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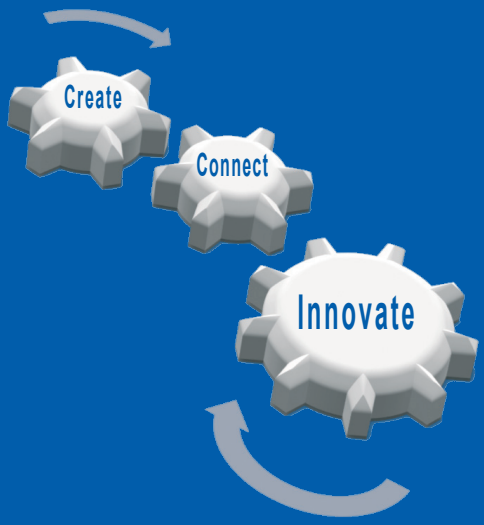
Consultation

Draft Innovation Strategy for Northern Ireland 2013 - 2025



Innovation Strategy
Northern Ireland

Contacting Us

This document is available in an accessible format if required, e.g Braille, large print, audio cassette or in a minority ethnic language.

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Ministerial Foreword

Innovation can mean many things to many people but in an economic context it is about the successful generation and exploitation of new ideas. It is critical to our future prosperity because it drives economic growth. Companies who are innovative have seen their employment and sales grow twice as fast as their non-innovating competitors and they are also significantly more productive.

During challenging global economic conditions the need for innovation is even greater, as it allows firms to stay ahead of their competitors and position themselves to exploit growth during recovery. From the wider economy perspective, the level of innovation in a region is an important factor in attracting inward investment. It is for these reasons that the Northern Ireland Executive has placed innovation at the core of its drive to rebalance the economy and it is why the NI Executive Sub-Committee on the Economy, which I chair, has been tasked with producing this Strategy.

This draft Strategy identifies the key actions necessary to support Northern Ireland companies to become more innovative. In recent years we have seen record expenditure in Research and Development and many of our companies are continuing to be world leaders in their sector. We need to build on this success and see more local companies engaging in both innovation and exporting activities.

Innovation does not happen in isolation and it is not just about R&D and high tech firms. Instead, it is also about skills, design, and collaboration – collaboration between sectors and collaboration internationally. That is why this draft Strategy aligns fully with the Skills Strategy, the Higher Education Strategy, the Access to Finance Strategy and of course the Economic Strategy.

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

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

The actions identified are primarily for the Northern Ireland Executive to take forward as we recognise that we must support the creation of a more positive environment to encourage our companies to innovate. However, if we aspire to transform Northern Ireland into one of the most innovative regions in the UK, it will require collaboration, partnership and leadership from the Executive, business, academia and the third sector.

On behalf of the Executive Sub-Committee on the Economy, I encourage you to consider this draft and offer your views on what actions are needed to help transform Northern Ireland into one of the most innovative regions in the UK.

Arlene Foster MLA

Minister for Enterprise Trade and Investment

1. Innovation Vision & Introduction

"Innovation is the successful generation and exploitation of new ideas"

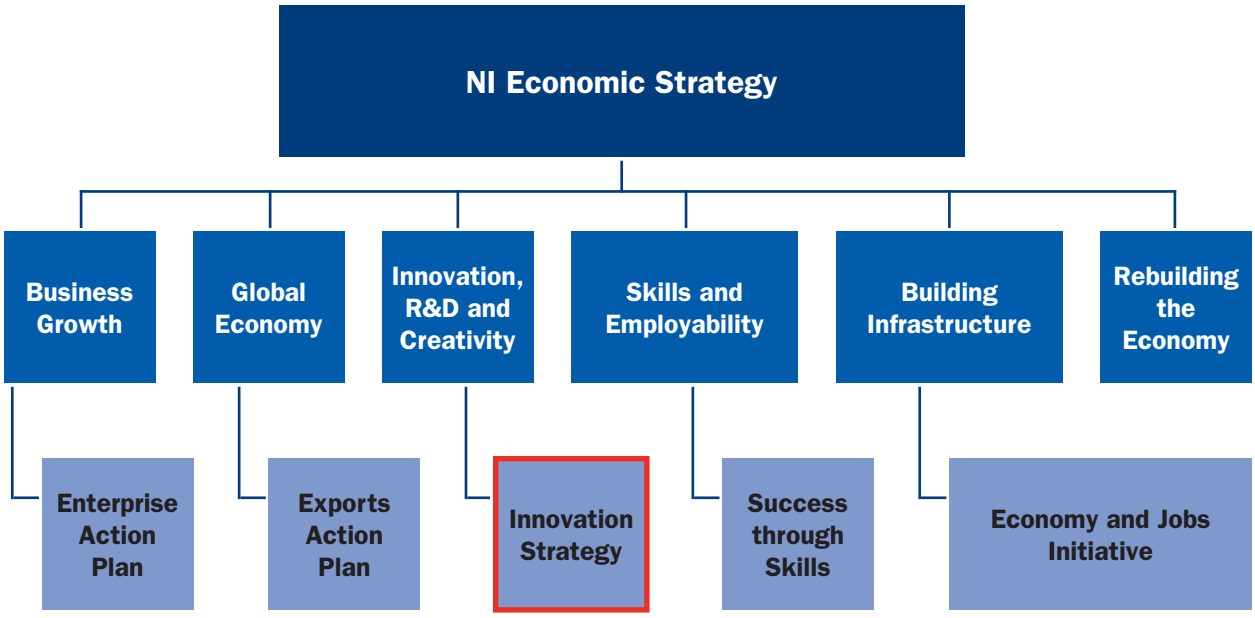
Innovation is one of the primary drivers of economic growth, underpinning the growth of the best performing regional and national economies across the world. Innovation enables firms to stay ahead of competitors, and with global economic conditions remaining challenging, the focus on innovation is now more important than ever.

Strategic Context

The Northern Ireland Economic Strategy set out a vision for 2030 to have an economy ***'characterised by a sustainable and growing private sector, where a greater number of firms compete in global markets and there is growing employment and prosperity for all'.***

The Economic Strategy outlined a range of actions designed to increase employment and wealth through building a larger and more export-driven private sector. This Innovation Strategy seeks to expand upon and refine the priority within the Economic Strategy to stimulate innovation, R&D and creativity, and the linkages are set out in Figure 1.

Figure 1: Innovation Strategy Linkages



Innovation Vision

If innovation is to play its full part in realising the vision of our Economic Strategy then Northern Ireland needs a complete step change in its culture, priority and performance in respect of innovation. The challenge of such a transformation should not be underestimated since, for too long, we have languished at the bottom of just about every UK league table on innovation. However, there is renewed confidence that this step change can be achieved. In just a few short years, Northern Ireland has made huge strides in its R&D performance. However, R&D is only one part of innovation and going forward we will need to replicate this sort of transformation in all the other areas of innovation across all sorts of sectors within the region.

This Innovation Strategy sets out the key long term actions necessary to make that transformation and so ensure that innovation plays its full part in realising the vision of our Economic Strategy. Thus this Innovation Strategy aims to stimulate a step change in innovation, R&D and creativity across the economy and in doing so deliver a vision that:

Northern Ireland, by 2025, will be recognised as an innovation hub and will be one of the UK's leading high-growth, knowledge-based regions which embraces creativity and innovation at all levels of society

In tangible terms this sort of transformation by 2025 will mean:

- Many more of our companies engaging in innovation, collaboration and exporting;
- Doubling the number of knowledge economy businesses and increasing their employment by 15,000;
- Expenditure of £1billion per annum on R&D; and
- Greater numbers of young people achieving graduate and post-graduate qualifications in STEM.

Innovation in its Widest Sense

There is a frequent misconception that innovation means scientists and R&D. **Innovation is much more than R&D.** It includes changes to products and processes, introduction of new business models, organisational changes and entering new markets. Research by NESTA suggests that less than 20% of UK investment in innovation was in the form of R&D[1]. If firms invest in skills, leadership, design, branding, training or marketing – they are investing in innovation.

1 NESTA (2009) Innovation Index

In 2013, **Amazon** was voted the second most innovative company in the world by Fast Company magazine. Amazon introduced same-day shipping in seven major U.S. markets in 2010, but the e-commerce giant's significant 2012 expansion of its next-day and same-day delivery services was a surprise for its competitors. The entire retail industry seemed to realise its power. Rivals such as Google, eBay, and Walmart could only attempt to catch up, launching modest pilot programs and making investments. Even shipping services UPS, FedEx, and USPS upped their game. To achieve their innovation, Amazon acquired additional companies which specialised in order- processing time reductions and invested heavily in increased distribution centres in high population areas. They also introduced the idea of delivery locker service in '7 Elevens'.

The Importance of Innovation

Firms who innovate are more productive and competitive, and it has been shown that such companies grow twice as fast compared to those that do not innovate[2]. Following the financial crisis, economic recovery has been substantially stronger in countries which had previously invested the most in R&D and Innovation.[3]

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.[4]

Barriers to Innovation

To realise our vision, this Strategy needs to address the main barriers to innovation. For Northern Ireland, these include factors such as capability/capacity issues, access to knowledge and cost (Table 1). To successfully overcome these barriers, particularly for our SMEs and micro businesses, support from the public sector is critical and delivery of the action within this strategy will therefore overwhelmingly fall to the public sector. However, to realise the transformational change required to deliver the Innovation Vision, and our Economic Strategy aims, we will require a collaborative approach across all sectors.

2 NESTA (2009) The Vital 6%

3 State of Innovation Union (2011) Com 2011, 849

4 Community Innovation Survey 2012

Table 1: Barriers to Innovation

Knowledge	Absorptive capacity, trust, IP, user knowledge, lack of communication, lack of information
Access to Capital	Availability of finance, cost of finance
Incentives	Lack of competition, lack of inducements, lack of ambition
Markets	Identifying opportunities, understanding opportunities, regulation, standardisation, access to markets, and language barriers
Skills	Leadership, technological, R&D, creative thinking
Cultural Changes	Risk aversion, entrepreneurship, understanding innovation, managing change

Innovation in the Public & Third Sectors

Increased innovation is also required in the public sector. In addition to becoming more innovative in how it operates, whether as a customer, or as a partner to drive change, it can play a powerful role in encouraging innovation. Through procurement and policy development to address societal challenges, it can also incentivise innovation in companies and its suppliers.

The third sector is also important within our innovation ecosystem and can act as a driver of innovative thinking. Initiatives such as NESTA's Neighbourhood Challenge Initiative have shown that the third sector can play a major role in driving innovation in public service delivery and in addressing societal issues such as reoffending, care of those with mental health issues and care of the elderly.

Key Themes

The focus of this Strategy is on companies and how they can be better supported to engage in innovation in order to achieve our wider economic objectives. 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.

These themes are underpinned by **cultural change**, which reflects that changes in approaches and behaviours are needed. Cultural change does not sit alongside knowledge generation, exchange and exploitation – it is a cross-cutting area which must be achieved across all three. The remaining sections of this Strategy are based around knowledge generation, exchange and exploitation, followed by our priorities to achieve cultural change. An overview of the Strategy themes is shown in Figure 2.

Figure 2: Innovation Strategy Key Themes

Finally, it is important to note that this Strategy aims to be exactly that – a Strategy. It does not detail all our existing innovation interventions, research and evidence. It also does not seek to replicate Programme for Government commitments nor repeat what has already been said in other Strategies. We have published[5] an accompanying evidence pack alongside this, as well as more detail on who has responsibility for taking actions forward[6]. This Strategy is purposely focussed on identifying what Northern Ireland's strategic innovation priorities are, along with key actions we believe can deliver on these up to 2025.

Where reference is made to 'we' in the strategy that should be read as the NI Executive in partnership with relevant stakeholders.

5 www.detini.gov.uk/innovationstrategyni

6 www.detini.gov.uk/innovationstrategyni

Question 1:	Do you agree with the vision set out in the draft Innovation Strategy?
Question 2:	Do you consider the key themes in the draft Innovation Strategy are appropriate to ensure that businesses are better supported to engage in innovation?

2. Knowledge Generation

Overview

What is 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
What do we want to achieve?
• 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 • Our education system providing the skills needed by innovative companies
What are we going to do?
• 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 • 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 • Support R&D and innovation infrastructure in HSC organisations
How will we know that we are on target?
• Firms with innovation activity (% of total firms) • Total R&D expenditure (£m) • BERD by indigenous SMEs (£m) • Number of R&D based Companies • Annual STEM graduates

Why is Knowledge Generation Important?

Within the innovation system, Knowledge Generation is the catalyst for future economic growth. To grow Northern Ireland's economy we need to create an environment which encourages research and creativity to equip young people and our workforce with the skills and attitudes to succeed.

Encouraging Companies to Invest in Innovation

Although innovation allows firms to stay ahead of their competitors, Northern Ireland demonstrably lags behind the rest of the UK in terms of the number of our firms engaging in innovation. There is a need, therefore, to enhance and concentrate our efforts on encouraging more firms to invest in innovation. **We will examine how potential enhancements to existing programmes could attract further companies to undertake innovative activity, particularly with a collaborative focus.**

Through Invest NI we will work with a greater number of companies to encourage their progression up the 'innovation escalator', developing enhanced company capabilities to undertake more advanced forms of innovative activity. As part of the awareness measures, **we will investigate the potential to introduce innovation audits within companies linked to the provision of intensive mentoring.** In addition**, we will incentivise research performers to engage in networking / mentoring to increase the technological activities and capabilities of enterprises.**

Internationally, governments and businesses are increasingly using novel approaches to incentivise technological breakthroughs or to overcome particular challenges. Scotland is using the Saltire Prize - a £10 million challenge fund to accelerate the commercial development of marine energy - to support its efforts to be at the forefront of international efforts to tackle climate change. The life and Health Science sector are also addressing global challenges such as obesity and infectious diseases. **We will therefore examine the feasibility of running a number of competitions to support innovation in key areas where there is potential for Northern Ireland companies to compete on a global basis.**

Encouraging Companies to Invest in R&D

Although R&D is only part of the overall investment made in innovation, it remains an important driver in manufacturing and high technology sectors. In a short space of time our R&D performance has improved dramatically. Between 2008 and 2011, business R&D expenditure doubled – our spend (as % of GVA) is now around the UK level whereas five years ago we were well below average. However, this success has not been across the board and still only 430 of our companies reported undertaking R&D in 2011[7].

7 NI 2011 R&D Survey (2012)

In essence, our large, foreign-owned companies are responsible for most of our R&D and the substantial increases seen in the last few years. With over 60% of R&D spend concentrated in just 10 firms, we are heavily reliant on a small number of local firms who invest in R&D[8]. There is therefore a clear need to encourage many more indigenous SMEs to prioritise R&D. Building on the existing range of interventions already offered, **we will intensify our efforts to encourage businesses that have not previously invested in R&D to become active.**

Alongside this we will also need to build on the success of those companies that have driven our much improved R&D performance. This requires us to encourage those companies already engaged in R&D, to continue to invest more and to work more collaboratively with partners in both industry and academia. **We will engage strategically with existing companies who invest in R&D on a sectoral basis**, so as to determine their research needs, deepen their R&D capabilities and to develop their technology management capabilities.

Devenish Nutrition Ltd is an innovative agri-technology company based in Belfast that manufactures mineral and vitamin supplements for pig, poultry, ruminant and companion animals and makes starter diets for pigs and poultry both here and in the US. Devenish deal with some of the largest pig and poultry businesses globally and is known to provide solutions through their range of innovative products.

Employing over 100 people and with a turnover of over £60m it is a truly international operation. Investment in Research and Development and Innovation have been key to the success of Devenish Nutrition. Through product development and developing partnerships with industry, academia and government, they have established themselves as one of the leading companies in their sector.

Focusing Resources where we have Greatest Opportunity

In delivering support to industry, we will need to prioritise investment and assistance in those areas most likely to generate sustainable economic growth for Northern Ireland and in those indigenous businesses with the potential for high growth. We cannot compete in every global market and across all sectors and technologies. Therefore, building on the initial technology capability study undertaken by MATRIX (the Northern Ireland Science Industry Panel), **we will undertake a new research and technology capabilities study across the public and private sectors.**

8 NI 2011 R&D Survey (2012)

Wrightbus is a Ballymena-based company currently employing over 1,200 people and is one of Europe's leading suppliers of accessible public transport vehicles. By integrating world class design, advanced materials and innovative business models, Wrightbus has become a leading global supplier of buses. It secured the contract to manufacture the prestigious New Bus for London and has won significant orders in the US, Hong Kong and Singapore as well as the UK and Ireland.

The Economic Strategy identified the following key market sectors[9] where Northern Ireland has both the capability and the potential to compete on a global basis, and **we will therefore prioritise funding and support for research and innovation in both our education and company base in these priority areas:**

- **Advanced Engineering (Transport);**
- **Advanced Materials;**
- **Agri-food;**
- **Life and Health Sciences;**
- **ICT;**
- **Telecommunications; and**
- **Sustainable Energy.**

New Global Opportunities

It is important that Northern Ireland pro-actively seeks to identify new and changing global market opportunities so that local companies are at the forefront of these. This will help us grow our high technology indigenous business base and also enable us to produce a skilled workforce to give our region its best competitive advantage. It will also help to grow our exports and ensure we capture new global markets and have a research base which attracts new FDI. Therefore, with the support of the MATRIX Panel, **we will develop a foresight programme that will identify new and emerging technologies and key future markets.**

Enhancing Northern Ireland's World-Class Research Base

A world-class research base is a key driver in promoting economic growth. Data is also usually central to the research process and making data available to users is a key part of the Research Councils UK Common Principles on Data Policy[10]. Investment in innovation and R&D creates new businesses and improves existing ones, it brings highly skilled people into the job market and it attracts international investment.

9 Full details of MATRIX niche market priorities can be found in the accompanying evidence slide pack

10 See http://www.rcuk.ac.uk/research/pages/outputs.aspx

We need to continue to prioritise investment in the Northern Ireland research base. Significant investment in the university research base through mainstream Quality-related Research (QR) funding will therefore remain a strategic priority, building upon the introduction by DEL under 'Graduating to Success' (the Higher Education Strategy for Northern Ireland) of a new Higher Education research funding model. This model focuses on current resources and encourages our universities to pursue excellence in R&D, whilst also ensuring that the current and future needs of the economy are met.

This drive to enhance our world-class research base will however, incorporate all of the Higher Education and Further Education institutions, public sector research institutions as well as in-house company research. Therefore, **we will develop further our research excellence in sectors with high growth potential and also double the number of funded postgraduate places to 1000 by 2020, with a specific emphasis on an additional 300 PhD places in areas of economic relevance.**

Queen's University is recognised as a world leader in cancer research. In 2012, it was awarded the Queen's Anniversary Prize for world-class achievement through its leadership of the Northern Ireland Comprehensive Cancer Services programmes.

To further promote industry priorities within the world class science and technology capabilities of our academic research base, we will roll out the Invest NI Competence Centre programme. Concentrating on the key MATRIX market opportunities, and driven by specific industry needs, the Competence Centres will support companies to bring new products and services to markets that otherwise would not have been possible. **We will continue to support the development of Competence Centres in strategically important technologies where a clear industry need or emerging market opportunity is identified.**

An aging population, coupled with changes in disease prevalence, have led to shifts in health care demands. The ***Connected Health Innovation Centre (CHIC)*** aims to provide Northern Ireland with a world-class, industry led organisation and facility, within which high-quality R&D, networking, Intellectual Property (IP) generation and brokering can be conducted on connected health applications. CHIC, based at the University of Ulster, targets research in areas such as e-Health, digital health, tele-health, tele-monitoring, disease management, and home based care. The Centre will showcase Northern Ireland skills and work alongside health providers, international companies and academia to provide growth and collaboration opportunities.

Enhancing Creativity and Design

"Imagination is more important than knowledge" Albert Einstein

Creativity and design are important features of a well-developed knowledge economy. They are essential for a company to grow and innovate, as shown in Figure 3.

Figure 3: Creativity and Design for Innovation

Creativity is essential for a company to grow and develop novel ways of looking at existing problems or realising new opportunities and connections presented by changes in technology and society. To promote creative thinking and the use of digital technologies by pupils, teachers and youth leaders, **we will increase the capacity of the region's Creative Learning Centres and maximise the potential of our cultural base** to provide inspirational learning experiences that support the curriculum and the eSTEAM[11] agenda, and which add value to teachers, students and lifelong learners.

To further nurture a culture of creativity across the public, private and third sector, **we will develop a Creative Northern Ireland Framework**. This will catalyse and enhance collaboration, creativity, design and innovation within and across business, academia, the third sector and government. It will support broader-based innovation by generating and exchanging ideas across sectors and disciplines and by connecting multiple networks and sources of insight and inspiration. This aims to help creative people, ideas and businesses to emerge and flourish.

Research has consistently shown a link between the use of design and improved business performance[12] and many leading European innovation economies have placed design at the centre of their innovation strategies. We also recognise that design is a key enabler and driver of innovation. Through Invest NI and other Government interventions we already support companies to improve the competitiveness of their products and services through design support. Invest NI's Design Service for example, through awareness, advice and capability development encourages SMEs to use design as a business tool and an enabler of innovation. Using a strategic approach Invest NI will continue to promote design as a driver to support businesses increase their potential in existing and new markets through creating compelling customer experiences via products, services and systems. Therefore,

11 Enterprise, Science, Technology, Engineering, Art, Maths

12 Eden Partners (2011) Evaluation of Design Demand

we will look to increase our efforts in this area to drive behavioural change and encourage more companies to incorporate design into their business planning processes.

Skills and Education to Support Innovation

To transform our economy into one of the UK's leading high-growth regions, we need better educated and more highly skilled workforce. This will enhance the innovation performance of our local companies. Encouraging more SME's and Micro Businesses to engage in innovation is particularly important. Through the DEL Employer Support Programme (ESP), £6.9m has already been allocated to our Further Education Colleges to support companies to develop the skills capability of their employees. However, it is recognised that more can be done. By **working with the FE sector and other stakeholders, we will increase focus of the ESP to provide targeted support to SME's and micro businesses for the skills required to engage in innovation, R&D and entrepreneurship**.

Qualifications in Science, Technology, Engineering and Maths (STEM) are particularly relevant for the knowledge economy, but this is an area where NI has had limited growth in annual student numbers (using the narrow definition of STEM) in recent years from Higher Education Institutions (HEIs). This has the potential to limit the flow of skilled labour for knowledge-based businesses and therefore we will, with the support of business, continue to progress the implementation of the Northern Ireland STEM Strategy, 'Success through STEM', and, in particular, fund an additional 1,200 undergraduate places in STEM areas.

It is not just formal qualifications which are important for innovation, but also skills such as entrepreneurship, risk and creativity which can be developed throughout the education lifecycle. This will be in addition to potential new learning programmes to promote the wider innovation agenda through STEM.

In addition, research within our HSC Trusts and organisations is essential for the development of more effective medicines, devices and other treatments. **We will ensure that professional staff have opportunities to acquire and deploy research skills within their clinical workplaces and we will invest further clinical research careers.**

Another core component of a knowledge-based economy is ICT skills. These need to be embedded into the culture of our schools, and into the training of our teachers. An ICT Future Skills Action Plan has already been produced by DEL, and ICT is now embedded into the revised curriculum as a skill across all Key Stages. However, we need to ensure continued good communication between industry and academia to ensure that the ICT skills supplied match those demanded by industry. A number of successful initiatives are underway to address this such as the 'Software Testers Academy'. We will continue to work with industry to ensure the necessary skills pipeline is in place to meet their needs.

Key Actions

1 We will undertake a new research and technology capabilities study across the public and private sectors.

2 We will prioritise R&D funding towards opportunities identified in the Economic Strategy.

3 We will develop a foresight programme that will identify new and emerging technologies and key future markets for local companies.

4 We will develop a Creative NI Framework to foster and nurture a culture of 'creativity and design thinking'.

Question 3: Are there any additional actions to those identified in the Knowledge Generation Section, necessary to deliver the aims of this strategy?

3. Knowledge Exchange

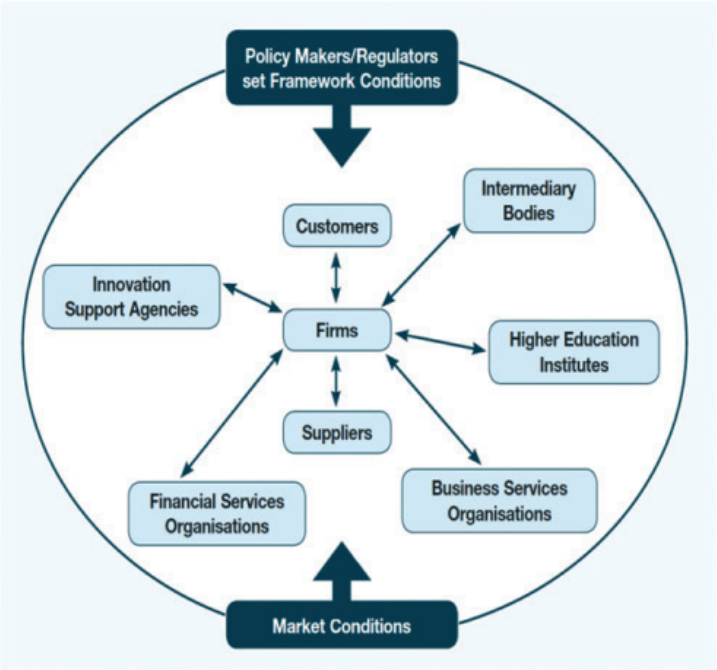
Overview

What is Knowledge Exchange?
Knowledge exchange is about facilitating the exchange and access to quality information across all sectors in order to support economic growth
What do we want to achieve?
• More firms engaging in open innovation • Increase business to business collaboration • Increase business to academia collaboration • More international partnerships and collaborations • Greater funding success for EU collaborative R&D funding
What are we going to do?
• 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 • Develop further the innovation capacity of HSC organisations
How will we know that we are on target?
• Co-operation and collaboration on innovation activities (% of innovators) • HE income from collaborative activities (£m) • Drawdown from EU Framework Programmes and Horizon 2020 (€m)

Why is Knowledge Exchange Important?

Innovative economies are outward-focused, collaborative and have structures which can fully exploit the benefits of knowledge exchange. Success, therefore, will be strongly dependent on our ability to identify and develop effective private, academic and public sector collaborations that can deliver economic growth. We must incentivise collaboration, encouraging companies to develop their capabilities to exchange, access and absorb knowledge, technology and skills in order that they can exploit opportunities. An overview of the main actors in the innovation ecosystem is shown in Figure 4 below.

Figure 4: Overview of Innovation Ecosystem



Source: InterTradeIreland (2012) 'Leveraging the Innovation Ecosystem for Business Advantage: A Cross Border Study

Encourage Companies to Engage in Open Innovation

Companies which engage in collaboration are more productive than those that do not. Currently, NI firms are less inclined to collaborate than their counterparts in the rest of the UK. Encouraging collaboration and accessing external knowledge are central to moving towards a modern open innovation system and to increasing productivity and growth[13]. There is therefore a need for more of our companies to be open to collaboration, as this is often the best way of accessing new ideas.

13 Love, JH, Roper, S & Bryson, J (2011) Knowledge, Openness, Innovation and Growth in UK Business Services

We want to encourage a greater number of companies to look outside their own environment for new knowledge and ideas. Often described as 'open innovation', it can involve formal or informal collaboration with a wide range of organisations including other firms, suppliers, customers, colleges and universities.

The success of open innovation is dependent on a change in culture and attitudes to innovation in which trust, collaboration and knowledge exchange are integral. A recent report[14] indicates that our firms have much more limited connections than businesses in other UK regions. Northern Ireland needs to move to an enhanced model of open innovation where collaboration and commercialisation is accelerated across businesses.

We will therefore enhance our support to companies to enable them to engage in open innovation activities within and outside the Northern Ireland innovation eco-system. Work is underway to determine if this can best be delivered by the creation of a new Open Innovation Centre or the provision of a new support service.

Increasing Business to Business Collaboration

Collaboration capitalises on opportunities for innovation. In its purest form it can help businesses to compete in larger markets, strengthen their capacity to compete in global markets. Encouraging local businesses to coordinate and aggregate their resources, acts as a 'building block' for the potential creation of Industry Innovation Communities (IICs).

A number of organisations work with businesses to support collaboration and open innovation. Invest NI works with a wide range of sectors to deliver projects by providing facilitation support to enable effective working within collaborative networks. This support allows and encourages a cross-sectoral approach, which bridges the boundaries between traditional sectors and exposes companies to new markets, technologies & research opportunities. Working with nascent networks to help form the scope of projects, Invest NI will ensure all projects are industry-led and **we will increase our investment in establishing industry-led collaborative networks, particularly those focused on market opportunities identified in the Economic Strategy.**

Increasing Business to Academia Collaboration

Our Universities and Further Education colleges have vital roles in supporting business to access new ideas and knowledge. Northern Ireland currently ranks as the best performing UK region in terms of interactions between academics and the business, public sector and wider community[15], whilst collaborative activities are a more important part of universities income here than elsewhere in the UK.

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14 Roper S. (2012) Developing an Open Innovation Centre for Northern Ireland'

15 UK Innovation Research Centre (2009)

Since the publication of FE Means Business, the strategy for further education in Northern Ireland, further education colleges have developed and strengthened their links and relationships with employers, business and industry both on a local, regional and international basis. Colleges have improved their services and products in response to industry demands and are increasingly working in partnership with the business community. The partnership will develop a more comprehensive, economically relevant curriculum which meets the specific needs of employers in terms of providing highly skilled, knowledgeable and competent people who can add significant value to employers when they enter the workforce. Provision within the colleges therefore remains very closely aligned to the Programme for Government (PFG) and the Economic Strategy.

Initiatives such as DEL's Higher Education Innovation Fund (HEIF) and the Connected Programme already provide invaluable roles in helping companies engage in innovation. While HEIF underpins the core business and community-facing activities of Queen's University and University of Ulster, Connected adds a further dimension. It enables the universities and Further Education colleges to come together to identify and meet the knowledge exchange needs of businesses in a fully joined-up, holistic fashion, taking companies through the entire innovation process. However, we want to build on the success of these programmes, and therefore as set out under 'Graduating to Success', **we will seek to increase funding for the next rounds of both the Higher Education Innovation Fund and Connected programme.**

We will also increase our investment in other existing programmes which support collaboration between our universities and colleges and companies, including:

- **Knowledge Transfer Partnerships (KTPs):** these facilitate the transfer of knowledge and the spread of technical and business skills through joint projects between third-level education establishments and local companies, undertaken by high-calibre, recently-qualified graduates. **We will look to increase the number of KTPs** through strengthening our engagement with the Technology Strategy Board's Knowledge Transfer Networks (KTNs) in its delivery of a series of KTP-themed 'calls'. **We will also liaise with the Technology Strategy Board to agree on the scope and budget for a number of NI specific calls with a focus on priority sectors.**

Hughes is a leading NI insurance broker, with a product range including all personal insurance products and a range of commercial insurance products. Through a KTP with Queen's University, an astrophysics graduate working with the School of Maths was tasked with helping the company to develop a successful pricing strategy. Astrophysicists gain advanced skills in mathematics at Queen's that are easily transferable to the world of business, in particular to financial modelling. The KTP Associate's work in researching and building regression models to predict customer retention, churn and price elasticity, has served to embed new technology and expertise in the business and contributed to a 4.5% increase in customer retention figures.

- **Knowledge Transfer Network (KTNs):** these provide an over-arching network bringing businesses, technology organisations and academia together to enable the exchange of knowledge and encourage innovation. The Networks can help companies find out about new opportunities in key research and technology sectors and provide them with the opportunity to meet and network with individuals and organisations, in the UK and internationally. **We will continue to work with the Technology Strategy Board to strengthen and develop KTN in Northern Ireland.**

- **Innovation Vouchers:** this scheme provides SMEs with a voucher for £4,000 which can be exchanged with academia in FE colleges, universities or research institutions. They can be used to help develop important links, introduce new products or processes into a business. Importantly they encourage collaboration capacity and are of critical importance in our efforts to encourage firms to engage in innovation because they can 'de-risk' a first step for many businesses to become more innovative. Building on our recent extension to cover all SMEs, **we will seek to increase investment in the Innovation Vouchers programme.**

Elmore Fish in Dunmurry used an innovation voucher to work with Loughry Campus CAFRE to develop an innovative range of easy to cook fish dishes. The family owned and managed company, which has been supplying fresh and frozen fish since 1894, has launched its restaurant-branded range of ready fish dishes that can be oven cooked in just 15 minutes, enabling families to enjoy the health benefits of seafood.

- **Creative Credit Vouchers:** These have been piloted in the UK and enable businesses to access expertise and knowledge to develop new products, services and new markets. **We will work with NESTA to introduce a Creative Credit Voucher.**

- **Specialist Provision for Industry using College Expertise (SPICE) Centres:** FE colleges continue to drive excellence within FE provision in priority sectors and by developing good practice and expertise in specialist areas. Colleges are committed to contributing to this vision by developing centres of excellence, which will be known as Specialist Provision for Industry using College Expertise (SPICE) Centres. **We will encourage FE colleges to create and establish SPICE centres, in order to provide bespoke support for all businesses in Northern Ireland, which will help them innovate and grow.**
- **Knowledge Transfer Awards:** These support the embedding of results from R&D into HSC organisations. **We will encourage clinicians and other HSC staff to become more efficient innovators by providing routes to the implementation of new products or practices that emerge from R&D, normally undertaken jointly with academics and / or businesses.**

Supporting International Partnerships & Collaborations

Innovation is an international process where knowledge, resources and personnel freely move across borders. Local researchers, businesses and officials need to more actively engage and collaborate at UK, EU and global levels. Through greater collaboration, Northern Ireland can enhance knowledge and build networks by forging strategic partnerships which will help local businesses access new markets and improve the quality of commercially-focused research. These collaborations are essential if we are to establish a global reputation for excellence in key markets and technologies. Our strategic approach will include:

- Promoting our research and high technology sectors overseas to attract FDI;
- Promoting NI as a great place to live work and invest;
- Supporting our businesses and researchers to access international markets and collaborative research networks;
- Ensuring Northern Ireland continues to attract globally mobile capital, technology and highly-skilled people;
- Strengthening our engagement with initiatives within the European Union; and
- Building strategic links with high growth economies.

Developing new international partnerships will give Northern Ireland access to new markets and increase our collaborative research partnerships. **We will continue to forge strategic partnerships at the highest level with emerging economies in areas where there are alignments with Northern Ireland's capabilities and future market opportunities.** In

particular, **we will support our key research institutes centres, to develop international agreements.** In addition, **we will remain fully committed to the development of the US / Ireland R&D Partnership, working closely with our partners in the Republic of Ireland and the United States.**

C-TRIC based in Altnagelvin Hospital, is a clinical translational research and innovation centre with an international reputation for excellence. In 2011 C-TRIC signed a MoU, on a strategic alliance formed to advance tissue engineering research and development, between partners in Northern Ireland, Finland and Massachusetts.

Increasing Success in EU R&D and Innovation Programmes

EU funding for R&D and innovation not only provides an invaluable source of new funding but also helps establish sustainable international collaborations. While Northern Ireland has exceeded targets for the Framework Programme 7 (FP7), the increased scope of Horizon 2020 – with a budget of over €70 billion – presents an opportunity to significantly improve on recent performance.

Analytics Engines, a Belfast-based SME, is currently engaged in a number of FP7 projects. One of these is the 'HANDHOLD' project which is developing multi-source data analytics for the detection of environmental hazards. The project has allowed Analytics Engines to collaborate with world class research institutes and leading companies from the Republic of Ireland, Germany, Portugal and Estonia in a project valued at over €4.5m.

In preparation for Horizon 2020, new support measures have already been introduced including the appointment by DETI of a Horizon 2020 Manager and the establishment of a new £1.8m Fund for the creation of a network of research experts in each of the key societal challenges. These experts, known as Northern Ireland Horizon 2020 'Contact Points' will work directly with researchers in companies, research institutes and HSC organisations supporting them to develop better quality applications. **We will, however, continue to enhance support so that more Northern Ireland companies and researchers are more successful in Horizon 2020 and that we can secure at least €100 million in funding.**

Key Actions

1 We will enhance our support to companies to engage in open innovation activities, either through the development of an Open Innovation Centre or the provision of a new support service.

2 We will increase our investment in establishing industry-led collaborative networks, particularly those focused on market opportunities identified in the Economic Strategy.

3 We will increase our investment in programmes and initiatives that support collaboration between businesses and academia and business to business.

4 We will increase our support to local companies and research organisations to secure at least €100m from Horizon 2020.

Question 4: Are there any additional actions to those identified in the Knowledge Exchange Section, necessary to deliver the aims of this strategy?

4. Knowledge Exploitation

Overview

What is Knowledge Exploitation?
Transformation of knowledge into products and services which can add value and preferably be exported
What do we want to achieve?
• 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 • Our innovation infrastructure being exploited to its full potential
What are we going to do?
• 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 • Promote the Small Business Research Initiative (SBRI) to drive innovation through pre-commercial procurement of R&D
How will we know that we are on target?
• Increased turnover from innovative goods & services (% of total) • Firms reporting innovation protection (% of firms) • Private equity backed firms (per 1000 VAT businesses) • University spin-offs (per million persons)

Why is Knowledge Exploitation Important?

Within the UK, it is recognised that the current innovation infrastructure is *"strong on research but, weak on economic impact"*.[16] Similarly, Northern Ireland has a solid innovation foundation but we need to work more effectively at exploiting this.

The journey from innovation to commercial success is not an easy one, with mistakes and failures inevitable on the way. We need to be more accepting of those entrepreneurs who have tried and failed, but who have learnt from their experience and are persisting on the entrepreneurial journey with new ventures. In a fast moving technological world, even the smartest teams cannot pick winners every time and it is better to share the stories of what did not work and move on to a new and better venture. We must always support our entrepreneurs and companies along this journey.

Supporting Companies to Access Finance and Exploit Knowledge

In recent years, significant investment in terms of finance and research has been introduced to support entrepreneurial growth. This has come from Invest NI, InterTradeIreland, NISPO, Halo, NISP, NISP Connect, Co-Investment Fund and Development Funds, Local Enterprise Development and others in the private sector. Notwithstanding the current debt initiatives, where Invest NI is addressing market failure through the Northern Ireland Small Business Loan Fund and the Growth Loan Fund, providing £55m of debt finance over the next 5 years, therefore we need to build on this.

If new innovative businesses are to grow quickly into export-focused enterprises, we need to make it easier for them to access finance. Invest NI has already developed a suite of funds under its Access to Finance Strategy and it will promote the continuum on an ongoing basis to ensure no funding interruption. However, building on the findings of the Economic Advisory Group's (EAG) review of 'Access to Finance for NI Businesses' **we will continue to look for new innovative approaches to support companies to access finance**. As part of this we will seek to increase the funding available for NISPO so that they can increase its support for early stage businesses with high growth potential In addition we will develop a number of capability programmes such as raising finance workshops and finance vouchers.

Commercialisation of Intellectual Property

There have been significant efforts to improve the commercialisation of Intellectual Property (IP) generated in our HE sector, and the success of these efforts has been reflected in a large rise in IP income since 2003/04. More recently, similar efforts have

16 The Current and Future Role of Technology and Innovation Centres in the UK, Dr. Hermann Hauser for BIS, 2010.

been made to increase the commercialisation of IP from our public sector research institutions. In partnership with the research base and MATRIX, **we will seek to enhance the management and exploitation of knowledge and Intellectual Assets including IP from our research institutes**. A Report will be published by Matrix later in 2013 outlining recommendations to facilitate greater exploitation of intellectual assets over the medium and long term.

The public sector also generates IP through its services in areas such as education and health. This 'soft IP' presents an opportunity to stimulate new business and generate an additional revenue stream for the public sector. **We have asked MATRIX to identify areas of 'soft IP' which could be licensed or commercialised to create exportable products or services by local companies.**

Supporting Businesses with High Growth and Export Potential

Now and in the future job creation will be highly dependent upon fast expanding companies in growth areas and markets such as ICT. Research by NESTA[17] demonstrates that around 6% of innovative, high growth businesses created 40% of new private sector jobs and were responsible for over 50% of the growth in jobs across the UK between 2002 and 2010. To encourage these kinds of businesses, we need to:

- Encourage entrepreneurs to commercialise their innovations and give them the tools to start and grow their businesses to a global level;
- Challenge entrepreneurs to focus as much on the processes of building their businesses as developing their technologies; and
- Work with those businesses that succeed and wish to continue to grow rapidly to help accelerate their growth and scaling.

In addition to the current support available from across the public and private sectors, **we will fund a world-class Business Accelerator within Northern Ireland to foster the growth of early stage high tech start-ups.** This Accelerator will provide an intensive and time-bound suite of support to high tech start-ups, including access to mentors and academia, a continuum of capital and a skilled workforce, business support services and global market opportunities. A shared workspace will encourage peer-to-peer learning during the programme.

17 NESTA (2009) The Vital 6%

Companies exposed to the challenges and competitive pressures of export markets are more likely to be innovative and high performing. More local businesses, particularly our SMEs, need to be encouraged to sell their goods and services outside Northern Ireland. To support these businesses **we will provide increased levels of support, particularly in those areas identified by MATRIX, and to those businesses with the greatest potential to exploit new markets.**

Exploiting Public Sector Data

Over the past 10 years there has been a drive to open up public sector information as a driver of economic growth and innovation. Through the 2012 Open Data White Paper, the UK government has committed to make data available in accessible formats and to put in place measures to actively encourage the re-use of public data.

In Northern Ireland, with the development of the Spatial NI portal for our public sector data sets, we are committed to making significant strides to open up our public sector data. As part of this **the Department for Regional Development will investigate the exploitation of the data it holds on traffic and public transport movements for the benefit of road and public transport users and the better management of traffic.**

The **Spatial NI** portal, provides a platform for the delivery of Open Data in Northern Ireland. It links directly to the UK Open Data portal www.data.gov.uk and many of the Departmental datasets currently available on Spatial NI can be accessed through an open data license either from the portal itself or through data.gov.uk. The spatial data on the portal can provide a location framework for finding, analysing and displaying the majority of government-held information.

In order to maintain progress and to learn from international best practice, **the Northern Ireland Executive will become a strategic partner of the UK Open Data Institute.** Working with The National Archives (TNA) and the Technology Strategy Board, **we will also produce a developer engagement strategy to support local companies create new products and services from open data.**

The **Open Data Institute** is an independent organisation led by Sir Tim Berners-Lee, inventor of the world wide web. It was created with £10.75m funding from the Technology Strategy Board and the Omidyar Foundation. Its priorities include:

- creating start-up companies and helping them to grow;
- helping companies use open data;
- to enable data entrepreneurs and developers in open and linked data technologies to enable them to create new products and services from open data; and
- helping public sector organisations publish accessible and useable data.

Data Analytics

Data Analytics and 'Big Data' refers to data sets which are beyond the ability of typical tools to capture, store, manage and analyse. There is strong evidence that data can be used to drive productivity and competitiveness as well as to stimulate innovation.

Information technology which was created to manage data within institutional 'silos' is now being harnessed to integrate, interrogate and exploit massive volumes of data. Our Public Sector generates significant amounts of data that, if properly exploited, could lead to significant efficiencies and also provide 'sandboxes' to allow developers to explore new business opportunities.

In Northern Ireland we have already successfully started to commercially exploit such data sets. In 2012, nine public sector data sets were made available under licence as part of an NI Tourist Board (NITB) competition for tourism apps. By making these data sets available new apps were created by local companies. **We will ask MATRIX to conduct a study into the size and nature of the opportunity presented by open data and big data for NI businesses and to advise on the actions required to exploit this.**

Using Public Procurement to Stimulate Innovation

The Northern Ireland Public Sector spends some £3 billion per annum on the procurement of goods and services. It has been shown that the public sector, as an intelligent customer, can make a major contribution to encouraging innovation. Directing even a small proportion of this towards innovative procurement programmes will help stimulate innovation in the economy by accelerating ideas, products and services through from businesses. This approach has been used successfully through the Technology Strategy Board's Small Business Research Initiative (SBRI).

The **Small Business Research Initiative** is a structured "pre-commercial procurement" process aimed at driving innovation through the procurement of Research & Development. It provides innovative solutions to Public Sector challenges and business opportunities to technology-based businesses. By using SBRI the public sector is able to access ideas and technologies that they would not reach through normal channels.

Northern Ireland was the first devolved administration in the UK to run a SBRI competition. DETI and DARD have recently launched a major competition to encourage the development of solutions for the sustainable utilisation of poultry litter. DHSSPS is also progressing an initial SBRI completion. In partnership with the Technology Strategy Board, Northern Ireland has the potential to be a leader in the use of SBRI. Building on this the **Department for Regional Development will use the SBRI approach to promote the use of electric vehicles and will investigate its use on other transport challenges. We will also provide further investment into the SBRI model to appoint four Innovative Procurement Executives (SBRI Champions) and investigate the development of a central fund, to co-fund SBRI projects across public sector organisations.**

Newly-founded Drumbo company **RepKnight** radically changed its business offer after responding to a SBRI competition from a Whitehall department. The company has since developed the fastest social media monitoring platform of its type in the global market. Staff numbers have risen from just three in December 2011, growing to 15 by spring 2013. Annual turnover has topped £10m and new customers are being signed up at home and abroad.

'We have been punching way above our weight thanks to SBRI, securing and delivering contracts way beyond what could reasonably have been expected of us.' John Reid, Chief Executive Repknight.

Enhancing and Exploiting our Innovation Infrastructure

The NI Science Park has played a vital role in helping to rebalance our economy. It is home to over 100 companies and the biggest research institute in Northern Ireland, who together employ over 2,000 people. In just a decade of operation, it has become a microcosm of the knowledge economy that we wish to develop for the whole of Northern Ireland. Its continuing success as a key part of our economic infrastructure, needs to be fully exploited and built upon. Going forward, **we will support the expansion of the NI Science Park**.

This will further develop its role to support more firms in the MATRIX-identified sectors to engage in open innovation so they can exploit new global market opportunities.

An annual £4.5 billion invested in the Health and Social Care sector also presents huge opportunities to drive innovation in local companies. The HSC R&D Fund enables the development of infrastructure – networks of support staff and research services for clinical trials and other studies – across HSC organisations. Positive progress has been made in this area, with a recent 'Task and Finish' group identifying recommendations on how such opportunities can be further exploited. **We will take forward those recommendations, and in particular, seek to develop an overarching Health and Life Sciences Strategy in partnership with stakeholders.**

The recent 'Going for Growth'[18] report highlighted the importance of innovation to the continued expansion of the Agri-food sector, Northern Ireland's largest manufacturer. The report produced a series of recommendations on how industry, working in partnership with the public sector, can exploit global opportunities. **We will work with the Agri-Food Strategy Board and other stakeholders to take forward these recommendations.**

Exploiting E-commerce

E-commerce continues to provide tremendous opportunities for local companies to compete on a global basis. Through an investment of more than £60 million, we have built one of Europe's most extensive regional broadband networks.

The challenge we face now is how to fully exploit this opportunity. **We will continue to improve the competitiveness of businesses through e-business support** which will:

- Integrate e-business and digital communications into every aspect of business;
- Increase the e-capability of NI businesses through awareness building and training;
- Increase the volume and value of export sales through e-commerce;
- Target support for businesses, to enable them to both understand the business potential of the digital platform and also ensure they fully exploit the technology; and
- Engage key players across government, industry and academia, to drive forward Pathfinder initiatives, which will result in step change business performance as a result of exploitation of the digital platform.

18 Agri-Food Strategy Board, 2013

Key Actions

1 We will fund a new world-class business accelerator.

2 We will become a strategic partner of the UK Open Data Institute and develop a developer engagement strategy to support local companies create new products and services from open data.

3 We will establish a central fund to co-fund SBRI projects.

4 We will support the expansion of the Science Park.

Question 5: Are there any additional actions to those identified in the Knowledge Exploitation Section, necessary to deliver the aims of this strategy?

5. Cultural Change

Overview

What is Cultural Change?
Changed attitudes and behaviour towards collaboration, and the openness towards and use of new ideas, innovation and risk taking
What do we want to achieve?
• 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 • Improved communication
What are we going to do?
• 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 • Promote innovation and creativity as core competences for Civil Servant managers
How will we know that we are on target?
While indicators specific to the underpinning requirement for cultural change have not been identified, engagement at the highest level through delivery of key actions detailed in the strategy will be evidence of progress. Together with the twelve indicators identified across the key themes, positive or negative change will be evident.

Why is Cultural Change Important?

Transforming our innovation performance requires sustained commitment and long-term focus. It will require changes in culture and behaviours that must be embraced across all levels of society. To become imbedded, and truly irrevocable, these changes will require a long-term, sustained, level of visible commitment at the most senior levels in Government, business, the third sector and academia.

Driving Innovation Forward

The interaction and dependencies within the innovation ecosystem are complex. For this strategy to succeed in its aims, many different individuals, organisations, sectors and agencies will need to embrace change, refocus their activities and better coordinate their efforts. It will also require a step up in efforts to drive change across the public sector, to provide a supportive environment and to develop enterprising leaders for the modern public sector. Without the appropriate drive and leadership, action will be sporadic, progress slow and the aims of this strategy will only face resistance or even stagnation.

Visible leadership, to drive forward the aims and objectives of this strategy, is crucial. That leadership is not a one off activity and the changes envisaged will require long-term, sustained, leadership at the most senior levels in the private and public sectors. As a result, we will look to establish a Northern Ireland Innovation Council, chaired by the Minister for Enterprise Trade and Investment, to include senior representatives from business and academia to oversee implementation of this strategy.

Coordinated Approach to Science across Government

To have a systematic and coordinated approach to science within the public sector, and to reinforce its importance in driving economic growth, **we will appoint a Chief Scientific Advisor for Northern Ireland.** This new position could contribute to providing effective leadership across a range of issues including:

- Coordinating the various strands of science across departments and agencies including, where appropriate, participation in UK-wide initiatives;
- Greater inter-connectedness across all sectors of science capability;
- Demonstrating the value placed on science by Government leadership; and
- Helping to develop a more coordinated approach to R&D, including the increased targeting of EU and other research funding opportunities such as enabling the development of research teams drawn from different NI sectors.

Ensuring a Culture of Leadership

Strong, effective leadership and business dynamism drives business growth. While Northern Ireland has many business leaders successfully growing their companies on a global scale, evidence from our Skills Strategy, 'Success through Skills', demonstrates the need to do more to adopt best practice leadership and enhance management skills.

The role of leaders in creating conditions for greater innovation, within and beyond their organisations, is critical. It is the attitudes, values, and behaviour that promote innovation and it is 'the Leader' that reinforces this culture, by creating cultural attributes that stimulate and support innovation and growth.

We need to foster a culture of leadership within the public and private sectors that will drive change. There have already been some significant commitments in this area and, for example, the Invest NI Leadership and Management Support Framework (LMSF) has been successful in helping businesses overcome problems or barriers to growth through the development of leadership and management capabilities. **We will continue to ensure leadership and management training is directed towards our SME base.** As part of this, **we will introduce a range of new leadership programmes and also develop a management strand within Invest NI's Skills Growth Programme.**

Through Invest NI and with DEL support, we will improve company leadership and management at senior level and cascade best practice throughout the business. Our approach will include:

- raising awareness of the importance of good leadership and management practice;
- deliver tailored development aimed at behavioural changes in the most senior people within SMEs; and
- deliver direct support to Northern Ireland businesses for skills development.

A More Balanced Approach to Risk and Regulation

While there is a need to ensure good governance is maintained over the management of publicly funded projects, there is also a need to ensure that we allow a more balanced approach to risk within the public sector. **We will develop new models, in tandem with the business community, to support innovation and to manage higher levels of risk in return for higher returns to the economy.**

While oversight in the form of regulation is necessary to support economic growth and ensure a fair and competitive market in which companies operate, we will continue to review the regulatory burden on business imposed through government intervention and regulation. While regulations are often perceived as a burden, they can also be a spur to develop new products and services which are capable of export. **We will therefore**

encourage more companies to invest in attaining international standards such as ISO and recognised national schemes such as the United Kingdom Accreditation Service.

Innovation within Government

Government has a key role in leading and facilitating the development of skills, research and the capacity of business to innovate. Government's role is also to act as a catalyst of innovation demonstrating how the public sector can help Northern Ireland become more productive and at the same time improve public services. We will ensure that innovation and creativity are incorporated into training and development programmes of public servants and become core competencies for managers.

The public sector also needs to be innovative and this will involve cultural change and a break from the past, adopting different ways of doing things. The challenge now for the public sector is to develop an innovation culture underpinned by this comprehensive innovation strategy, to provide a supportive environment to develop 'enterprising leaders' for the modern public sector. **We will look to appoint 'innovation champions' within all Government departments, to drive and coordinate the innovation agenda.**

As with governments across the world, the NI Executive is faced with complex challenges that span multiple social and economic boundaries. Integrating design into public policy making and public service development will lead to more efficient and effective decision making and delivery. To support this aim, we will build on efforts to introduce the strategic role of design thinking in Government as a joined-up approach to problem solving and stimulating innovative and integrated solutions. This aims to support Government departments and agencies in addressing complex challenges that demand new ways of working across departmental boundaries.

The Department of Health in GB asked the Design Council to bring designers, manufacturers and frontline NHS staff together to see if they could come up with new ideas that would help the NHS improve hospital environments and the experiences of patients. Called "Design for Patient Dignity" this project considered the whole patient experience while in hospital, including what patients wear and how they interact within the hospital. Six teams of designers and manufacturers, as well as healthcare design specialists came up with innovative new designs that show how different privacy and dignity issues could be solved.

The Design Council reports that as a result of this project new products and services have been developed that are supporting the NHS making lasting improvements to the "care environment" and are helping it organise care around patients' needs and expectations.

To support innovation in companies, we need to seize opportunities for public sector delivery. This is more important in the context of financial constraints and slow growth.

Delivery from alternative sources is also part of the rebalancing agenda and the move away from an economy that is dependent on the public sector. **We will therefore develop and implement an Innovation Programme for the Northern Ireland Civil Service. This will develop and test solutions to the challenges facing communities and public services. It will equip people with the skills, knowledge, tools and experience to innovate, and contribute to a wider cultural change in the Northern Ireland Civil Service, making it more open to ideas and better able to work with citizens.**

Stimulating Social Innovation

The Executive recognises the social economy as an important emerging sector with the potential to make a valuable contribution to employment and the local economy. Creating a supportive and enabling environment for the sector to thrive will play an important role in regenerating communities and helping to create a balanced economy. **We are committed to developing social economy policy and development of the sector, to be supported within the context of the Economic Strategy.**

Bryson Charitable Group continues to be a champion of best practice in the field of social enterprise, delivering 25,000 services per day to families and individuals right across Northern Ireland and County Donegal. Bryson House uses a modern social business model to address many of the main social issues facing society for example; aging population, ethnic diversity, sustainable waste management, energy use and unemployment.

Communication and Access to Knowledge

One of the main barriers for Northern Ireland companies, particularly our SMEs, who want to innovate and grow, is accessing the right knowledge at the right time. To help fill this gap in our innovation ecosystem **we will develop a 'focussing on innovation' communication strategy for business,** which will:

- Demonstrate the benefits of innovation;
- Identify key support mechanisms for companies who wish to engage in innovation;
- Identify current innovation research and opportunities both locally and globally;
- Increase connections and spill-over knowledge from one sector to another;
- Inform society of the benefits of using new technologies;
- Celebrate our innovation successes.

Key Actions

1 We will seek to establish an Innovation Council.

2 We will establish a Chief Scientific Advisor role for Northern Ireland.

3 We will develop a new Innovation Communication strategy.

4 We will develop new models, in tandem with the business community, to support innovation and to manage higher levels of risk in return for higher returns to the economy.

Question 6: Are there any additional actions to those identified in the Cultural Change Section, necessary to deliver the aims of this strategy?

6. Measuring Progress

The Innovation Strategy is one of the key strategies that supports the Northern Ireland Economic Strategy (2012). The Economic Strategy will publish annual reports on progress and this will also include an annual assessment of the wider health of the NI economy including its innovation performance.

Performance Indicators & Monitoring Progress

A detailed portfolio of specific innovation performance indicators have been identified to measure progress on the key themes of this Strategy.[19] A monitoring methodology, set out in Figure 5, has been developed, based on:

- Long-term strategic goals based on regional benchmarking and increased employment in knowledge-intensive sectors; and
- Medium-term indicators based on the broad Innovation Strategy themes designed to provide clarity and focus on the three themes of successful innovation.

All 12 medium-term indicators have been set out under the three themes of knowledge generation, exchange and exploitation. Although the indicators are allocated to individual themes, in reality innovation is a non-linear process and many of the indicators will be relevant for more than one theme. It is therefore, the twelve indicators as a whole, rather than the theme that they are listed under which is of most importance.

Prioritisation

While each of the indicators will have an impact on improving performance across all the long-term objectives, some will impact on more than one area and will therefore have a greater impact. As shown in Table 2, prioritisation has been given to the indicators depending on their influence on long-term goals.

Monitoring Arrangements

The monitoring of actions, indicators and targets will allow us to gauge the delivery and effectiveness of these actions. It also allows for any reprioritisation of resources and interventions, particularly given the continued uncertainties in the local and global economy. An annual progress report on implementation of this Strategy will be presented to the Executive Sub Committee on the Economy.

19 Further analysis and details on the indicators can be found in the accompanying evidence slide pack www.detini.gov.uk/innovationstrategyni

Figure 5: Innovation Strategy Indicators and Current Performance

LONG TERM GOALS	Current	Ambition
European innovation scoreboard ranking	8th (of 12)	Top 5
UK regional innovation ranking	11th (of 12)	Top 6
Employment in the knowledge economy	32,200	47,000

MEDIUM TERM KNOWLEDGE GENERATION	NI
Firms with innovation activity *(% of total firms)*	27%
Total R&D expenditure *(£millions)*	568
BERD by indigenous SMEs *(£million)*	83
Number of R&D companies	430
Annual STEM graduates*	7,119

MEDIUM TERM KNOWLEDGE EXCHANGE	NI
Co-operation on innovation by firms *(% of innovation)*	45%
HE income from collaborative activities *(£millions)*	87
Drawdown fromEU FP7/H2020 *(£millions)*	56

MEDIUM TERM KNOWLEDGE EXPLOITATION	NI
Turnover from innovative goods and services *(% of total turnover)*	25%
Firms reporting innovation protection *(% of firms)*	8%
Private equity investments *(per 1000,000 VAT businesses)*	16
HE spin-offs active after three years *(per million persons)*	27

* Narrow STEM plus Medicine & subjects allied to Medicine

Table 2: Prioritisation of Medium-Term Indicators

HIGH	% of firms who are innovation active % of innovative firms who co-operate Total annual R&D expenditure Annual HE STEM graduates
MEDIUM-HIGH	BERD by indigenous SMEs HE income from collaborative activities % of firm turnover from innovative goods and services Firms applying for any form of innovation protection
MEDIUM	Number of companies investing in R&D Drawdown from EU Framework Programme / H2020 University spin-offs active after three years Private equity backed firms

Question 6: Do you consider that the performance indicators and proposed monitoring arrangements are appropriate to provide timely indications of progress?

Summary of Key Actions

Knowledge Generation	1.	Prioritise R&D funding towards opportunities identified in the Programme for Government and the Economic Strategy
	2.	Undertake a new research and technology capabilities study across the public and private sectors
	3.	Develop a foresight programme that will identify new and emerging technologies and key future markets for local companies
	4.	Develop a Creative NI Framework to foster and nurture a culture of 'creativity and design thinking'
Knowledge Exchange	5.	Enhance our support to companies to engage in open innovation activities, either through the development of an Open Innovation Centre or the provision of a new support service
	6.	Increase our investment in establishing industry-led collaborative networks, particularly those focused on market opportunities identified in the Economic Strategy
	7.	Increase our investment in programmes and initiatives that support collaboration between businesses and academia
	8.	Increase our support to local companies and research organisations to secure at least €100m from Horizon 2020
Knowledge Exploitation	9.	Fund a new world-class business accelerator
	10.	Become a strategic partner of the Open Data Institute and develop an engagement strategy to support local companies create new products and services from open data
	11.	Establish a central fund to co-fund SBRI projects
	12.	Support the expansion of the Science Park
Cultural Change	13.	Seek to establish an Innovation Council
	14.	Establish a Chief Scientific Advisor role for Northern Ireland
	15.	Develop a new Innovation Communication Strategy
	16.	Develop new models, in tandem with the business community, to support innovation and to manage higher levels of risk in return for higher returns to the economy

Glossary

BERD	Business Expenditure on Research & Development
CHIC	Connected Health Innovation Centre
C-TRIC	The Clinical Translational Research and Innovation Centre is a unique facility promoting and facilitating translational and clinical research, the primary objective of which is to reduce both the time to market and the costs associated with research and development of innovative health technologies, medical devices and therapeutics
DEL	Department for Employment and Learning
DETI	Department of Enterprise, Trade and Investment
DHSSPS	Department of Health, Social Services and Public Safety
EAG	Economic Advisory Group
ECIT	Institute of Electronics, Communications and Information Technology was established in 2003 to commercialise world-class research and expertise in a variety of enabling digital communications technologies at the School of Electronics, Electrical Engineering and Computer Science at Queen's University Belfast
ESP	Employer Support Programme
eSTEAM	Enterprise, Science, Technology, Engineering, Arts and Maths
EU	European Union
FDI	Foreign Domestic Investment
FE	Further Education
FP7	EU's Seventh Framework Programme for Research
GVA	Gross Value Added
HALO	Halo is the business angel network for Northern Ireland and is sponsored by InvestNI and IntertradeIreland. Its role is to match companies with growth potential with high net-worth individuals – the angels – who may wish to invest in them.

HEI	Higher Education Institution
HEIF	Higher Education Innovation Fund
HSC	Health and Social Care
H2020 / Horizon 2020 Programme	Term for a new simplified and focussed EU Framework Programme
ICT	Information Communication Technology
IIC	Industry Innovation Community
IP	Intellectual Property
ISO	International Office for Standardisation
KTN	Knowledge Transfer Network
KTP	Knowledge Transfer Partnership
MATRIX	MATRIX, the Northern Ireland Science Industry Panel, which is a business led expert panel formed to advise Government on the commercial exploitation of Research and Development, science and technology in N Ireland
MoU	Memorandum of Understanding
NESTA	National Endowment for Science, Technology and the Arts
NIACE	Northern Ireland Advanced Composites and Engineering Centre is a technology hub for the research and development of advanced engineering and advanced materials technologies across a range of industrial sectors
NHS	National Health Service
NISP	Northern Ireland Science Park
NISP Connect	NISP CONNECT is an independent and a non-profit making organisation. The organisation fosters entrepreneurship by accelerating the growth of promising technologies and early stage companies.

NISPO	Northern Ireland Spin Out - supports start-up and early stage businesses in Northern Ireland. The support includes a £5 million venture capital fund, the Invest Growth Fund, which is provided by Invest Northern Ireland and focuses on seed and early stage businesses with high growth potential. NISPO also includes a £3 million proof of concept fund, the Invest Growth Proof of Concept Fund, which is funded by Invest Northern Ireland to provide funding to very early, non-university projects
NITB	Northern Ireland Tourist Board
QR Funding	Quality-related Research Funding
R&D	Research and Development
SBRI	Small Business Research Initiative
SME	Small and Medium Enterprises - Businesses with fewer than 250 employees
SPICE	Specialist Provision for Industry using College Expertise
STEM	Science, Technology, Engineering and Mathematics
Third Sector	Part of an economy or society comprising non-governmental and non-profit making organisations including charities, voluntary and community groups
TNA	The National Archives
UKAS	UK Accreditation Service

Your Views

Your views are important to us and we would welcome any comments or suggestions you might have relating to this strategy. In particular we are interested in your views to the questions detailed within the document.

In addition, we would welcome any other comments or additional information you wish to provide relating to the draft NI Innovation Strategy.

There are several ways you can provide feedback. You can:

- Go online by visiting our website – **www.detini.gov.uk/innovationstrategyni** and complete an electronic feedback form; or
- Email us at **innovationpolicyunit@detini.gov.uk**; or
- Telephone us on 028 9052 93999 to request a paper copy of the feedback form or to get more information on accessing electronic feedback.

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