different in nature. No more than 2 projects are normally allowed to operate at any given time. However, if one of the projects is nearing successful completion, support for a third will be considered providing the aforementioned project frequency limit is not exceeded.
Impacts and Outputs[111]	It was intended that the implementation of the TDI scheme would result in the following benefits for businesses: • First time introduction to the concept and benefits of product or process development; • Strategically positioning companies to advance to Invest NI product and process development schemes;

[110] As at the September 2012 Invest NI internal review of the TDI Scheme
[111] http://www.investni.com/proof_of_concept_programme_evaluation_final_report_jan-2011_cs.pdf

Aspect of Programme	Detail of Programme
	• Improvements to manufacturing processes leading to efficiency and output benefits; • Product verification and enhanced customer confidence leading to improved competitiveness; Protection of ideas and products leading to marketplace advantage; • Improved quality control processes leading to reduced product failures, better traceability and increased efficiency; • Companies better placed to address product/production failures and implement remedial measures to prevent reoccurrences; and • Introduction of new technologies leading to improved competitiveness and efficiencies

Source: Invest NI website and Invest NI Internal Review of TDI Scheme

3.2 Other Supports for Knowledge Transfer in NI

3.2.1 DETI – MATRIX (the Northern Ireland Science / Industry Panel)

Table 3.15: DETI - MATRIX

Aspect of Programme	Detail of Programme
Name of Programme / Support	MATRIX - Northern Ireland Science Industry Panel
Target Group / Eligibility	The Northern Ireland Science Industry Panel, is a business led expert panel, formed primarily to advise government, industry and academia on the commercial exploitation of R&D and science and technology in Northern Ireland.
Purpose / Aims / Objective	MATRIX works with industry and academia to identify new high technology market opportunities, IP and technologies for Northern Ireland companies to exploit and academia to benefit from. MATRIX aims to: • 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

Aspect of Programme	Detail of Programme
	R&D and science and technology. The objectives of the Northern Ireland Science Industry Panel are: • 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.
Support Offered	The Panel provides 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. MATRIX is an enabling framework – offering advice and guidance on funding priorities. It provides the strategic context for Invest NI engagement (and is not a direct intervention).
Impacts and Outputs	MATRIX's recommendations have influenced the development of the Programme for Government, the NI Economic Strategy, the Innovation Strategy for Northern Ireland and the DEL's approach to future skills provision. Five Collaborative Networks have been developed: • Glantek – A collaboration to develop innovative solutions in the water & waste water treatment processes and in the on-farm anaerobic digestion renewable energy solution. This network has had commercial success and individual companies have had new market opportunities opened; • Whisple Cloud Computing – A network which is pursuing an opportunity to unify the collective Cloud Computing expertise and

Aspect of Programme	Detail of Programme
	technology of the Northern Irish software industry to enable the network play a major role as Cloud Service brokers & a development & integration community; • European Connected Health Alliance – The main thrust of this network will be the delivery of a connected health agenda to the benefit of NI companies & research institutes; • Digital NI 2020 – A collaboration pursuing the acceleration the pace of exploitation and realisation of the benefits of the Northern Ireland Digital Platform; • Global Maritime Alliance –A network trying to become the "supplier of choice" to the marine energy technology developers by offering a "one stop shop" for consultancy and support services. MATRIX and DETI officials have worked closely with Invest NI to ensure that this approach has been fully integrated into the Invest NI Collaborative Networks Programme.

Source: Invest NI; MATRIX website

3.2.2 NISP "Connect" Initiative

Table 3.16: NISP "Connect" Initiative

Aspect of Programme	Detail of Programme
Name of Programme / Support	Northern Ireland Science Park (NISP) Connect Initiative
Target Group / Eligibility	NISP CONNECT's focus is strictly on start-up ventures and the commercialisation of science and technology ready to leave the research base. It cannot help established companies (post series A of VC investment) or established companies in distress.

Table 3.16.1 NISP – "Connect" Initiative – Eligibility

Activity	Target Group
Springboard	Entrepreneurs from life sciences & high tech companies in all stages of development; including concept, start-up, challenge and opportunity stages.
Frameworks Workshops	Entrepreneurs attending Frameworks workshops include technology and biotech founders, CEOs, top management or scientists and technology experts considering a business start-up. The workshops attract people from a wide range of disciplines including technology, communications, software, life sciences and business services.
Evening Series	Access is open to all constituents of Northern Ireland's "venture community": entrepreneurs, capital providers, economic development agencies, service providers and executives.
25k Award	This annual competition is open to any member of research staff, academic, masters or PhD student, doctors, nurses or individual in any facility where public money is spent on R&D.
NISP CONNECT Videos	Available online.

Aspect of Programme	Detail of Programme
Purpose / Aims / Objective	The first CONNECT organisation was started in 1985 at the University of California, San Diego (UCSD). It was created on the initiative of the local business community and sought to redirect an ailing local economy into the knowledge-based era. Since then, over 600 new high tech companies and 120,000 new jobs have been created in connection with the San Diego network. In addition, new networks have grown up inside and outside the borders of the US. NISP CONNECT is an independent, non-profit organization fostering entrepreneurship by accelerating the growth of promising technologies and early stage companies. Its core purpose is *'to connect people, technology and capital to drive innovation and create wealth through building high value IP-based companies in Northern Ireland'*, aiming *'to help to establish a thriving entrepreneurial eco-system where innovation, vision and talent flourish'*.
Support Offered	A collaboration between NISP, the University of Ulster and Queen's University Belfast, NISP CONNECT acts as an 'honest, neutral broker' within the region. The collaboration provides direct delivery programmes, mentorship/coaching services (Springboard), educational seminars and events geared at developing and encouraging entrepreneurial ideas (Frameworks), talent and leadership (Evening Series). It encourages entrepreneurship in academia (£25k Award) and helps companies get early stage funds (halo). NISP CONNECT designs and delivers bespoke programmes and forums dedicated to creating and sustaining the growth of innovative technology companies. It mentors entrepreneurs, assists them with business model development, advises them on growth strategies and provides them with access to venture capital providers through their network. NISP manages 'halo', the local angel network, for which it provides administration and logistical support. It prepares companies for their investment consideration. In addition, NISP invites entrepreneurs and investors from outside the region to participate in its programmes. This expands the CONNECT network, highlights the region, and creates opportunities for outside investment in Northern Ireland. NISP CONNECT depends on small government grants, sponsorship and the good will of the business community. **Table 3.16.2 NISP – "Connect" Initiative – Activities** **Activity** / **Description** Springboard / Springboard provides free assistance for life sciences & high tech companies in all stages of development, including concept, start-up, challenge and opportunity. Entrepreneurs accepted into the program spend 3 to 8

Aspect of Programme	Detail of Programme	
		weeks in coaching sessions with one of NISP CONNECT's Entrepreneurs in Residence or Springboard Fellows. Upon completion of this process, the entrepreneur is invited to make a presentation of their business model to a select group of experts. This group usually includes a venture capitalist, seasoned entrepreneur with domain expertise, accountant, corporate and patent attorneys, marketing professional, and an executive from a successful company in the same industry. Experts are also being drawn from insurance, real estate, human resources and other areas as needed. The panel of experts is tailored to the individual needs of each company. The goals of the panel presentation are to provide the entrepreneur with candid recommendations for the refinement of their business plan and to help identify next steps to achieve the company's goals. Following the panel presentation, the entrepreneur meets with their Entrepreneur in Residence or Springboard Fellow to identify next steps, incorporate the feedback from the panel and implement a strategic plan for the next six to twelve months.
	Frameworks Workshops	Many of today's business founders and future entrepreneurs have scientific and technical backgrounds but have had limited experience in industry, so they often lack exposure to critical information which is essential to leading a start-up. To fill this gap, Frameworks workshops offer content-rich, targeted, educational programmes that help young to mid-staged companies build a business around their promising science or technology. Subject matter expertise is provided by knowledgeable top-tier professionals and industry veterans to facilitate the transfer of knowledge and experience. Programme attendees gain valuable business vocabulary and tactical skills and presenters gain credibility with future business leaders. Entrepreneurs attending Frameworks workshops include technology and biotech founders, CEOs, top management or scientists and technology experts considering a business start-up. The workshops attract people from a wide range of disciplines including technology, communications, software, life sciences and business services.
	Evening Series	Throughout the year NISP produces events targeted at showcasing the experiences of local or international science and technology corporation that were once start-ups. Access is open to all constituents of Northern Ireland's "venture community": entrepreneurs, capital providers, economic development agencies, service providers and executives.

Aspect of Programme	Detail of Programme	
	25k Award (annual)	The purpose of the £25K contest is to identify, qualify, prepare and present the intellectual property from the publicly funded research base in Northern Ireland with the most commercial potential. Over six months, competing teams are coached in how to transform their ideas into start-ups. Winners are announced in September before an audience of more than 250 top executives, entrepreneurs, investors, service providers and academics. It is a great opportunity to meet the innovators of the next great technology in the categories of: Hitech; Biotech; CleanTech; and Digital Media and Software. In 2012 the event attracted 420 attendees, and was opened by the President of the Royal Academy of Engineering.
	NISP CONNECT Videos	NISP CONNECT offers key events and people throughout the year through video. Examples of videos available include '**Spirit of Ireland** - Dissection of an 11billion Euro start-up'; '**Toby Coppel** - Ex SVP of Yahoo Europe speaks at the annual 25k award dinner in 2009'; or '**The Next Big Thing** - What do you think will be 'the Next Big thing' - a panel of industry experts voice what they believe the Next big thing will be in Bio-Tech / Life Sciences, Electronics / Telecoms, Software / Internet and Clean-Tech'.
Scale of Support, Impacts and Outputs	In 2011, DETI announced funding of up to £937k over five years to support NISP Connect, including £468.5k from the European Regional Development Fund[112]. Some of the main impacts of the Programme highlighted in the 2012-13 Annual Report include: • Over 2,000 attended NISP Connect events • 467 early-stage ventures and "wantrepreneurs" [113] have engaged with NISP Connect programmes • Over 170 stakeholders have been assisted with developing knowledge economy plans • New programmes introduced: Co-Founders Wanted and Frontiers in Science and Technology • There is a strong willingness from the community to volunteer support: £1m contributed in volunteer hours and member fees	

Source: NISP Connect Website

[112] http://www.northernireland.gov.uk/index/media-centre/news-departments/news-deti/news-deti-february-archive-2011/news-deti-090211-foster-announces-937000.htm
[113] Wannabee entrepreneurs.

3.2.3 UK Technology Strategy Board – "Knowledge Transfer Networks"

Table 3.17: UK Technology Strategy Board – "Knowledge Transfer Networks"

Aspect of Programme	Detail of Programme
Name of Programme / Support	UK Technology Strategy Board - Knowledge Transfer Network
Target Group / Eligibility	Members are usually individuals from business, research, or government organisations concerned with developing and exploiting a technology for the economic benefit of the UK. Registration for membership of a KTN is possible through visiting the homepage of that KTN and following the instructions. Each KTN manages its own applications.
Purpose / Aims / Objective	A Knowledge Transfer Network is a single over-arching national network in a specific field of technology or business application which brings together people from businesses, universities, research, finance and technology organisations to stimulate innovation through knowledge transfer. Knowledge Transfer Networks (KTNs) have been set up to drive the flow of knowledge within, in and out of specific communities. KTNs have been established and are funded by government, industry and academia. They bring together diverse organisations and provide activities and initiatives that promote the exchange of knowledge and the stimulation of innovation in these communities. There are currently 24 KTNs. The objective of a Knowledge Transfer Network is to improve the UK's innovation performance by increasing the breadth and depth or the knowledge transfer of technology into UK-based businesses and by accelerating the rate at which this process occurs. The Network must, throughout its lifetime, actively contribute and remain aligned to goals of the Technology Strategy Board. Within the overall objective of accelerating the rate of technology transfer into UK business, the specific aims of a Knowledge Transfer Network include the following: • To deliver improved industrial performance through innovation and new collaborations by driving the flow of people, knowledge and experience between business and the science-base, between businesses and across sectors; • To drive knowledge transfer between the supply and demand sides of technology-enabled markets through a high quality, easy to use

Aspect of Programme	Detail of Programme
	service; • To facilitate innovation and knowledge transfer by providing UK businesses with the opportunity to meet and network with individuals and organisations, in the UK and internationally; and • To provide a forum for a coherent business voice to inform government of its technology needs and about issues, such as regulation, which are enhancing or inhibiting innovation in the UK.
Support Offered	Knowledge Transfer Networks (KTNs) have been set up to drive the flow of knowledge within, in and out of specific communities. KTNs are funded by the Technology Strategy Board[114] to help businesses innovate by providing them with networking and partnering opportunities, giving them up-to-date knowledge on markets, technologies and routes to funding. Their main role is to put companies and innovators in contact with the knowledge and funding that they need to bring new products, services and processes to market. KTN Central website[115] provides information about Knowledge Transfer Networks and the government funding body behind them, the Technology Strategy Board. As well, there is information available about individual KTNs, the scientific and technological disciplines they cover and how to become a registered member. The Knowledge Transfer Networks share a common on-line platform to help them disseminate and transfer knowledge to individuals as well as industry and other networks, for example. **The KTN Platform** is a common online platform that has been developed and enhanced under the KTN programme to implement an online capability set that exceeds current market expectations featuring: • An industry standard online configuration interface; • A simple document storage tool for easy deployment of structured content; • A high level collaboration suite incorporating advanced security features, document version control, discussion areas and alerting; • A full content management suite supporting scalable work-flow processes; and • A rich online conferencing suite using state of the art Voice over IP technology.

[114] The Technology Strategy Board is an executive non-departmental public body (NDPB), established by the Government in 2007 and sponsored by the Department for Innovation, Universities and Skills (DIUS). (Note DIUS now superseded by BIS).

[115] http://www.ktnetworks.co.uk

Aspect of Programme	Detail of Programme

Technologies of the portal

Apart from the Branding of the portal in terms of the "Grid" layout, header and footer, colours used and the designated content regions, each KTN is free to present content any way it needs to. The portal uses standard portlet technology to allow discrete areas of the site to be developed independently, using free text, HTML, bespoke content types within content manager, or structured presentation interfaces and wizards.

Each KTN defines its own user groups and permission structure to allow dynamic service and customisation to the user.

Administration and web-mastery can be delegated throughout the KTN permission structure. No specialist knowledge of web development is needed. HTML experience is advantageous.

Fundmap

Fundmap provides easy navigation to the grants and funding available to businesses in the UK technology sector:

Table 3.17.1 KTN – Fundmap – Grants and Funding available in the UK by category

Category: Development Stage	No. of Support Schemes
Design & Development / Business Development	158
Prototype / Clinical	147
Proof of Concept	125
Design / Preclinical	122
Blue Sky	118
Collaborative	95
Start up	93
Sales & Marketing	80
Production / Manufacturing	77
Academic Collaboration / Facilities	38

Aspect of Programme	Detail of Programme	
	Employment & Training	35
	Internationalisation	28
	Category: Type of Support	No. of Support Schemes
	Grant/subsidy	158
	Venture capital	75
	Loan	68
	Equity investment	56
	Consultancy grant	7
	Competition based funding	4
	Tax relief	3
	Loan guarantee	3
	Angel investment	2
	IPO support	1
	Category: Applicable Organisation	**No. of Support Schemes**
	SME	335
	Non-SME	199
	Academic	71
	Category: Market Sector	**No. of Support Schemes**
	Medical / Healthcare	291
	Engineering and Industrial	251

Aspect of Programme	Detail of Programme	
	Renewable Energy	246
	Data Communications / Telecoms	231
	Aerospace	230
	Consumer Electronics	226
	Space	226
	Automotive	225
	Utilities	223
	Scientific and Analytical	220
	Broadcasting / Film & TV / Audio	215
	Travel and Tourism	203
	Instrumentation & Control	199
	Digital Media / Games	198
	Security	191
	Defence / Military	180

Aspect of Programme	Detail of Programme	
	Marine	176
	Oil & Gas	174
	Nuclear Energy	173
	Lighting	173
	Media	160
	Financial Services	152
	Retail	136
	Government	122
	Category: Region	**No. of Support Schemes**
	Not region specific	144
	Scotland	35
	Wales	26
	Yorkshire & Humber	23
	North East	20
	South East England	18

Aspect of Programme	Detail of Programme	
	East Midlands	18
	London	17
	South West England	14
	Northern Ireland	12
	England – (region not specified i.e. these are England-wide support schemes not restricted to a particular region)	10
	North West	9
	West Midlands	9
	East of England	4
	Sub-Total Europe	**14**
	Sub-Total UK	144
	Sub-Total Regional	207
	TOTAL	**365**
	Source: Knowledge Transfer Network – Fundmap website (http://www.fundmap.co.uk)	

Aspect of Programme	Detail of Programme

Technological Areas Covered by KTNs

Table 3.17.2 Knowledge Transfer Network – Networks

Networks	Description
Aerospace & Defence	The UK Aerospace & Defence Knowledge Transfer Network (KTN) task is to help promote innovation and collaboration across UK industry, Government and academia, helping to improve industrial performance and implement the UK National Aerospace Technology strategy (NATS).
Biosciences	Biosciences KTN serves the agriculture, food and industrial biosciences sectors to connect and catalyse knowledge transfer, promote networking and stimulate innovation to help industry profit and grow from new technology-enabled products and processes.
Chemistry Innovation	The Chemistry Innovation KTN has been set up with Government and academic support to bring together a range of expert people and organisations that can assist with large or small science, engineering or manufacturing changes in your business.
Creative Industries	The Creative Industries Technology Innovation Network (CITIN) will work with a variety of creative industries including: advertising; architecture; art and antiques markets; computer and video games; crafts; design; designer fashion; film and video; music; performing arts; publishing; software; television and radio. It will identify and clarify the challenges and opportunities of a rapidly changing technology landscape and bring together creative industry companies, technology providers and researchers to exploit this potential, drive innovation and secure the UK's international competitiveness.
Digital Systems	The Digital Systems KTN (DSKTN) brings together expertise in scalable computing, location & timing and cyber security in order to drive the development of a digitally-enabled Britain.
Digital Communications	The Digital Communications KTN members share white papers on technical developments and business planning, case studies of new business ventures, coordination in research programmes, links to business sectors inside and outside the communications environment, information on developing regulations and standards and an industry technology roadmap.

Aspect of Programme	Detail of Programme	
	Electronics	A key objective of the Electronics-KTN is to provide access for companies right across the electronics value chain to knowledge that will help them to understand how to capitalise on their innovations.
	Energy Generation & Supply	The mission of the Energy Generation and Supply Knowledge Transfer Network (EG&S KTN) is to create an integrated and dynamic network of business, technology, academic and policy stakeholders delivering strategic and effective knowledge exchange to advance the UK Energy Generation & Supply sector.
	Environmental Sustainability	The Environmental Sustainability KTN draws together organisations and businesses that deal with environmental and resource management and assists them to accelerate the development and uptake of innovative sustainable solutions. The KTN focuses upon areas where there is the greatest potential for addressing the interlinked challenges of excessive use and depletion of natural resources, environmental degradation and loss of biodiversity, and climate change. Its efforts are particularly concentrated upon Key Priority Areas where the competitiveness of British businesses and the UK economy as a whole can be enhanced.
	Financial Services	The Financial Services Knowledge Transfer Network (KTN) harnesses cutting edge scientific research to support and protect innovation, competitiveness and market stability.
	HealthTech & Medicines	A KTN dedicated to advancing the UK's human health life sciences sector, through knowledge transfer, innovation and building powerful networks of forward thinking organisations in priority areas such as medicines, medical devices, diagnostics, regenerative medicine, associated bioprocessing and convergence. The KTN is able to operate at a strategic level, liaising with relevant government departments and trade associations to enable a better climate for innovating in the UK, and supports groups or individual businesses to access the knowledge and resources needed to move innovations forward.
	Industrial Mathematics	The Industrial Mathematics KTN harvests the UK's world-leading strengths in modelling and analysis to accelerate innovation. The KTN unlocks value in business operations, products and services, illuminating the best ways forward for companies and giving early warnings of potential difficulties.
	Intelligent Transport Systems	Intelligent Transport Systems (ITS) have huge potential to reduce the environmental impact of road transport, increase productivity through reduced congestion and improve the safety and security of the road transport network. The ITS provides a platform to bring together industry thinking stimulate collaborative working across ITS industries, services, and R&D. The ITS KTN is led by innovITS, the UK Centre of Excellence for Transport

Aspect of Programme	Detail of Programme

	Telematics and Sustainable Mobility.
Low Carbon	'Description under development'
Materials	The Materials KTN aims to bring together the views of all in business, design, research and technology organisations, trade associations, the financial market, academia and others in an overarching value network across the materials community.
Nanotechnology	The Nanotechnology KTN has been established to provide a market-oriented focus for the facilities, people and organisations engaged in Micro and Nanotechnologies in the UK and to lower entry barriers and drive the widespread market development and exploitation of these technologies.
Modern Built Environment	The Modern Built Environment KTN has been established to intensify technological innovation within the modern built environment through improved knowledge transfer. The KTN will achieve this through a series of activities, which will identify and communicate information on new and emerging technological innovations that are both relevant and applicable to key industry sectors.
Photonics & Plastic Electronics	Photonics and plastic electronics are key technology areas for future development of capabilities and for addressing the 'green agenda.' Moreover, these are technologies where the UK has established a global reputation for innovation. Photonics has matured considerably from the days of the first laser devices and is now a technology firmly embedded in our society at all levels from consumer products to high value capital equipment. Plastic electronics, in which the UK is a world leader, is an exciting embryonic technology that will enable the conception of new products and bring about revolutionary changes in the way current products are designed and manufactured.
Sensors and Instrumentation	The Sensors and Instrumentation KTN covers the whole of the UK's sensing community, from academics and large industries to small businesses, research councils and government departments. The KTN embraces sensing in its entirety – from the principles of measurement to novel sensor technologies, deployment in the field and data analysis.

Source: http://www.ktnetworks.co.uk

Each of the 19 KTNs presented in the table have their own website, management board and steering committee, organisation structure, programmes and activities, resources and funding, membership policies, events and conferences, etc.

Aspect of Programme	Detail of Programme
Process of Delivery	Organisations use the KTNs' resources to find new routes to market, collaborative partners or new customers; get help with finding funding for their projects; get access to the latest academic knowledge and skills; or to understand the impact of new and emerging technologies on their business model.
Scale of Support	In October 2009, there were 19 knowledge transfer networks with a membership of around 60,000[116]. The newest KTNs were in Energy Generation and Supply and Financial Services. KTNs provide many benefits for members including: • **Networking** – frequent opportunities to network with other businesses and academics through targeted events, meetings and Special Interest Groups organised by the KTN. • **Information and news** – free access to on-line services such as reports, newsletters, webinars/e-training, events diaries, e-conferencing and collaboration tools and general sector/application specific information. • **Funding opportunities** – advice on Technology Strategy Board Collaborative R& D calls, Knowledge Transfer Partnerships and other sources of funding for innovation such as Framework Programme 7, Eureka and Venture Capital. • **Policy and regulation** – a communications route between their community, Government and EU, giving members the opportunity to influence policies and regulation in the UK and abroad. • **Our strategy** – KTNs are playing an increasingly important role in the development of the Technology Strategy Board's future direction. **Optimising the KTN 'Family'** During 2008 a review of the Knowledge Transfer Networks was carried out to assess their current effectiveness and scope. The comprehensive review, which obtained views from 2,100 KTN users and R&D intensive businesses, strongly confirmed the value of the networks. 75% of business respondents rated KTN services as effective or highly effective. Over 50% had developed, or were developing, new R&D or commercial relationships with people met through a KTN and 25% had made changes to their innovation activities as a result of their engagement. The most highly rated functions of KTNs, according to the survey, are monitoring and reporting on technologies, applications and markets; providing high quality networking opportunities; and identifying and prioritising key innovation related issues and challenges. The review also

[116] *Source: Technology Strategy Board Brochure – What is a Knowledge Transfer Network or KTN? (October 2009)*

Aspect of Programme	Detail of Programme
	emphasised the strong benefits brought to the KTN programme through links with a wide range of partners. KTNs engage with trade associations, technology providers, research councils, Regional Development Agencies and the Devolved Administrations to deliver benefits to businesses of all sizes. The review highlighted an opportunity to refocus the work of the KTNs, optimising the coverage of business and technology sectors, creating a more targeted, comprehensive and accessible range of network resources to help accelerate innovation.

Source: Knowledge Transfer Networks website; Technology Strategy Board Brochure – What is a Knowledge Transfer Network or KTN? (October 2009)

3.2.4 Local Council Programmes Lisburn City Council – University of Ulster: Innovation Networks Programme

Table 3.18: Local Council Programmes

Aspect of Programme	Detail of Programme
Name of Programme / Support	Innovation Networks Programme
Target Group / Eligibility	The programme targets business located in the Lisburn City Council area interested in improving their business performance and identifying new opportunities for growth through innovation.
Purpose / Aims / Objective	Innovation Networks is a three year programme that aimed to place innovation and research at the core of local business development activity and develop strategic innovation partnerships between businesses located in Lisburn and higher education and research centres. The programme has three phases: Innovation Development Programme, Innovation Networks and Commercialising R&D, and aims to achieve the following outcomes: 6 Innovation Roadshows to Local Business Centres and Industrial Estates; 5 Business & Innovation Technology Audits carried out; 36 companies recruited and participate in new and existing business networks; 30 new projects identified and progressed; 30 new commercial opportunities identified and progressed; 30 businesses signposted and achieving further areas of innovation support and funding (Invest NI Innovation Vouchers Scheme, KTP's, SMART & COMPETE AWARD); 36 businesses made aware of opportunities for interaction and collaboration with universities; 6 commercialising Research & Innovation awareness seminars held; 15 student placements identified; and 10 new Invest NI clients become actively engaged. Funded by Lisburn City Council and the EU under the Sustainable Competitiveness Programme 2007-2013, the tender for the delivery of the programme was awarded in June 2009 to University of Ulster (managed by the Office of Innovation) in partnership with South Eastern Regional College. It is assisting local businesses to identify and develop new technologies, new processes, new systems or products to add value and improve overall business competitiveness and profitability. The programme aims to: • provide innovation support to 12 businesses in the Lisburn City Council area; • present Ulster research commercialisation opportunities to Lisburn-based businesses; and • develop innovative joint collaborative projects between Lisburn-based businesses.

Aspect of Programme	Detail of Programme
	Support and advice is provided to businesses in order to tap into world class research to boost new business ventures or add new products and services to established businesses. The vision of the programme is to 'work together in strategic partnership as the building block for innovation'. Through this programme, innovation is promoted as accessible by all, with businesses encouraged to network, and to share best practice and ideas around innovation thus maximising commercial opportunities, creating new jobs and helping to grow the local economy. The programme also offers businesses the opportunity to access the world class research and new technologies developed by University of Ulster staff, which provided opportunities to explore the development of new commercially viable products. The support offered also means a way for the University of Ulster's scientists and researchers to commercialise their technology breakthroughs through technology licensing to businesses.
Support Offered	The Innovation Networks Programme has four key elements: **Access Innovation Road shows** The range of support offered was showcased through the 'Access Innovation Road shows' series of seminars, held throughout the City of Lisburn in September 2009 (3 in Lisburn, 1 in Belfast and 1 in Dunmurry). These were aimed at meeting with local companies and undertaking a bespoke business innovation and technology audit to highlight areas for improvement and opportunities for growth within the business. More seminars are expected to be held on an on-going basis. Support and advice offered included the following: • A free bespoke business innovation and technology audit to highlight areas for improvement and opportunities for growth within the client's business; • Access to cutting edge expertise and facilities from University of Ulster and South Eastern Regional College; • Opportunity for businesses to join a new Council-funded Innovation Support Programme; and • Advice on other innovation funding opportunities. ***1. Innovate*** Each participating business recruited to the "innovate" element of the programme benefits from up to 6 days innovation support from

Aspect of Programme	Detail of Programme
	experts at UU or SERC to explore a business opportunity or solve technological or knowledge based problems, as well as signposting to additional support if appropriate. Types of projects may include product development, design, prototyping or feasibility study. Spaces are limited on this element of the programme and are allocated on a competitive basis. To take part, eligible businesses were requested to complete an expression of interest for the 'Innovate' element of the programme, including company name, contact details, type of business, number of employees, main product / service and stating if they are Invest NI clients. ***2. Collaborate*** The programme provides an opportunity for businesses to network with other companies to identify and progress exciting new collaborative projects between businesses. Network events are being scheduled at the moment of undertaking this report. ***3. Commercialise*** Businesses also have access to the world class research and new technologies developed by the University of Ulster staff, which provides opportunities to launch new commercially viable products and enter new markets. Showcase events are being scheduled at the moment of undertaking this report.
Process of Delivery	Local companies are encouraged to grow their business through increased 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. The University and College undertake initial scoping projects with the business to test feasibility of a new business concept, or to test the physical prototyping of a new product or service, or in identifying a new process or service, before applying for support or funding for further development.
Funding	Total project cost: £180K. Funded under EU Sustainable Competitiveness Programme for NI, Priority 2 Sustainable Enterprise and Entrepreneurship (Sub-Priority: 2.2 DETI LED:Sub-Sub-Priority: 2.2.1 Local Economic Development.
Scale of Support	Between Aug 2011 and July 2012, 8 local businesses were recruited onto the programme and underwent a business and innovation assessment. The participants received 6 days support from the UU or SERC experts, paid for by Lisburn City Council. They were given direction and assistance to access further areas of innovation support and funding. A further 15 businesses were recruited onto the mini-innovate element of the programme. They underwent a business and innovation assessment and received 2 days support from UU or SERC experts in the areas of search engine optimisation or branding and design.'

Source:UU and http://successes.eugrants.org/ (project number 002829)

3.2.5 DARD / CAFRE Knowledge and Technology Transfer Activities[117]

3.2.5.1 Introduction

DARD's knowledge and technology transfer activities are delivered to farmers, growers and the food industry.

Within DARD, the College of Agriculture, Food and Rural Enterprise (CAFRE) has overall responsibility for Knowledge and Technology Transfer (KTT) to the agri-food sector, with the Agri-Food and Biosciences Institute (AFBI) being DARD's primary knowledge provider. AFBI also undertakes scientific and research and development work for the veterinary, fisheries and forest sectors and has overall responsibility for communicating the outcomes of this research to policy customers, DARD Veterinary Service, veterinary practitioners, the fishing industry and Forest Service.

The current structures 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 an 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.

DARD recognises the important role of innovation in securing a sustainable and competitive rural economy and society and that effective KTT is a key vehicle for promoting innovation. To that end, knowledge transfer arrangements form an integral part of DARD-funded research programmes undertaken by AFBI

In addition to the work that AFBI does with CAFRE, funded by DARD, AFBI also works in collaboration with primary producers, levy bodies representing that industry and commercial companies within the agri-food processing sector, providing innovative research and development. A key aspect of this non-DARD research is working with customers to ensure that new processes and technologies are demonstrated and transferred into practice to improve productivity and/or deliver new products and processes.

3.2.5.2 Aims and Objectives

DARD's Strategic Plan 2012-20 sets out its Vision of a thriving and sustainable rural economy, community and environment. The Vision is underpinned by 4 strategic Goals, namely:

- To help the agri-food industry prepare for future markets opportunities and economic challenges;
- To improve the lives of rural dwellers;
- To enhance animal, fish and plant health and animal welfare;

[117] Information in this section provided by Jackie Robinson, DARD

- To help deliver improved sustainable environmental outcomes.

DARD's current KTT activities serve all of these goals to some extent.

3.2.5.3 Supported Activities and Funding Available

The demonstration of new technologies and systems to the industry at CAFRE is achieved mainly through technology projects and initiatives. These projects aim to equip those in the industry with the knowledge, skills and experience to adopt the appropriate technologies and systems within their businesses. Depending on the project, economic, environmental, health and safety and animal welfare benefits will accrue to the agri-food industry.

It is difficult to put a specific figure on the level of funding for DARD's knowledge transfer activities at CAFRE, as funding for most of the programme is from the College's overall annual budget allocation from DARD.

3.2.5.4 Eligibility / Target Audience

The target audience for CAFRE's Knowledge and Technology Transfer programme includes developing farm and commercial horticulture businesses and food processing businesses. (A developing farm business is one generally of > 1 Standard labour requirement (SLR) where the farmer has the potential, attitude and capacity to implement change and improve farm business performance.)

3.2.5.5 Process

Farmers and Growers

The process of delivery of technology projects / systems to farmers and growers at CAFRE follows a number of defined steps:

- **Investigation –** this involves desk analysis of recently developed technologies emerging, for example, from R&D projects / systems developed within AFBI or from around the world to identify and investigate those with greatest potential benefit for the Northern Ireland agri-food sector. On identification of a potential technology / system, a business case for full implementation of the project is prepared and presented for approval to the appropriate CAFRE Head of Branch.
- **Initiation** of the project follows. This involves the implementation of the technology / system in the working environment on either the CAFRE farm / unit and / or on partner farms / units throughout Northern Ireland. This enables the technology / system to be tested under practical conditions and put in to a business context through financial evaluation. The implementation of a new technology / system on a typical farm under local conditions has proven to be a very effective training and development method in order to allow other farmers

to adopt the technology / system on their farms. During this phase, the competences and skills needed by farmers to adopt and apply the technology / system are identified and development commences on appropriate training programmes to facilitate adoption.

- **Demonstration –** this third phase involves the dissemination to the industry of information about the technology. This is achieved through a range of activities such as Open days where those within the sector are invited to observe and discuss the technology / system and the benefits delivered. The technology / system is also promoted through publications, information bulletins and technical articles within the farming press and by means of the RuralNI website**.**

In addition to CAFRE Open Days, AFBI delivers technology transfer events, publications and technical seminars and conferences. In any given year, AFBI will host 100 plus inward visits from industry groups and farmers, it will publish more than 50 technical articles and more than 80 scientific publications. Many of the on-farm research dissemination events delivered by AFBI are hosted at AFBI's research farms at Hillsborough and Loughgall. These are often delivered in association with CAFRE and industry bodies such as AgriSearch.

- **Adoption** is the final stage of the CAFRE Knowledge and Technology Transfer process. This is achieved by CAFRE Development Advisers through the delivery of short courses and "Challenge programmes" which encompass one or several technologies / systems and which places a strong emphasis on the development of the business. This training is delivered in both the formal teaching situation and through visits to partner farms, early adopters and Focus Farms to discuss the application and adoption of the technology / system in a practical setting. The experiences of partner farmers and early adopters in applying the technology within their own business provide a practical illustration of the benefits to be gained. Similarly, the adoption of a technology by a Focus Farm provides a means for promoting the technology / system to a wider audience than the customers of Development Service Advisers and programme participants.
- Training is supported by "mentoring" to enable participating farmers / growers to apply the knowledge and skills gained within their own business. The adoption phase normally continues for a period of five years, following the completion of the technology / system.

KTT Quality Management

An annual Quality Management Review of KTT projects is carried out by a Quality Management Team (QMT) chaired by CAFREs Head of Development Service. Projects are selected to ensure live projects are reviewed at least every two years. Members of the QMT will vary depending on the project, and will include an external specialist in the discipline and a CAFRE Head of Branch.

Project leaders are asked to deliver a ten minute presentation highlighting aims and objectives of the project, progress to date including costs, and outcomes in terms of

demonstrations, adoptions and knowledge transfer. The QMT will score the project on achievement of objectives, VFM and risk. Recommendations will also be given as to the future direction of the project.

Food industry

Technologists based at Loughry Campus work across all key industry sub-sectors to encourage innovation, promote the adoption of appropriate technologies and provide a comprehensive range of accredited training.

Technology transfer projects delivered by Loughry Campus comprise two main types: -

- Proactive projects – where new products/processes are identified and potential applications of new and emerging technologies are assessed. The outcomes from this work are disseminated / demonstrated to the industry and, where appropriate, adoption is encouraged.
- Reactive projects – where a project is initiated on the request of a food company for the benefit of that company. This "tangible" service is a chargeable service.

Uptake

See the next section (Impacts and Outputs).

3.2.5.6 Impacts and Outputs

The output of CAFRE's Knowledge and Technology Transfer is measured through the number of businesses adopting technology. At the end of the year a Management Report is prepared by CAFRE which details the apportioned cost of each main programme area delivered.

The NI Economic Strategy has a target to : Deliver a programme of Knowledge and Technology Transfer leading to 1500 adoptions of technology by agri-food businesses by 31st March 2015. DARD through CAFRE has achieved 1,323, 1,573 and 1,705 adoptions during each of the last 3 years.

3.2.6 AFBI

Within the AFBI Annual Report 2011/2012 it states under Corporate Goal 4 that AFBI's continued to focus on delivering innovation and scientific support to the agri-food sector through commercialisation and knowledge transfer activity. AFBI continued to promote its Intellectual Property Policy amongst staff. This policy highlights how new scientific know-how and knowledge should be managed by AFBI to ensure that it is captured and commercialised effectively. AFBI's senior management continued to meet with representatives from CAFRE to ensure that CAFRE's requirements in respect of knowledge transfer activities were met by AFBI. AFBI's target to publish 80 scientific papers in peer reviewed journals was exceeded with 103 papers being

published. Work to develop a Science Strategy was partially achieved with a Science Strategy sub-committee being established under the AFBI Board. Divisional Science Strategies were drafted; however the production of an overall Science Strategy will be progressed in 2012/13.

AFBI Innovations was established to support AFBI staff in taking new discoveries from AFBI's science base through the commercialisation process and to find markets for the Institute's new services and inventions. The objective of AFBI Innovations is to assist scientists in matching problems in the industries we serve with solutions discovered in our laboratories and in the field. We will then seek to "productise" these solutions, in the form of products or bespoke services. AFBI Innovations is currently progressing implementation of a 3 year Business Development and Marketing Strategy.

Key Services and Expertise

- A Research Support Office was established to assist staff with research and contract support. RSO's initial focus has been on working with research scientists to establish links and relationships with internal and external customers; to identify appropriate funding partners; to participate in events to profile AFBI expertise; to anticipate future developments and create dialogue with policy makers.
- AFBI Innovations supports scientists with legal advice on commercial agreements and contracts, management of confidentiality and Intellectual Property.
- DARD is managed as a prime customer with the appointment of a DARD Business Manager.

The DARD Business Manager is heavily focused on developing and agreeing a work programme for all DARD work and managing interactions with DARD policy branches.

- AFBI Innovations is responsible for supporting staff in complying with the AFBI IP Policy and applying the Rewards to Staff Policy.
- Supporting scientists to commercialise novel technologies and services through developing market assessments and commercialisation plans.
- Corporate Communications are responsible for Press Liaison services, Marketing and Brand management and Event management.

Key Customers / Sectors

AFBI Innovations is the "portal" for communication internally and externally, providing staff with a contact point for accessing commercialisation support and providing potential clients with an initial gateway into AFBI.

Key Achievements in 2011-2012 Year

- Managed the north-south Ministerial launch of the All-island Animal Disease Surveillance Report at the National Ploughing Championships in Co Kildare.

- Organised a High Pressure Processing open day to showcase AFBI's capabilities to local industry.
- Managed the issue of over 110 news articles, and over 50 media interviews and statements.

Source: AFBI Annual Report 2011/2012

3.1 Cross Border Supports for Knowledge Transfer

3.1.1 Innovation for Competitive Enterprises (ICE) Programme[118]

Aspect of Programme	Detail of Programme
Name of Programme / Support	Innovation for Competitive Enterprises (ICE) Programme
Target Group / Eligibility	The ICE Programme is an innovation programme aimed at established SMEs with innovation potential in the border counties of The Republic of Ireland, Northern Ireland and in Western Scotland.
Purpose / Aims / Objective	As well as assisting SME's in the three regions, ICE aims to transfer innovation policy insights and lessons between the regions.
Support Offered	The project aims to embed innovation practices within SMEs through a four-stranded approach: • Strand 1: Regional Information Resource and Network of SMEs for sharing of information, resources and knowledge • Strand 2: Access to regional Panel of Experts • Strand 3: Access to Technology Transfer and Licensing Opportunities • Strand 4: Specialist SME Innovation Learning Programme coupled with in-company mentoring and assistance with innovation planning and implementation (Learning By Doing) Each strand is delivered on a cross-regional cross-border basis through the tri-regional innovation network with an overall project team of one full-time Programme Manager and Project Administrator based at Dundalk Institute of Technology, one full-time Project Manager based in Scotland and one part-time Project Manager based at University of Ulster in Northern Ireland.
Process of	The ICE Initiative is collaboration between the University of Glasgow, Glasgow Caledonian University, the University of Ulster and is led by

[118] http://www.iceprogramme.com/

Aspect of Programme	Detail of Programme
Delivery	Dundalk Institute of Technology (the ICE Partnership). The programme is delivered on a modular basis combining workshop-based learning and on-site company specific action based learning sessions (mentoring) for the participating companies over the 12-month period. A key objective of the programme is to combine the theoretical aspects of innovation management and exploitation with practical implementation directly into an individual's organisation. This will be achieved through a combination of group workshops; in situation based learning within the work place and a number of real innovation projects that each individual will be responsible for progressing from the initial stimulation of ideas all the way through to exploitation.
Funding	The European Union's INTERREG IVA cross border programme, managed by the Special EU Programmes Body with match financial assistance from Scottish Enterprise and the accountable departments in Ireland and Northern Ireland, are funding this tri-regional innovation network project. The project is a three-year programme with a three-month set-up phase and a three-month wrap-up phase. The total project funding is €2.49m from the EU INTERREG IVA Programme with match funding contribution from Scottish Enterprise.
Scale of Support	Overall Activities versus Performance as at August 2012[119]: It should be noted that "targets" set for Cohort 1 of the ICE Programme are activities associated with the programme. The targets / activities set for Cohort 1 of the ICE Programme and the extent to which these have been achieved by the ICE Programme participants are shown in the table below.

Cycle 1	Target (Cycle 1 only)	Achieved	Percentage of Target Achieved
Outputs			
Innovation Audit	45	606	1,347%
Recruitment of Participants*	30	26	87%
In Company Innovation Learning Programme	30	26	87%
Companies Developing New Products	7	34	486%
Companies Developing New Processes	11	44	400%
Companies Developing New Business Models	12	23	192%

[119] RSM McClure Watters, *Interim Evaluation of the Innovation For Competitive Enterprises (ICE) Programme* (2012)

<table>
<tr><th>Aspect of Programme</th><th>Detail of Programme</th></tr>
<tr><td></td><td>
<table>
<tr><th colspan="4">Results</th></tr>
<tr><td>Number of Staff Trained in Company Innovation Process</td><td>90</td><td>75</td><td>83%</td></tr>
<tr><td>Technology Transfer Licensing Opportunities</td><td>5</td><td>4 and 6</td><td>200%</td></tr>
<tr><td>Number of Innovation Strategy and Action Plans in Place</td><td>30</td><td>26</td><td>87%</td></tr>
<tr><th colspan="4">Impacts</th></tr>
<tr><td>Companies Entering New Markets</td><td>8</td><td>23</td><td>288%</td></tr>
<tr><td>Companies Increasing Turnover</td><td>3</td><td>25</td><td>833%</td></tr>
<tr><td>Companies Increasing Exports</td><td>2</td><td>13</td><td>650%</td></tr>
<tr><td>New Jobs Created/ Safeguarded</td><td>30</td><td>103</td><td>343%</td></tr>
</table>
Note: 90 participants have been recruited across the 3 Cycles at present. 321 companies attended recruitment workshops against a target of 270 companies with the aim of achieving 90 participants.
</td></tr>
<tr><td>Impacts and Outputs</td><td>
Through the programme all company participants will become drivers of innovation within their own organisations. At the end of the programme the participating companies will:

Have an understanding of the importance and value creation of innovation;
Be able to develop and tailor the most appropriate approach to innovation within their business;
Have developed a company specific sustainable innovation strategy, with supporting actions and projects; and
Have a clear understanding of the various stages involved in the innovation cycle.

Each participating company through the programme will have detailed knowledge of the innovation process from being able to:

Create an environment where the stimulation of ideas can begin;
Understand and create a mechanism for the identification of commercially valuable ideas for further progression;
Progress each potentially good idea through a structured validation where a commercial and financial business risk assessment plan; and
Realise these business plans through a structured commercialisation process which will lead to the successful exploitation of the

</td></tr>
</table>

Aspect of Programme	Detail of Programme
	commercial opportunity resulting in new revenue streams. The Key quantitative and qualitative outputs expected from the project are: • Establishment of a tri-regional innovation network of SMEs • 27 information sessions over life-time of the project • 270 SMEs attend information workshops for the duration of the project • 135 SMEs undergo an Innovation Audit and feedback results • 90 companies to participate in an intensive Innovation programme • 50 new/modified products/services/ process or business models developed for commercialisation • 270 people (average 3 per company) involved in company innovation process • The creation of 90 new sustainable jobs/placements. • At least 15 technology transfer or licensing opportunities identified and investigated • Increase in turnover for participating companies by 10%. • 75% satisfaction rating from SME participants • Database of role models and ambassadors from the participating SME group which can support and encourage other SMEs in their innovation endeavours • Development of a sustainable network of SMEs allowing for exchange visits into the future.

Source: ICE Programme website; Interim Evaluation of the Innovation For Competitive Enterprises (ICE) Programme (RSM McClure Watters 2012)

3.1.2 InterTradeIreland – Cross-border Collaboration Vouchers

Table 3.19: InterTradeIreland – Cross-Border Collaboration Vouchers

Aspect of Programme	Detail of Programme
Name of Programme / Support	Cross-border Collaboration Vouchers
Target Group / Eligibility	The programme targets companies and academics in Ireland and Northern Ireland to assist in the development of collaborative partnerships.
Purpose / Aims / Objectives[Error! ookmark not defined.]	The Cross-border Collaboration Vouchers scheme aims to increase access to expertise from companies or academics in Ireland and Northern Ireland and to assist in the development of collaborative partnerships.
Support Offered	The cross-border collaboration voucher can be redeemed against the cost of travel or accommodation for up to £500 / €550 when meeting with partners or potential partners in the other jurisdiction with the view to engage in EU R&D and innovation funded projects. Complete a short application form (which can be downloaded from the website). Applicants will need to include contact information, details about the specific FP7 call of interest and the cross-border partnership that they would like to establish. Applications will be assessed within 2 weeks and if approved applicants will be notified immediately. Once approved, applicants will receive an expenses claim form to be used to redeem the voucher. Complete and return the form and to be reimbursed for travel and accommodation expenses incurred in the development, or establishment, of FP7 cross-border research partnerships. The voucher is valid for six months only.

Source: http://www.intertradeireland.com/fp7support/cross-border_collaboration_vouchers/

3.1.3 InterTradeIreland – All-Island Innovation Programme

Table 3.20: InterTradeIreland – All Island Innovation Programme

Aspect of Programme	Detail of Programme
Name of Programme / Support	All Island Innovation Programme
Target Group / Eligibility	Business interested in innovation / innovative practices
Purpose / Aims / Objectives	The All-Island Innovation Programme aims to promote and encourage innovation across the island
Support Offered	Support is offered through a series of free innovation lectures, seminars and master classes held throughout the year to share international best practice in areas of innovation.
Funding	It is free for participants at the point of entry

Source: http://www.intertradeireland.com/all-island-innovation-programme/

3.1.4 InterTradeIreland – Fusion

Table 3.21: InterTradeIreland – Fusion Programme

Aspect of Programme	Detail of Programme
Name of Programme / Support	The Fusion Programme – InterTradeIreland's all-Island Technology Transfer Programme
Target Group / Eligibility [120]	FUSION, InterTradeIreland's all-island technology transfer programme, can help you to bolster your business's bottom line and get ahead of the competition by partnering your company with a third-level institution with the specialist expertise you need and a high calibre science, engineering or technology graduate. The graduate is employed by you and is based in your company throughout the project (12 - 18 months) with mentoring from the academic partner and InterTradeIreland FUSION consultant. To qualify for financial support through our FUSION programme your business must be: • Located on the Island of Ireland (North or South) • Financially viable • Able to demonstrate the need for InterTradeIreland FUSION support • Demonstrate the capacity and commitment to support a FUSION project at senior management level.
Purpose / Aims / Objectives	Potential Benefits of the Programme Include: • On average, each company taking part on the FUSION programme benefits from over £1 million worth of sales or efficiency savings in the three years following the project. • Develop or improve products, processes or services • Streamline business processes to increase efficiency and performance • Develop and implement new technologies, systems or processes • Improve capabilities in innovation, design and technology

[120] http://www.intertradeireland.com/fusion/eligibility/

Aspect of Programme	Detail of Programme
	• Reduce costs • Increase sales.
Support Offered[121]	• Funding for product/service development • Funding for process improvement **Step 1: Initial assessment** • Contact our team to discuss your particular business needs and find out how the programme could help you. If you are eligible for support, one of our consultants will arrange a meeting to understand your particular needs in more detail. **Step 2: Business-Academic Partnership formed** • We will work with you to discuss your specific innovation needs and identify potential university or college partners with the expertise that you require. Alternatively, you may already have an academic partner in mind that you would like to work with on your FUSION project. Note: As this is an all-island programme, the third-level institution which you are partnered with must be based in the opposite jurisdiction to your business. **Step 3: Complete a joint application** • Together with your academic partner, you will submit a joint application for support. The application sets out the project plan, objectives, milestones and the support your company needs. You will also scope the graduate skills/experience you require to help manage the project. Your FUSION consultant will help you to complete your application and you can also attend an application workshop. **Step 4: Approval** • The application will be considered at a monthly meeting and if approved, you will be notified immediately. Next, we will work with you to help you recruit your graduate project manager. **Step 5: Graduate recruitment**

[121] http://www.intertradeireland.com/fusion/how-it-works/

<table>
<tr><th>Aspect of Programme</th><th>Detail of Programme</th></tr>
<tr><td></td><td>
You will supply a job/personnel description for the graduate position and we will advertise the position on your behalf. Applications are initially shortlisted by your FUSION consultant and suitable candidate applications are then reviewed by you and your academic partner for interview and selection.
Step 6: Project Implementation
Throughout the duration of the project, your company will work in partnership with the graduate project manager and the academic institute. InterTradeIreland will assist in co-ordinating the project by providing a FUSION consultant to oversee its successful implementation. As part of the programme support package, the graduate will be funded by InterTradeIreland to complete a Post-Graduate Diploma - Business & Management delivered on a part-time basis by Queen's University, Belfast. They may also be funded to complete specific training courses to improve their capabilities and expertise in delivering your project.
</td></tr>
<tr><td>Funding</td><td>18 month support package - worth up to £44,250/€52,800 typically in the area of new product/service development

12 month support project - worth £31,000/€37,000 typically in the area of process improvement</td></tr>
<tr><td>Scale of Support[122] and Impacts and Outputs</td><td>
<table>
<tr><th>Sector</th><th>No. of Companies Supported</th></tr>
<tr><td>Construction</td><td>7</td></tr>
<tr><td>Engineering</td><td>19</td></tr>
<tr><td>Food</td><td>28</td></tr>
<tr><td>IT</td><td>21</td></tr>
</table>
</td></tr>
</table>

[122] http://www.intertradeireland.com/fusion/companies_we_have_helped/

Aspect of Programme	Detail of Programme		
	Medical Devices	9	
	Pharmaceuticals	3	
	Manufacturing	4	
	Telecommunications	4	
	Waste Management	2	
	Energy	5	
	Electrical	2	
	Machinery and Equipment	3	
	Plastics / Rubber Plastics	3	
	Printing	1	
	Renewable Energy	2	
	Sensors	2	
	Consultancy	2	
	Analysis	1	

Aspect of Programme	Detail of Programme	
	Bioscience	1
	Clinical Trials	1
	Electronics	1
	Equine	1
	Furniture	1
	Health & Life Science	2
	R & D	1
	Software Development	1
	Transport	1
	Hospitality	1
	HR	1
	Lighting	1
	Media / broadcasting	1
	Total	**132**

Source: http://www.intertradeireland.com/fusion/

3.1.5 InterTradeIreland – INNOVA

Table 3.22: InterTradeIreland – INNOVA Programme

Aspect of Programme	Detail of Programme
Name of Programme / Support	INNOVA Programme – Company to Company R&D Support
Target Group / Eligibility	The INNOVA Programme is aimed at businesses with an innovative idea, with strong commercial potential and who have found a strategic partner to make it happen. Eligibility criteria include: • Companies should be based on the island of Ireland • Ideally, you should have identified a suitable innovation partner to work on the project from the other jurisdiction • Your project should have clear demonstrable benefits to you and your partner and represent a fundamental part of your strategic business plans • Applicants are particularly welcome from the following sectors: life and health sciences, polymers and plastics, environmental, agri-food, ICT and engineering • Your proposal must be able to demonstrate strong commercial potential • IP agreements must be in place • As numbers are limited, previous participant companies will be subject to additional scrutiny levels. Concurrent participation is not deemed eligible.
Purpose / Aims / Objectives	Innova has up to £250k/€300k funding available for strategic North/South Collaborative innovation partnerships to develop new products, process or service development or to build on existing innovations. Companies benefit from pooling their expertise and resources to bring their innovations to market faster than if working alone. In 2013, we are now actively looking for further partnerships which have demonstrable commercial potential. Partners can work in the same sector or come from different but complimentary disciplines such as an environmental company working with an ICT organisation.

Aspect of Programme	Detail of Programme
	Business focussed innovation partnerships are currently invited to apply for Innova funding. In particular, projects in the following areas are now being sought : • life and health sciences including polymers and plastics • agri-food • advanced engineering • advanced materials • telecoms • environment • ICT
Support Offered	You can claim up to £250,000/€300,000 per partnership to cover staff, equipment, consultancy and the operating costs of the innovation project.
Process of Delivery	If successful, you will be issued with a letter of offer which outlines the amount of funding awarded - up to the maximum level of £250,000/ €300,000 per project. You will then submit a quarterly claim in arrears for eligible costs named.
Funding	You can claim up to £250,000/€300,000 per partnership
Scale of Support	To date InterTradeIreland has released over £5m in funding and supported 24 partnerships.

Source: http://www.intertradeireland.com/innova/

4 BENCHMARKING

4.1 Introduction

This section gives an overview of numerous comparable knowledge transfer programmes in several countries across Europe and the UK. These are:

- Switzerland;
- Sweden;
- Finland;
- Scotland;
- Wales;
- Republic of Ireland;
- Joint Information Systems Committee (UK); and
- National Centre for Universities and Businesses (UK).

A brief description of interventions is included and where information is available, this includes: structure, management and delivery; company and project eligibility, measuring success and lessons learnt.

A summary of each of the relevant programmes featured in these countries is presented alongside Connected 2 for comparison in Section 10 of the report.

4.2 Switzerland

In Switzerland[123], no public funding is provided for R&D or innovation directly to businesses. All support in this area is provided to the universities and technology centres, which in turn need to work with businesses in order to access the funding.

The *Federal Office for Professional Education and Technology* (OPET) is responsible for the Universities of Applied Sciences and for innovation policy. The national *Innovation Promotion Agency KTI* is the main public funding source for applied R&D in Switzerland and contributes substantially to policy making in this area.

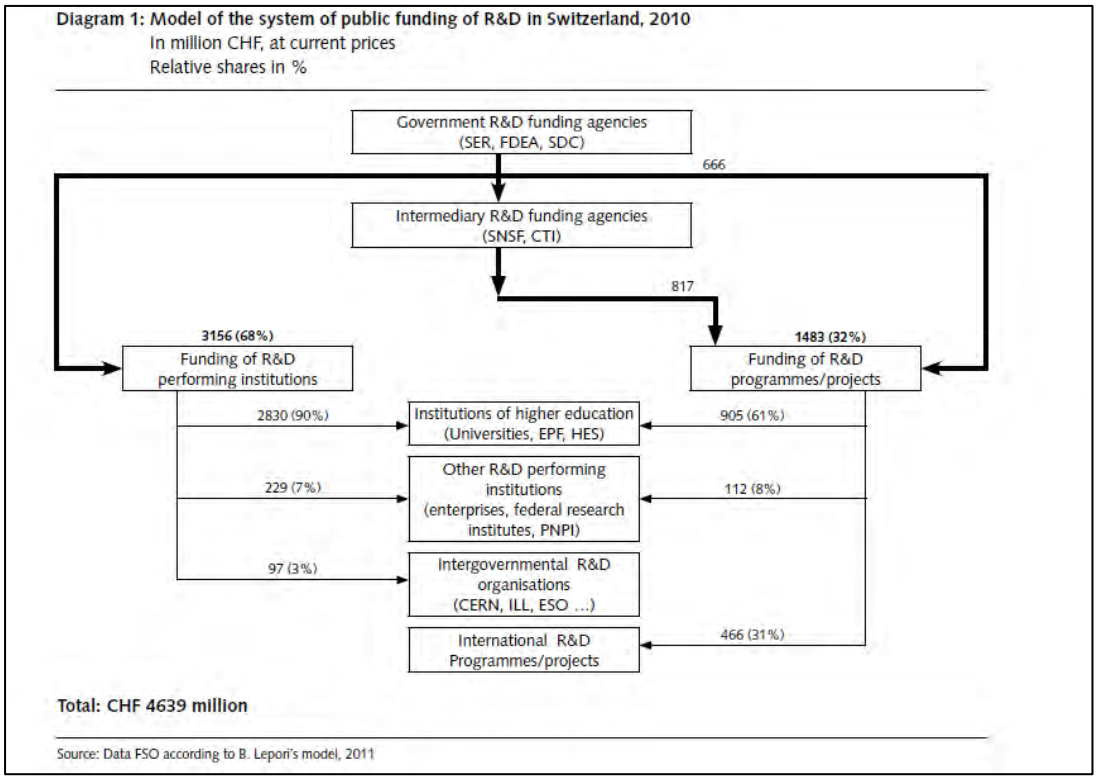
The diagram below (Fig 5.1) shows the model of the system of public funding of R&D in Switzerland. This illustrates that Government funding is delivered though three main funding agencies, State Secretariat for Education and Research (SER), Federal Department of Economic Affairs (FDEA) and Swiss Agency for Development and Cooperation (SDC). Some of the funding is passed to intermediately funding agencies who solely deliver funding to R&D programmes and projects directly. The intermediate agencies include the Swiss National Science Foundation (SNSF) and the Commission for Technology and Innovation (CTI). These agencies are responsible for managing research programmes and projects at the national and international level. With the

[123] The Story behind Swiss Innovation: Published by economiesuisse, April 2013

grants they receive from the Confederation, they fund research projects run by higher education institutions, irrespective of whether or not these are integrated in national and international research programmes.

The diagram shows that 68% of public funding for R&D in Switzerland in 2010 went to Funding of R&D Performing Institutions, of which 90% went to Universities, Federal institutes of technology (EPF) and Universities of applied sciences (HES).

Fig 4.1: Model of the System of Public Funding of R&D in Switzerland



The Federal Office for Professional Education and Technology (OPET) is responsible for the Universities of Applied Sciences (HES) as well as innovation policy, while the National Innovation Promotion Agency KTI (a sub-unit of OPET) is the main public funding source for applied R&D in Switzerland, with a considerable contribution to policy making.

OPET is a federal competence centre covering the areas of vocational education and training, Universities of Applied Sciences and innovation policy. It aims to ensure a high level of innovation, and to strengthen the Swiss economy.

With regards to innovation policy, OPET aims to develop and improve tools for promoting innovation and new technologies. The main method used for the development of innovation is the Innovation Promotion Agency. Founded in 1943 under a different name, this organisation improves the transfer of knowledge and technologies between universities and the industry, as it is necessary to take steps in

order to bring universities and companies closer together. It backs innovative projects, from their inception up until their successful market launch, identifying those which have substantial market and application potential. The organisation also aims to improve collaboration between national research institutions and international partners.

KTI is located in the OPET, and is made up of a number of different teams (5-10 members each, and with support from a secretariat) which focus on several different funding areas. The teams are coordinated via an operations council.

For the 2012 year, KTI had an operating budget of €120m (sourced from OPET), which has seen a general increase year after year. Most of the funding is allocated to the manufacturing sector. KTI is viewed as the most important funding body in Switzerland regarding applied research, facilitating the running of a number of initiatives and programmes.

Switzerland ranks 1st in the:

- Innovation Union Scoreboard 2013;
- Global Competitiveness Report 2013-2014; and
- Global Innovation Index 2013.

In 2011 their spending on R&D was 2.9% of GDP compare to 1.77% in the UK. Although there are no directly comparable schemes to Connected 2, there are significant lessons to be learnt in the delivery and structure of R&D funding in Switzerland. The Swiss have multiple agencies tasked with promoting R&D and Innovation both nationally and internationally. In Switzerland, basic research mainly takes place at the federal institutes of technology and at universities. Applied research and development and the transfer of knowledge into marketable innovations, however, is primarily the domain of the private sector and universities of applied sciences. The public sector finances research according to liberal principles. This means that funds are awarded on the basis of the researchers' individual initiative on a competitive basis, where the decisive factor is the quality of the proposals submitted. Promotion of international cooperation is another cornerstone of this policy.

Under the Research and Innovation Promotion Act (RIPA), the Confederation is responsible for providing grant funding for research and innovation through the Swiss National Science Foundation (SNSF) and the Commission for Technology and Innovation (CTI). It also provides the necessary funding for the Association of Swiss Academies and supports nearly 30 non-university research institutions. Finally, the Confederation provides funding for teaching and research at institutions in the ETH domain.

The cantons in turn are committed to promoting research in their role as funding bodies of the universities and universities of applied sciences.

4.3 Sweden

There are two key agencies responsible for the delivery of innovation in Sweden: the Swedish Research Council; and the Agency for Innovation Systems (VINNOVA). Both of these organisations are covered in detail below:

4.3.1 Swedish Research Council

The Swedish Research Council is an authority within the Ministry of Education and Research. Their activity includes the promotion of communication between researchers and academic areas, as well as between researchers and society in general. In 2012, the Council distributed SEK 5 billion in research support, highlighting its position as the largest state funder of basic research at higher education institutions and research institutes. The main recipients of the funding are the medicine and health and the natural and engineering science sectors. Within the council there are special decision-making bodies, scientific councils and committees, with a secretary-general involved in each of these.

Although the Swedish Research Council does not have a scheme which is directly comparable to the Connected Programme they do provide funding to similar activities including:

- Grants for Recruitment of Researcher;
- Grants to hold Innovation Conferences which act as network events for companies and universities; and
- Grants for scientific research.

4.3.2 Agency for Innovation Systems (VINNOVA)

The Agency for Innovation Systems (VINNOVA) is Sweden's innovation agency. Founded in 2001, it aims to promote sustainable growth via the improvement of conditions for innovation, and fund needs-driven research. They also have a long term goal of making Sweden a world-leading country in innovation and research.

VINNOVA stimulates collaboration between universities, companies and research institutes via the encouragement of a greater use of research, and by making investments in solid research and innovation settings. They also collaborate with other innovation organisations, in order to further their impact.

VINNOVA invests approximately SEK 2 billion per year across a variety of initiatives, with funding almost doubling from what it totalled previously. Decisions on the allocation of funds are made with support from national and international experts, and the main focus of their innovation is on the health, biotechnology and transport sectors. With offices in Stockholm and Brussels, approximately 200 individuals are employed by VINNOVA.

One strategic area covered by VINNOVA is the Knowledge Triangle, which aims to generate an interaction between education, research and innovation. This would result in an increased utilisation of university activities, and an overall increase in mobility between universities and industry. Similarly to Northern Ireland this is achieved through a series of funded programmes aimed at increasing the triangle of knowledge transfer and although there is not presently a scheme which is directly comparable to Connected the VINNOVA does fund some of the activities that Connected would support such as:

- Graduate placements;
- Financial support for collaboration; and
- Advice and guidance on difficult issues such as confidentiality and Property Rights.

4.4 Finland

There are two main bodies responsible for the innovation system in Finland, namely the Ministry of Employment and the Economy, and the Ministry of Education and Science. In addition to these, Tekes is the main funding agency for increasing innovation, development and research in Finland.

A non-profit, publicly funded organisation, Tekes enhances innovation activities in research communities, industries and service sectors, and does not only focus on funding technological breakthroughs, but also service-related, design, business and social innovations. The organisation works with the best innovative companies and research facilities in the country, financing approximately 1,500 business R&D projects and 600 public research projects (universities, research institutions etc.) per year. Funding is mainly directed at the projects which pose to create the greatest long-term benefits for the economy and society. Tekes received 2,900 funding applications in 2012, with 1,700 development ideas eventually being tested. Their target turnover for 2012 from company projects totalled €6.2 billion.

Tekes utilises an impact innovation assessment in order to guide their funding and programmes. It monitors the impacts of projects that it is involved in, collecting project impact information at the beginning and end of each project, as well as three years after its completion. These assessments, conducted by external experts, give insight on how the objectives of the programme have been obtained, its effectiveness, and any methods that will aid in the improvement of Tekes programme operation and strategies.

An evaluation of Tekes was conducted by the Ministry of Employment and the Economy in order to assess its effectiveness. It concluded that Tekes is a strong performer and one of the leading innovation agencies in the world. However, the period from receiving a grant or loan until reaching commercially successful innovation is a long and indirect one. Tekes has contributed to increased research intensity and improved cooperation between companies and knowledge infrastructure.

It is also worth noting that the SME co-operation towards innovation in Finland has been growing at a faster rate that the average across Europe.

4.5 Scotland

4.5.1 Scottish Funding Council – Knowledge Transfer Grant

The main funding body for Scottish universities and colleges is the Scottish Funding Council (SFC). Established in 2005, SFC is a national strategic body, responsible for funding activities including teaching and learning provision, and research in Scottish colleges and HE institutions. The remit of the SFC's two senior directors covers research and knowledge exchange, and institutions and corporate services.

In order to achieve high quality learning provision in further and higher education institutions, SFC invests in the development of a comprehensible education system which will lead to enhanced economic, educational and social outcomes for the people of Scotland, via improved learning, research and knowledge transfer. The main activities of the SFC are:

- Developing and managing Outcome Agreements with colleges and universities;
- Supporting national priorities in improving access to knowledge exchange, innovation and research; and
- Managing collaborations between universities and colleges.

Funding for universities totalled £999.2m in 2011-2012, with £288.6m of this being allocated to general research and knowledge transfer (£242.6m from the General fund, and £46.0m via the Horizon fund). Both of these figures have seen a decline from the previous year however; in 2010-2011 funding was totalled at £1,124m, with £301.0m spent on research and knowledge transfer (£244.0m from the General fund and £57.0m via the Horizon fund).

One such method of knowledge exchange utilized by the SFC is their **Knowledge Transfer Grant**. This grant was introduced by the Scottish Higher Education Funding Council (one of the predecessors of the SFC) in 2001-2002 as a means of providing institutions with the necessary resources for delivering knowledge exchange activity. It gives the institutions the opportunity to choose which activities best meet their own aims and build on their current strengths. The grant consists of a baseline sum allocated to each university, acknowledging the fact that it is necessary for all institutions to maintain knowledge exchange staff. An annual knowledge exchange return is requested from each individual institution, in order to determine how they used the grant, statistics covering the results from any knowledge exchange activity, and the impacts it had.

A three-stage review of employer engagement and knowledge transfer has been carried out by the SFC from 2009-2011. The evaluation sought to investigate methods of improving the effectiveness of the programmes, and to assess their outcomes and

recognise the benefits they provide. It consisted of a college survey which included input from 35 colleges, the development and promotion of a maturity model, a survey of 122 employers which measured economic benefits and impacts, and 33 qualitative senior college staff interviews.

The evaluation was able to draw a number of conclusions. The college surveys showed that an increasing number of institutions had a desire to become more involved in business development, and there was a growing trend of utilizing facilities as a means of drawing in employer activity. This in turn led to the building of relationships with these employers. 61% of colleges had an increase in the number of external employers being worked with (note however that this percentage is slightly less than what was seen in previous years). 94% of those surveyed felt that the extra funding supported additional activities, on top of what would have been delivered without it. Most significantly, 80% of colleges stated that they would continue to sustain the additional activity that was brought about by the funding to some degree (61% said 'most' of the activity and 19% stated 'all'). Employers also acknowledged benefits from collaboration with colleges, with 22% reporting employment benefits and 20% stating turnover benefits as a result of engagement.

Also of note: the SFC has completed a review of KT activities and impacts, which set out the KPIs to be used in any KT activity.

4.5.2 Scotland: Interface

The following paragraphs present an overview of Scottish Interface – the Knowledge Connection for Business (Interface). The information is based on information presented in:

- 2007 Evaluation of Interface;
- Consultation with the Interface Director;
- 2011/2012 Interface Annual Report;
- EKOS – Evaluation of Interface October 2010; and
- BiGGAR Economics Evaluation of Interface 2013.

Interface was established in August 2005 based on recognition that despite SMEs representing the largest share of the business sector in Scotland they accounted for approximately only 2 to 5% of businesses engaging with Universities. Specifically Interface was designed to address market failure in respect of difficulties companies face in identifying and accessing support, compounded by the mass of information which has to be obtained and examined to assess supply-side capability and capacity

(the Higher Education Institutions (HEIs) and Research Institutions (RIs[124])), in order to reach the appropriate collaborative partner.

In Scotland the growing policy emphasis on supporting KT, and on stimulating innovation and R&D in the business sector through contact with HEIs and RIs is demonstrated in a number of ways:

- Smart Successful Scotland, the country's key enterprise development strategy;
- Scottish Funding Councils Corporate Plan; and
- A range of reviews and recommendations at UK and Scottish levels, supporting KT activity between SMEs and HEIs.

Interface was seen as playing a pivotal role in the KT landscape in Scotland, by positioning itself as a central signposting mechanism and brokerage service for business to HEIs and RIs, with well-developed funding mechanisms already in place to progress activities following the identification of the most appropriate partner (the majority of this funding is made available by the Scottish Funding Council). The mid-term evaluation concluded that:

- The concept of Interface is valid, and it adds value to the KT landscape in Scotland;
- It is addressing issues of confusion and lack of transparency for businesses seeking to tap into the HE sector's expertise and resources;
- It is stimulating demand in the marketplace;
- It is widening the spectrum of business interactions with HEIs;
- It complements other initiatives and has built up good relationships with these; and
- It plays a useful role as a first port of call and signposting agency. Structure, Management and Delivery.

The Interface Team comprises a Director, three assistants and one part-time administrative assistant: the Director and the three assistants all having working knowledge of industry, and in many cases innovation and knowledge transfer activities. The team is located within the University of Edinburgh's Research and Innovation Department. A Board is also in place to provide independent advice on the development and implementation of the strategy.

Interface has an annual budget of £250,000 per annum. This budget is split approximately 80% dedicated to staff costs (approximately £200,000) and 20% for promotional/marketing activities (£50,000).

The service delivered by Interface can be summarised, as follows:

[124] Initially focusing on HEIs only since January 2007, Interface has expanded its remit including Scotland's research institutes adding to its portfolio of partners and now represents over 20 higher education and research institutions.

- ***Promotion and Awareness raising activities*** – the team seeks to develop its reach and profile across three communities: businesses, the HEIs and RIs, and business intermediaries and advisors. This is primarily achieved by attending and hosting events on a regular basis and networking with intermediaries and advisors. Consultation with the Director indicated that advertisements in the trade press and other regional press activities had shown low levels of return. The 2007[125] evaluation and other monitoring has indicated that:

  - Over half (53%) of enquiries were generated directly from Interface's marketing and networking activities; and
  - Referrals where received from a number of intermediaries, particularly business advisors (15%) and the Scottish Enterprise Network (13%).

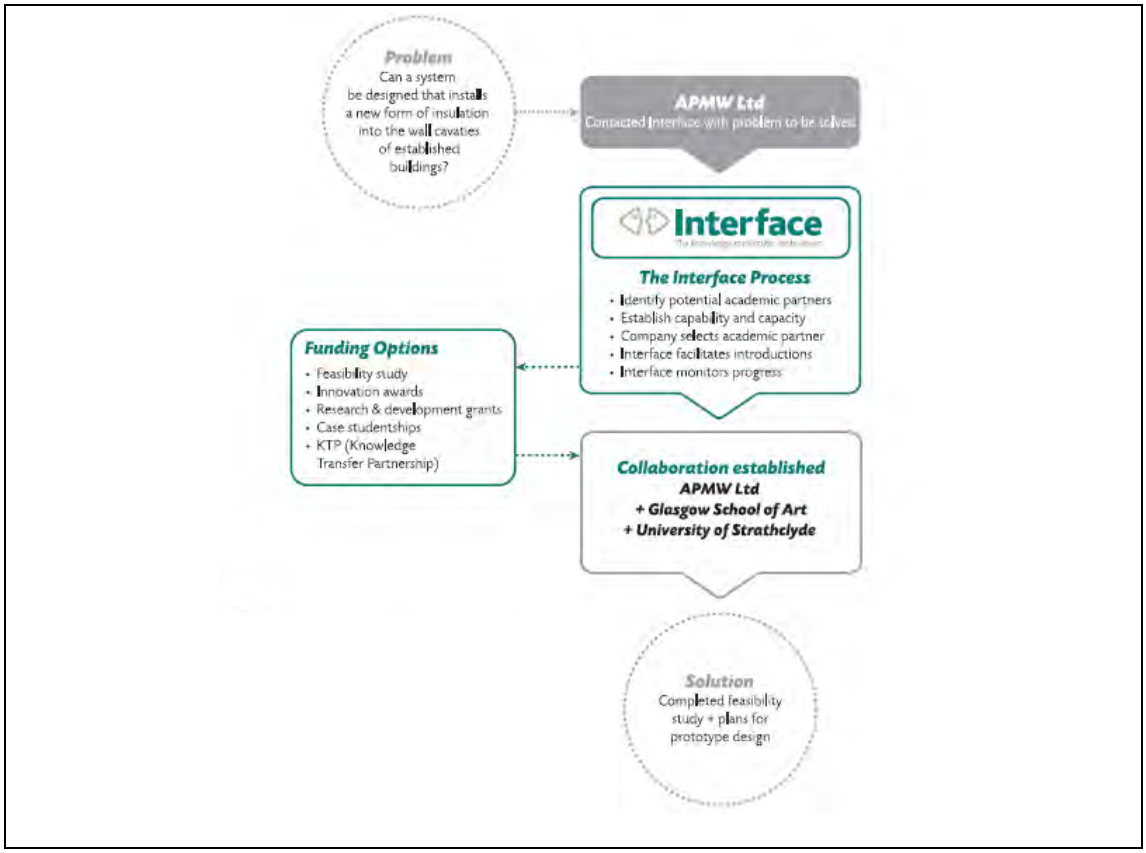
- ***Handling and profiling the enquiry*** – following an enquiry a member of the Interface team contacts the business to profile the enquiry in detail. The Director has indicated that this is a vital part of the process as it enables Interface to get a clear understanding of the profile and needs of the business, thereby ensuring that the expertise/capacity identified is an appropriate match i.e., business characteristics, project specifics, solution/project timescales etc.;
- ***Partner search*** – following agreement of the enquiry profile with the company the Interface Team references an internal database to identify potential academic partners and establish capability and capacity. This database has been developed by the team and is updated on a regular basis to ensure it reflects current market expertise. This match process has proved to be highly successful with less than 1% of enquiries not being matched;
- ***Presentation of results and selection of the academic partner*** – the outcome of the search is then provided to the company. The search may show that only one HEI or RI has the capability and capacity to deliver or may highlight a number of potential partners. The final selection is made by the company;
- ***Facilitation of meeting*** – once the company has made is selection the Interface Team facilities introductions and meeting arrangements. In order to ensure that activity is progressed Interface requests that all academic partners contacted respond to the business within a two week period (the Director has indicated that there is currently a Partner response rate of 90%);
- ***Progress monitoring*** – the Interface Team will monitor the progress of a project through to completion. The 2007 evaluation commended the commitment in this sense while at the same time recognising that a range of factors are out with Interface's direct control (e.g., capacity of businesses, costs, culture differences, etc.). In order to ensure that all activity can be easily tracked and assessed, the Interface Team also talk to the HEI/RI partner once a month and records any change of activity; and

[125] Based on the analysis of 507 enquiries received to end July 2007

- ***Additional support*** – in addition to the main element outlined above, the Interface Team will also sign post and advise companies on wider supports available to progress their projects i.e., funding options.

Figure A below presents a summary of how Interface assisted one Scottish company.

Figure A Interface Progress



Source: Interface

4.5.2.1 Company & Project Eligibility

Interface is open to all businesses both internal and external to Scotland, regardless of sector and size, indeed Interface has worked alongside Scottish Development International (SDI) in identifying and facilitating appropriate academic partners for investee companies. The service is entirely free to all businesses. A range of project types are supported including:

- Research & technology capabilities
- Contract research and collaboration
- Specialist expertise
- Consultancy
- Industrial placements
- Training, support &

development

- Access to equipment and facilities
- Strategy, marketing & planning support

Projects can range in size and duration e.g., from a three year collaborative project to a half day targeted project.

4.5.2.2 Measuring Success

The aim of Interface is, 'to develop interaction and stimulate innovation to benefit Scottish companies and the Scottish economy'. A range of targets is set for Interface, these include:

- Events attended
- Events hosted (SMEs attending)
- Enquiries generated (including % of new enquiries generated)
- Numbers presented to academic base
- Searches handled
- Projects initiated
- Projects achieved
- New generation companies engaging

The latest monitoring statistics for Interface (EKOS Report October 2010) indicate show the following:

- Over 2,173 enquiries received;
- Over 1,060 enquiries have progressed beyond enquiry stage to establishing capability and capacity;
- 272 company and university collaborative projects initiated;
- 67% of enquiries are from Scottish SMEs; and
- 14% of enquiries are from the rest of the UK & International organisations.

4.5.2.3 Lessons Learned & the Way Forward

The EKOS evaluation (2010) comes to the following conclusions regarding the Interface Programme which have been developed based upon evidence provided on programme performance and through stakeholder consultation.

- Interface is a well-managed and efficient project, providing a valuable and valued service to companies HEIs / RIs and other business support organisations and stakeholders;
- It has a distinctive and important role in the Scottish Innovation system, and has help raise the profile of knowledge exchange while addressing known market failures constraining HE / Business interaction;
- While there are areas for improvement and development the interface model works and does not need substantial overhaul; and

- There is a strong and widespread support for the continuation of Interface.

Future Development

The EKOS study objective related to two key areas:

- Future scale and focus; and
- Sustainability.

The following recommendation where delivered by the EKOS report in relation to the two areas listed above:

- Recommendation 1: Interface should continue to act as a central point of entry for companies into the academic expertise in Scottish Higher Education;
- Recommendation 2: Interface should be developed as a national service for connecting companies with the academic knowledge base;
- Recommendation 3: Interface should be restructured as a regionally based service with staff located in up to 5 offices;
- Recommendation 4: Interface should continue to focus on SMEs in Scotland as its primary target market. Working with international companies should be on a reactive basis, supported by SDI through a service level agreement that provides resources to interface to service this market. Social Enterprises should be supported, but again on a reactive basis and specific effort should be paid to key sectors currently under-represented in their use of the service;
- Recommendation 5: Interface should continue to focus on Scottish HEIs and RIs as the supply side knowledge base with which it engages;
- Recommendation 6: Interface should use the proposed new regional structure to stimulate demand, rather than additional marketing resources;
- Recommendation 7: The Scottish Funding Council should remain the core funder of Interface, with HE, SE and SDI contributing to the growth in delivery;
- Recommendation 8: Interface should consider introducing a charge for repeat customers, but services to new customers should remain free;
- Recommendation 9: The staffing structure for Interface should be reviewed and revised in light of the regional structure;
- Recommendation 10: Interface should not move to an online service, although efficiency gains through use of online tools should be investigated; and
- Recommendation 11: The monitoring processes should be streamlined to provide reporting on essential issues in line with the main objectives of the service.

In the executive summary to the “Evaluation of Interface – The Knowledge Connection for Business – May 2013” the main impacts of the programme are reported as being:

- Health Benefits;

- Interface has helped to facilitate many projects that directly or indirectly help to improve the health or well-being of particular groups in society such as the elderly or disabled.

- Environmental Benefits; and

- Some of the projects that Interface has facilitated have involved companies directly involved in the low carbon economy (e.g. renewable energy or recycling) while others have helped businesses in other sectors to reduce the negative environmental impact of their activities. Both types of project have helped to generate environmental benefits to society as a whole; and

- Sustainability Benefits

- Many of the projects Interface has helped to initiate have generated positive impacts across the realms of society, the economy and the environment (e.g. by supporting jobs in rural areas). These types of projects contribute to the overall sustainability of the Scottish Economy.

The key conclusion from this study is that Interface is making a significant contribution to helping the realise the Scottish Government's outcome of becoming a better educated, more skilled and more successful country that is renowned for its research and innovation.

Through its focus on SMEs and micro enterprises, Interface is fulfilling an important gap in Scotland's current knowledge exchange landscape by helping to make engagement between SMEs and academia more cost effective and efficient. The study has found evidence that interface is effectively reaching harder to reach small and micro enterprises with little experience of engaging with academia, Importantly however it has also found that the value of services it provides does not necessarily diminish as businesses gain experience of engagement.

The main lessons learned from the study are:

- Although many business have had very positive experience of working with HEIs this is not universal and there is yet still more that HEIs could do to ensure that the outputs and impacts of all projects are maximised; and
- Maintaining an on-going relationship with clients after a project has been initiated is an important part of the Interface service offering that is likely to become increasingly important as the number of clients assisted increases.

4.6 Wales

The Higher Education Funding Council for Wales (HEFCW) is the Welsh Government Sponsored Body responsible for the funding of the higher education sector. Established under the Further and Higher Education Act 1992, it utilises resources from the Welsh Government, amongst others, in order to make the most of the

contribution that the higher education sector provides to the economy and society, and provide the highest quality HE learning and research. A key area of focus, as identified in their Corporate Strategy, involves **knowledge transfer and ensuring that there is a strong relationship between HE institutions and external businesses**.

Similarly, **Expertise Wales (EW)** is a Government established website/searchable database, which provides businesses with a link to the services, facilities and experience offered by Welsh universities and colleges. The data featured on the website is provided free of charge, and aims to assist and encourage businesses and individuals that are pursuing academic expertise and facilities. Also featured on the website are a selection of success stories, demonstrating how Welsh businesses have benefited from innovation support and cooperation with universities. The project receives funding from the European Regional Development Fund (ERDF), via the Academic Expertise for Business programme (A4B). The A4B programme, which is in collaboration with the HEFCW, is a six-year effort which is funded by the Welsh Assembly Government and European Structural Funds. It is managed and facilitated by the Welsh Government with the aim to harness the commercial potential of the Higher and Further Education sector in Wales. The programme is worth up to £70 million and runs for a six year cycle. Concluding in 2014, it provides funding support for knowledge transfer from universities to businesses via a single strategic fund. A4B contains several elements taken from existing programmes, such as the Knowledge Exploitation Fund (KEF), the Centres of Excellence for Technology and Industrial Collaboration (CETIC), Know How Wales (KHW) and Accelerate Clusters (AC). These programmes have all achieved some level of success with regards to knowledge transfer from HE/FE institutions to Welsh businesses.

Innovation Wales is a newly introduced strategy, arising from the need for an innovation strategy which deals with the commercial exploitation of R&D and the promotion of innovation. Developed following an extensive period of public consultation, it identified the following key areas for action regarding innovation:

- Improving collaboration;
- Promoting a culture of innovation;
- Providing flexible support for innovation;
- Innovation in government; and
- Prioritising and creating critical mass.

With regards to improving collaboration, Innovation Wales states that efforts to ensure that knowledge from universities and colleges is being used effectively in aiding growth in economic activity and business innovation must be intensified. The government, academia and businesses must work to discover methods of making this target applicable. Support for innovation will be mainly focused on projects that promote collaboration, whilst providing economic and social impacts. Current programmes such as A4B will be independently assessed, and will face modification, or even discontinuation, if they are not deemed satisfactory. Overall, knowledge exchange will

be following a demand led approach, with HE/FE institutes being required to confirm and reinforce the role of knowledge transfer to their core strategies. Commitment to these activities will be paramount in acquiring Welsh Government support. Thus 'Innovation Wales' sets out the importance of HE/ FE collaboration on Knowledge Transfer; there is also an emphasis on the 'smart-specialisation' of R&I, and a focus on key enabling technologies (KETs[126]). The latter includes nanotechnology, micro- and nanoelectronics including semiconductors, advanced materials, biotechnology and photonics. Being able to acquire these technologies means being at the forefront of managing the shift to a low carbon, knowledge-based economy. They play an important role in the R&D, innovation and cluster strategies of many industries and are regarded as crucial for ensuring the competitiveness of European industries in the knowledge economy.[127]

Nine key sectors have been identified as being vital to the Welsh economy, these are[128]:

- Creative industries;
- Information, Communication and Technology (ICT);
- Energy and Environment;
- Advanced materials and manufacturing;
- Life Sciences;
- Financial and Professional services;
- Food and Farming;
- Construction; and
- Tourism.

4.7 RoI

4.7.1 Higher Education Authority

The main source of Government funding for the higher education sector in Ireland is the Higher Education Authority (HEA). HEA is the statutory planning and policy development body for higher education and research in Ireland. It aims to provide a higher education system that maximizes opportunities and experiences for students. The HEA is also the statutory funding body for universities and institutes of technology. In 2006 the Strategic Innovation Fund (SIF) was launched in order to assist with institutional restructuring and the development of postgraduate education and research, improving teaching and learning, and enhancing the equity of access into higher education. Collaboration between institutions is a key feature of SIF in

[126] They enable the development of key enabling technologies, such as photonics, or emerging fields, such as cyber-security
[127] http://ec.europa.eu/enterprise/sectors/ict/key_technologies/
[128] http://wales.gov.uk/topics/businessandeconomy/sectors/?lang=en

advancing strategic priorities. However, due to the deterioration of Irish finances, the programme was eventually cut short in 2008.

In addition to this, the provision of funding and support for R&D and innovation in businesses is offered by Enterprise Ireland. Enterprise Ireland feels that the application of research and innovation to business challenges is crucial in ensuring the success of the Irish economy. They provide sustenance for companies and researchers in HE institutions alike, in order to develop new technologies that will lead to the creation of jobs and increased exporting.

The following supports are available from Enterprise Ireland in assisting in company innovation:

- Innovation Vouchers;
- Technical Feasibility Grant;
- The R&D Fund;
- Innovation Partnerships – this programme funds small scale industry/academic research that provides fast pay back to companies.
- Technology Gateway Programme;
- EU, FP7 and ESA; and
- Technology Centres.

The InterTradeIreland supports documented in Section 4.3 of this Appendices document are also available in Ireland.

The IDA supports R&D&I through funding support for suitable projects and identifying other supports available from partner organisations such as Enterprise Ireland (EI), Science Foundation Ireland (SFI) and Sustainable Energy Authority Ireland (SEAI). The range of supports include::[129]

- A 25% R&D tax credit – designed to encourage companies to undertake new or additional R&D activity in Ireland;
- Irish legislation provides MNCs with incentives to generate qualifying patents – up to €5 million of annual qualifying income can be exempt from Irish tax;
- A maximum corporate tax rate of 12.5% on all corporate trading profits generated by RD&I activities;
- IDA Ireland/Enterprise Ireland Competence Centres finances industry led collaborative research on commonly identified industry problems;
- SFI Centres for Science, Engineering and Technology (CSETs) funds major university based centres of collaborative research with industry; and
- SFI also funds Strategic Research Centres (SRCs) to do collaborative research in selected research themes deemed important for Ireland's future economic growth.

[129] http://www.idaireland.com/business-in-ireland/research-development-and-/incentives-in-rdi/

The following EU based research programmes are available for HE institutions, offering the opportunity to work with some of the best research teams in Europe and win funding for Irish research projects:

- Seventh EU Framework Programme (FP7);
- Horizon 20/20;
- European Cooperation in Science and Technology (COST);
- EUREKA;
- Eurostars; and
- European Space Agency (ESA).

4.7.2 EURAXESS Ireland[130]

Earlier this year the Department of Jobs, Enterprise and Innovation (DJEI) in the ROI, launched a new one-stop-shop service for businesses seeking researchers and funding opportunities. The portal brings together a number of important resources that companies can access directly including:

- Advertising agencies;
- An online database of researcher CVs;
- Access to the fast track research visas system; and
- An online database of funding support opportunities.

The new R&D funding search facility allows businesses to search in real-time for all national and European funding supports for their business and research activities. This will address a common industry concern that this information is both fragmented and difficult to access.

4.8 Joint Information Systems Committee (JISC)

The Joint Information Systems Committee (JISC) is a registered charity which is funded by further and higher education funding bodies within the UK. Its goal is to provide world-class leadership in the innovative use of ICT to support education and research. They report an annual saving/cost avoidance of £259m for the sector.

JISC offer a wide variety of support programmes. One such support is the Business and Community Engagement (BCE) programme. Commencing in 2007, it is designed to support institutions in their relationships with outside organisations, in order to deliver services which benefit the economy and society. It was created as a means of addressing a point raised in their 2007-2009 strategy: “developing and implementing a programme to support institutions’ engagement with the wider community”.

The programme covers the following strategic areas, in its goal of enhanced institution efficiency:

[130] http://www.euraxess.ie/business/page.aspx?SP=216

- Knowledge transfer;
- Employer engagement;
- Public engagement; and
- Lifelong learning.

JISC works closely with institutions and key external stakeholders in its deliverance of the programme. A three-phase evaluation of the programme (as it ran from 2007-2010) was carried out in order to determine its effectiveness, and to aid in shaping the programme for the future. The evaluation concluded that the BCE programme had played an important role in JISC's strategy to support HE and FE institutions, with clear benefits in the investments made. The best measures of the success of the programme are shown through new partnership activities, services and networks in institutions.

4.9 National Centre for Universities and Business (NCUB)

The National Centre for Universities and Business (NCUB) is a not-for-profit organisation which develops, promotes and supports cooperation between universities and businesses in the UK. Drawing on the 25 years' experience of its predecessor body, the Council for Industry and Higher Education (CIHE), NCUB is committed to a programme of research, policy development and practical partnerships. Initial funding is provided by the Higher Education Funding Council for England (HEFCE), with support from additional national funding bodies, including DEL and SFC. NCUB aims to support UK businesses and HE institutes in a competitive global market, and has a vision of the UK becoming world-leading for university and business collaboration. It will achieve this goal by developing relationships between higher education, the public research base and businesses, creating inspirational accounts of the successes and challenges of collaboration, and enabling a sophisticated stream of information and calls to action from businesses to universities and the public research base. Its aim is to find practical ways of harnessing the talent being developed in UK universities, and the UK's strength in ground-breaking research and development, for the benefit of the nation's economy.

The activities of NCUB cover two main areas:

- Finding ways to improve the entrepreneurial and employability skills and opportunities of students in higher education; and
- Maximizing the UK's value in innovative research and development.

Projects, such as London Creative and Digital Fusion endeavour to assist in delivering productive relationships between HE institutions and smaller digital and IT companies.

NCUB's Global Graduates Project has brought together a group of senior leaders from higher education and business to build on the Global Graduates into Global Leaders research undertaken by the Council for Industry and Higher Education CIHE, the Association of Graduate Recruiters, and research agency CFE in 2011.

Today's university leavers are competing for jobs with graduates from across the world. There is a highly mobile graduate workforce and employers are eager to recruit the very best.

Currently global mobility among UK students is low, lagging badly behind our international competitors. This is bad news for the UK. The so-called 'headquarters effect' suggests that business leaders hold a stronger emotional attachment to their own country. It implies that such people, leading multi-national companies, are more likely to support the operations in their home-countries than elsewhere. Ensuring more global business leaders are UK citizens should be a strategic priority for the country.

The next stage of the Global Graduates programme will examine how universities can think about embedding the skills needed for global employability into students' learning experience, and how businesses can seek to attract global talent.

5 COMPANY CASE STUDIES

5.1 Case Study 1: Sepha Ltd (QUB)

This case study highlights the "Collaborative Journey" which is referred to at QUB where the initial outreach engagement, facilitated through Connected 2, can help to take the companies on a mutually beneficial journey which initially addresses the companies near market needs and then from a position of confidence in the University the companies are more willing to engage in more traditional R&D activities.

Sepha Ltd is a small company who manufacture and sell products for the pharmaceutical industry focussed on machinery that either produces tablet blister packs or removes tablets from pre-formed packs. The initial engagement with company was facilitated by the Connected 2 programme which allowed NITC to become involved in a new product Development (NPD) process with Sepha to fulfil an identified market opportunity for a low cost machine producing blister packs.

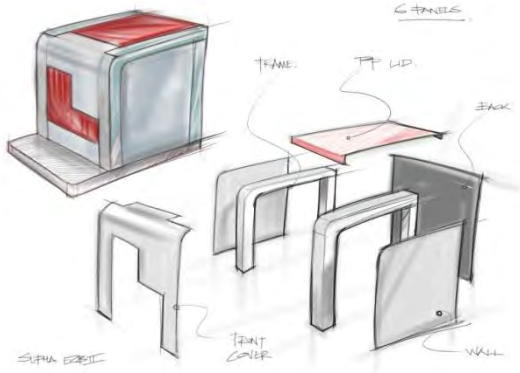
The main objectives for NITC were to:

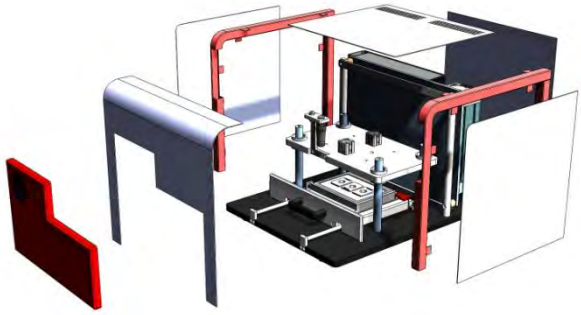
- Complete the detailed design to meet functional requirements;
- Design an outer casing to fit within the current machinery range;
- Ensure the machine cost was within a defined budget and the project was delivered within tight timeframes.

Using our extensive experience in engineering and NPD we worked collaboratively with the company to develop the new machine design fulfilling requirements. A planned and controlled R&D process ensured at every stage of the process the customer was involved and communicated with, to guarantee the customer was satisfied with the project direction and deliverables.

NITC delivered tangible outputs including 3D CAD designs, Bills of Material and specifications, manufacturing drawings and liaison with material suppliers.

The images below show the NPD process from design sketches through to CAD models.





NITC delivered the new product design and further engineering support so the company could build a prototype machine that was presented at trade shows and has resulted in new sales. The images below show the prototype machine and sample information from a brochure for this new machine.

This project was highly successful because:

- It delivered an effective, working design meeting all functional requirements;
- The project was delivered within a very tight timeframe and resulted in a machine that can be manufactured within budget; and
- The company were able to bring the machine to market quickly and have had worldwide sales exceeding expectations.

Approximate Value (£) of the design project:

- Design Services - £15k; and
- Development Costs - £12-15k.

Follow on collaboration with the University:

The company were successful in submitting a Knowledge Transfer Partnership (KTP) proposal with QUB to the Technology Strategy Board in 2012 – total value £125K. The title of the KTP project is: "To develop a non-destructive system for testing the seal integrity of porous packaging of medical devices to enter the medical device industry".

5.2 Case Study 2: AWP Environmental Ltd (now trading as Viltra Ltd) (QUB)

This case study highlights the "Collaborative Journey" which is referred to at QUB where the initial outreach engagement, facilitated through Connected 2, can help to take the companies on a mutually beneficial journey which initially addresses the companies near market needs and then from a position of confidence in the University the companies are more willing to engage in more traditional R&D activities.

Project Brief and the Client's Design Objectives

AWP Environmental had been producing waste water treatment systems for use in domestic markets which treats all waste water from a home, to an acceptable level where the water can be exhausted to a stream or other waterway. The system comprises 2 or 3 large, rotationally moulded plastic tanks connected together, having internal pipework and pumping, creating a staged process to remove 99% of pollutants.

There were specific issues the company wished to address including the existing use of very large and cumbersome manhole covers, and the difficulties involved in assembling a system when securing the tanks together. They believed that by resolving these issues the system would become more attractive for purchase due to the reduced footprint and be more cost effective to assemble.

The initial project activities objectives were to use 3D CAD to re-design the tank, specifically the upper portion to make it possible for a smaller, secured cover to be used and to design features that would allow the tanks to be more easily secured together during the assembly process, facilitating a more cost effective manufacturing process. Liaison would be required with the tank moulders to ensure that no issues would arise with the tank moulding process.

The Design Solution

In line with our approach to all design projects at QUB, this project involved a multi-disciplined team to provide the client with a successful design solution. In the initial stages working closely with the client, QUB investigated the design problem defined to understand the implications on unit function, tank integrity, manufacture and system

assembly. Numerous ideas were generated which resulted in various concepts being developed within a 3D CAD environment for review with the client, resulting in a specific direction for the design solution being agreed.

The final design solution was then developed using an iterative process, with the team liaising closely at all stages with the client and working with the supply chain, specifically the plastic tank moulding company to ensure there were no issues for tank manufacture.

The outcomes of the project included a fully developed 3D CAD design of the individual tank, an overall system that greatly reduced the footprint of the covers being used, a new design for the covers and tank risers, and interlocking features being designed in to assist in the assembly of the system. Ultimately it was ensured and agreed with the client that the requirements of the initial brief were completed.

The Commercial Outcomes

The client was keen to get the new design into the marketplace as quickly as possible based on the design project outcomes. Following on from the completion of the new design being completed the tank tooling was modified and the new tanks brought into service. The client also used the assistance of QUB to update its product documentation and website for this new product, and this new design has become the standard for this flagship product for the company. It has been on sale for over one year and selling strongly for the client. The system has been very successful for the client, so much so that they are looking into new export markets in Europe and have engaged with QUB to look at the design of the whole system to make it more suitable for shipping, that is making the system stackable so that a suitable number of tanks can be carried in a lorry trailer to minimize shipping costs.

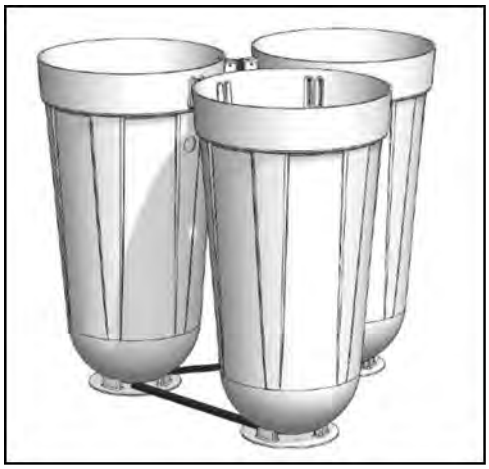
The re-design of the system has thus strengthened the client's position in the market place and has given them the impetus to expand sales into new markets.

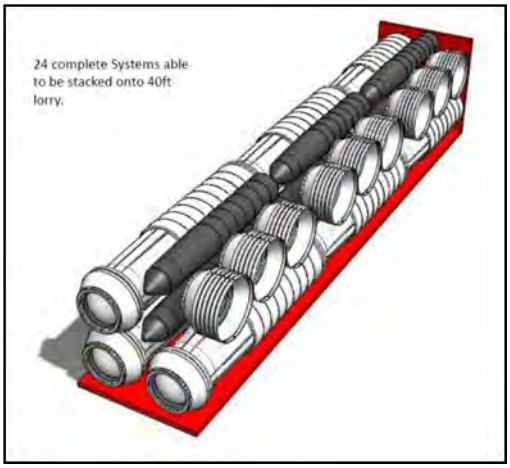
Since the initial meeting facilitated by the Connected 2 programme, the company have been on a range of funded projects with the University including:

1. Invest NI's Innovation Voucher – Product Re-Design (Value: £4,000)

2. Invest NI's Design Development Programme to re-brand the company for export markets

3. Invest NI's R&D Programme – Developing Product for Export markets (Value to NITC: £17,000)





Follow on collaboration with the University:

The company were successful in submitting a Knowledge Transfer Partnership (KTP) proposal with QUB to the Technology Strategy Board in 2011 – value £125K. The title of the KTP project was: "To develop a system of monitoring and maintaining domestic waste treatment systems, preventing pollution of waterways and ground water sources, ensuring compliance with emerging legislation".

5.3 Case Study 3: Precision Group – Turning FOG to Fuel (UU)

Waste fat, oil and grease (FOG) causes major environmental problems in the drainage and sewage system. Removing FOG from water systems costs millions of pounds in the UK and Ireland each year.

Dr Patrick Dunlop and Dr George Burke from Ulster's Nanotechnology and Integrated BioEngineering Centre (NIBEC) have been carrying out research for the Precision Group, as part of the Innovation Network Programme, to explore novel mechanisms for the conversion of FOG to biofuel, using environmentally friendly and sustainable processes. This research resulted in Precision Group scooping first prize in the Energy and Environment Innovation category at the Sustainable Ireland 2010 Awards for its achievements in separating, collecting and processing wastewater into a range of sustainable commercial products.

Alan Stringer, head of technical development for Precision Group, said: "We are delighted to receive this award and we look forward to working with the University of Ulster to explore new and exciting commercial opportunities with worldwide potential."

5.4 Case Study 4: FRESH programme

Name of Project: FRESH programme

Lead FE / HE Institution: BMC

Other FE Institution: Exclusive to BMC[131]

Other HE Institution: Exclusive to BMC[132]

Project description: The FRESH programme was developed through Connected project staff and was largely influenced by the learning outcomes of a Connected International knowledge transfer visit to California. . The programme was aimed at youth workers who had an interest in developing their creative thinking to enhance innovation within their organisation. The established objectives for the project included[133]:

- Development of new ideas and enhanced employability skills
- Enhanced creativity sustaining competitive advantage
- Enhanced team cohesion strengthening productivity
- Identification of new opportunities

FRESH exposes participants to a creative process devised to broaden their enterprise and employability skills. Embracing a combination of design thinking processes and skills development, participants acquire a new attitude to assessing challenging and

[131] http://www.belfastmet.ac.uk/News.aspx?num=47&
[132] http://www.belfastmet.ac.uk/News.aspx?num=47&
[133] Nuala Kilmartin – Belfast Metropolitan College

shaping innovation.[134] The FRESH Programme runs over a five day period, with participants working in teams while being guided through five phases: inspiring, conceptualising, refining, planning and presenting.[135] Each five day programme is attended by a maximum of 15 participants who avail of support through the FRESH Creativity Programme.[136]

Key Activities: During this four day programme participants where inspired and motivated to problem solve through a creative process. Within teams they engaged in a hands on project that focused on building empathy, encouraged ideation and fostered active problem solving. They visualised and presented new approaches to achieving progressive solutions for an ever changing marketplace. Throughout this four day programme the participants worked in teams and were guided through five phases – inspiring, conceptualising, refining, planning and presenting. The participants followed the process, defining problems, creating solutions and modifying and enhancing their ideas to present innovative solutions.

FRESH participants learn core competencies in communication, team working, creative thinking, problem solving, product design, planning, time management and presentation skills. FRESH aims to equip participants with tools to think for themselves and is focused on re-awakening creativity and enhancing skills development.[137]

Results: An evaluation of the programme[138] indicates that participants enjoyed the team work and commented on how the continuous change in group dynamics helped increase energy when needed. Working in teams under time constraints proved challenging but equally rewarding as each participant was able to witness the development of ideas regardless of their choice on the best way forward. Participants found the training empowered them to think more creatively and helped to identify a more responsive method of thinking, one which was more susceptible to developing and analysing innovative ideas.

The evaluation also states that the training provided clarity on idea generation, the benefit of building upon an idea rather than disregarding it, how deep diving can force multiple outcomes. Participants commented positively on the encouragement of “wild ideas” and that “nothing is excluded” when embracing ideation. 72% of the participants commented on the positive effects of teamwork and the importance of encouraging others ideas to develop creative solutions.

[134] Colleges NI
[135] FRESH impact evaluation
[136] http://www.belfastmet.ac.uk/Courses/Areas/Enterprise/Default.aspx
[137] Nuala Kilmartin – Belfast Metropolitan College
[138] FRESH Evaluation and Impact of Embedding FRESH in the Curriculum – provided by Colleges NI

Recognition: FRESH has been commended greatly at the UK National Enterprise Educators Awards and its creators, Patricia Flanagan, Connann Fitzpatrick and Nuala Kilmartin, were recognised as top Enterprise Educators in the UK.[139]

5.5 Case Study 5: NI Skillset Media Academy

Name of Project: NI Creative Skillset Media Academy (NICSMA)

Lead FE / HE Institution: NWRC

Other FE Institution: BMC, SRC[140]

Other HE Institution: UU[141]

Project description: This project is an example of a Sector Specific Project. The NI Creative Skillset Media Academy Network consists of 17 Universities and FE Colleges across the UK that are recognised as centres of excellence in moving image and interactive media.[142] The network features a series of residential training programmes, guest lecturers and visits to companies and conferences, which are planned in collaboration with lecturers, technical staff and national companies working in the area of moving image and interactive media, within the Skillset Media Academy partner institutes of NWRC, UU, BMC and SRC. The Academy is funded by Connected, and students who take part in their courses have access to industry placements, master classes and special UK and Ireland-wide events.[143]

Overall the project focuses on new and developing software and hardware, and on individuals and companies who are considered as leaders in their fields, and who will enable HE and FE institutions to improve training to students. This will in turn offer a more industry prepared graduate and a wider range of training services to digital arts businesses.[144]

Key Activities: Some of the activities undertaken as part of the programme include[145]:

- Visits – A number of NICSMA lecture had the opportunity to visit leading Media organisations. Participants had the opportunity to meet with newsroom staff and discuss current journalist practices within broadcast media. Participants also had the opportunity to see how cross-platform content is integrated into broadcast media;
- Seminars / Workshops – A series of 14 workshops were delivered between 2012 / 2013 as part of the programme. These included workshops with

[139] http://www.belfastmet.ac.uk/News.aspx?num=47&
[140] http://www.nwrc.ac.uk/skillset/
[141] http://www.nwrc.ac.uk/skillset/
[142] Colleges NI
[143] http://www.nwrc.ac.uk/skillset/
[144] HE-FE Collaboration Fund – Quarterly Progress Reports (April 2010 – June 2013)
[145] Activities of NI Creative Skillset Media Academy 2012/13 – Evaluation Summary 2012-2013

broadcasters and directors (e.g. James Roach) but also technical seminars on media software such as 'Stereo 3D';

- NICSMA Training Programme - As part of the NICSMA up-skilling courses are offered to NICSMA staff at NWRC, UU, BMC, local media/moving Image companies and freelance professionals; and
- Industry Placement Programme – Media students had the opportunity to undertake placements within media companies in Northern Ireland such as 360 Production and Culture NI.
- Creative Cluster: Two SMEs developing product for 3-D platforms (e.g. iPad, tablets, phones or PCs) were provided with the support to allow them to work with a specialist 3-D animation company to share skills, help improve efficiency and develop products compatible with the developing markets of mobiles and tablets. Troll Inc. have incorporated the skills and knowledge gained in this project to produce 3 games/apps now available for Apple and Android phones and tablets. Uproar Comics have used the support to produce The D.E.C (Digital Experience Comic), a new and ground-breaking comic app combining 2d and 3d animation and a range of interactive features, available on IOS. ShaunWho has recently completed animations for the BBC 2 series Groundbreakers and also for the Honeycomb Digital Works Creative Network. This project also incorporated an introductory workshop for NICSMA staff, invited SMEs, freelance personnel and students, offering them an insight into how character animation can be achieved with the Kinect Sensors and Maya software.

Over the last 4 years, the Ulster Media Show has been organised as part of the NICSMA. It provides an opportunity for students from UU, BMC and NWRC to create moving image and interactive media content and showcase this in a competitive atmosphere, with their work being assessed and critiqued by representatives of BBC, UTV, Waddell Media, NI Screen and Creative Skillset (the creative industries' Sector Skills Council). The award show also gives them the opportunity to network and showcase their work to a gathering of representatives of the local and national media industry. This event has proved a great opportunity for the HE and FE institutions to meet, share ideas and develop joint projects and interact effectively with the media sector.[146]

For 2 years in succession (2012 and 2013), NWRC played host to the prestigious Ulster Media Awards ceremony celebrating the achievements of students from NWRC, UU and BMC who are on NI Creative Skillset Media Academy approved courses. These events brought together academics and industry with prizes awarded for students' media projects in the categories of moving image, interactive media, photography and radio. Attendance at each event was approximately 100[147].

[146] Colleges NI
[147] Activities of NI Creative Skillset Media Academy 2012/13 – Evaluation Summary 2012-2013

External Recognition: At the Ulster Media Show in 2012 the standard of work produced by the students of the Northern Ireland Skillset Media Academy was praised by industry judges and the chair of Northern Ireland's Department of Arts, Culture and Leisure Committee. Moreover, Michael Wilson, managing director of UTV television, in his keynote speech, praised the standard and ingenuity of the work being awarded. He encouraged students to get together through the academy and form their own companies to realize emerging opportunities. He said: "The jobs I will be recruiting for in five years' time have not been invented yet such is the pace of change."[148]

5.6 Case Study 6: Industrial Advisory Board at SWC (IAB)

Name of Project: Industrial Advisory Board

Lead FE / HE Institution: SWC

Other FE Institution: None

Other HE Institution: UU[149]

Project description: This project is an example of an HE/FE Cluster, one of the activities under Strand 1 of Connected 2 – Project Generation. Through the Manufacturing Design Process Sector Skills Project, the Industrial Advisory Board (IAB) cluster has been firmly established, with strong links to the University of Ulster. The chair of the Board is Emer Murnaghan, the Business Improvement Manager for Grahams.

The key objectives of the IAB are focused on college/industry engagement, curriculum development and college promotion. Initially, the Board concentrated on the development of training programmes, at the request of industry representatives across the cluster. Membership in the cluster represents the entire spectrum of the construction sector, and has continued to grow over the past few months. It currently features 16 representatives from public and private construction organisations.[150]

Key Activities[151]: Board Members are encouraged to identify training needs for the construction industry and to contribute to the debate on curriculum development and thus promote "theory into practice". The IAB provides a source of "lecturers from industry", placement opportunities for students and membership of student assessment panels. The contribution made by the IAB to college operations has been acknowledged by two independent external bodies. The Joint Board of Moderators, a body established by four professional engineering institutions, to oversee and approve

[148] http://skillset.ulster.ac.uk/Coleraine/Ulster-Media-Show-2012-Ulster's-media-talent-honoured-by-industry-at-show
[149] HE-FE Collaboration Fund – Quarterly Progress Report (Jan-Mar 2013)
[150] HE-FE Collaboration Fund – Quarterly Progress Report (Jan-Mar 2013)
[151] Information provided by William Young, SWC

academic courses for profession progression, highlighted in a recent accreditation review, as "Special/Commendable Features, the strong links with industry, borne out by the high level of employer participation and the active involvement of the Industrial Advisory Board in the development of the academic programmes." A detailed Quality Authority Assurance audit of the operations of the entire college identified the industrial engagement and the working of the Industrial Advisory Board as two areas of best practice. An on-going key issue for the IAB is the interpretation, application and implementation of the "Social Clauses" on large public sector procurement projects in the South West of the Region e.g. Lisanelly Shared Educational Campus; A5 Dual Carriageway; Omagh Local Enhanced Hospital etc.

5.7 Case Study 7: Renewable Development Forum at SRC

Name of Project: Renewable Development Forum

Lead FE / HE Institution: SRC

Project description: This project is an example of an HE/FE Cluster, one of the activities under Strand 1 of Connected 2 – Project Generation. Southern Regional College has initiated a renewables cluster titled 'The Renewable Development Forum'. This forum, one of nine industry forums within the southern region of Northern Ireland, focuses on training requirements within the industry, and gives employers an insight into the range of support programmes that are available through the Business Support Centre.[152]

Current members of the Renewable Development Forum include individuals from construction, waste and insulation companies in the Southern regional area. The cluster is still in its early stages of development however, and SRC plan to further develop its membership.[153]

5.8 Case Study 8: Global Partnership between NI and Japan

Name of Project: Global Partnership Between NI and Japan

Lead FE / HE Institution: SERC

Other FE Institution: None

Other HE Institution: QUB, UU[154]

Project description: This activity has stemmed from 2 international recce visits[155] under Strand 1 of Connected 2 – Project Generation. It has created links between the SERC and Toyama National College of Technology in Japan.

[152] http://www.src.ac.uk/i3/current-news/1670-renewables-development-forum-at-src
[153] Colleges NI
[154] Connected 2 – Quarterly Progress Reports

Key Activities: It included student exchanges to and from Japan, as well as International Energy Conferences which took place in Japan and Lisburn[156].

- **Internship**[157]
  - Four cohorts of students have visited SERC 2010-2011-2012-2013.
  - Total of 58 Japanese Students mostly from an Engineering and IT Background, but with some from International Business.
  - National Colleges who participate are Toyama – Ishikawa – Numazu – Suzuka.
  - QUB give tour and talk on international Study in NI and additionally,
  - Day spent at QUP Polymer Processing Centre.
- **CAST (conference for advancement of science and technology)** [157]
  - Hosted in January in Toyama
  - Janese technology students present a talk in English on their project work.
  - SERC lecturers have for the past four years sat on the review panel with academics from Toyama University, Nagaoka University and King Mongkut's Institute of Technology (Thailand)
  - SERC Lecturers have addressed the engineering faculty of TNCT and Dr A Johnston will do so again this year.
- **International Symposium on Expertise in Sustainable Society (ISESS)**
  - Participants in the ISES conference included representatives from[157]
    - ·Nagaoka University of Technology.
    - Toyama University
    - Toyama NCT
    - Liverpool John Moore University
    - Temasek Polytechnic Singapore
    - University of Ulster
    - Queens University
  - Participants also visited the SeaGen facility at Strangford Lough[157].
  - The 3nd ISESS was held in NI with guest lectures from leading figures in the industry including Ken Webb, Principal and Chief Executive of South Eastern Regional College (SERC). The conference was organised by Toyama Technical College, Japan. Both Toyama and

[155] Connected 2 Quarterly Progress Reports:
- One study visit took place in January 2012; it focused on Disaster Recovery and Management using GIS and statistical analysis in land and property; Robotics – Stochastic regression modelling; and Fibre optic technologies FTTX. A significant outcome of this visit was the agreement that Northern Ireland should host the third International Symposium on Expertise in Sustainable Society.
- A second visit took place in November / December 2012. This involved Researchers and Directors from the University of Ulster, Queen's University, Colleges Northern Ireland and South Eastern Regional College. This visit was most successful with meetings held with the following companies, Colleges and Universities: Invest Northern Ireland, British Council, Dupont Japan, Japan Institute of Science and Technology, Toyama National College, Nagaoka University of Technology, Union Peck, Kanazawa University, Hive Nagoka, Eco-Town Exchange, Jaist, Adeka Corporations and Takigi Seiko.

[156] Colleges NI
[157] David Milford, SERC

SERC have close links with an international partnership which has now been extended by a further three years in order to continue the work of sharing knowledge and best practice from either side of the world.[158]

- **Visits by Japanese Academics**[157]
  - Dr Masamoto Tafu, TNTC
    - Specialism Recycling of Gypsum Waste Materials
    - Will visit NI mid - January 14 to visit QUB Questor Centre and visit recycling facilities in NI.
  - Professor Tsutomu Takahashi, Nagaoka University of Technology
    - Specialism Energy Saving and New Energy Sources
    - Will visit NI late January 14 to visit QUB and deliver lectures at Queens and SERC on renewable Energies and Sustainable Technologies.

Recognition: Speaking on the signing of the new partnership, Ken Webb said "this partnership has been a huge success over the past number of years, our staff and students have benefited from the close links. We are extremely proud to be the only the only College in the UK with this type of link to a Japanese college and we hope that this will lead to further opportunities for our students as they have a chance to see how the third largest economy in the world up skill their workforce to meet global challenges."
Membership with the partnership has now been extended to include Nagaoka University of Technology, a leading university in Japan. [159]

Report to First Minister and Deputy First Minister: Before their recent visit to Japan, David Farrell (Chair of Steering Committee), briefed Mr Peter Robinson and Mr Martin McGuinness on the Connected Project and the links it has created between SERC, local Universities and Japanese Institutions. As a result an Invitation was given to Dr Ishihara (president) and Dr Naruse (vice president) of TNCT to attend the dinner hosted by FM and DFM in Tokyo.

5.9 Case Study 9: Rainey Engineering Solutions

Name of Project: Rainey Engineering Solutions

Lead FE / HE Institution: NRC

Other FE Institution: None

Other HE Institution: None, but Rainey Engineering Solutions received referral to NRC from UU.[160]

[158] Colleges NI
[159] Colleges NI
[160] Colleges NI

Project description: Rainey Engineering Solutions (RES) is a leading distributor, designer and manufacturer of specialised cutting tools for the engineering industry. As part of their on-going product development programme, RES have need for trialling their new cutting tools in a manufacturing environment. However, due to production demands on CNC machining centres, this can be difficult in a manufacturing environment.

Key Activities: Upon contacting the University of Ulster, RES was directed to the NRC, who were able to provide assistance with their product development. The support from NRC allowed RES to conduct a series of cutting trials in aluminium components, In order to simulate cutting conditions in modern precision aerospace manufacturing.[161] The project was completed under an Innovation Voucher by a Colleges NI CNN specialist. RES received over 100 hours of specialist time.[162]

Results: Using this facility, RES were able to discover which cutting geometries performed best, ascertain optimum cutting conditions, and offer new, improved and tested cutting tools to the precision aerospace industry.[163] As a result of the product testing RES now confidently can estimate how long their precision cutting tools will last using best geometric specifications.[164]

[161] Colleges NI
[162] Alan Reid – Northern Regional College
[163] Colleges NI
[164] Alan Reid – Northern Regional College