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think | **create** | innovate

The Regional Innovation Strategy
for Northern Ireland

ministerial foreword



Innovation, creating and commercialising new knowledge, fostering enterprise, and improving our infrastructure and our skills base are key to the competitiveness and future success of the Northern Ireland economy.

The challenge facing us today is to develop policies and strategies that support and encourage business competitiveness – and to do it better than other regions.

This Regional Innovation Strategy sits alongside our Accelerating Entrepreneurship Strategy, the Reinvestment and Reform Initiative's Strategic Investment Programme of over £2 billion, which will transform our infrastructure, and our work to raise education and skills levels. Together they represent a co-ordinated approach to modernising the Northern Ireland economy.

“think | create | innovate” was developed in partnership and has involved extensive public consultation. It sets out a comprehensive action plan which will involve both Queens University and the University of Ulster, the Further Education sector and the business community, including their representative bodies – CBI (NI), the IoD, NICCI and the NI Centre for Competitiveness.

In order to translate the Strategy into action it will be important in the first instance to build on existing mechanisms in order to keep up the momentum which has characterised its development so far, rather than create new structures to drive it forward.

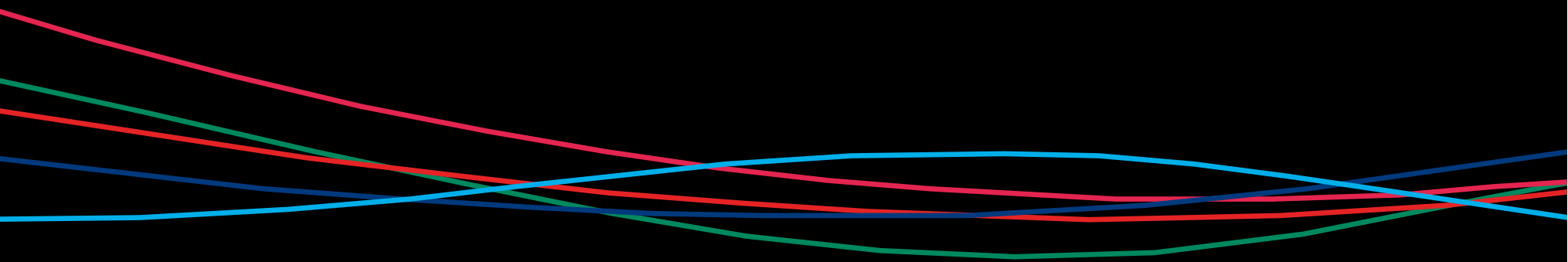
Continued cooperation will be essential if the Strategy is to have the required and lasting impact on levels of R&D and innovation in Northern Ireland, which will in turn be necessary to ensure that we have a dynamic, creative, robust and competitive 21st century economy.

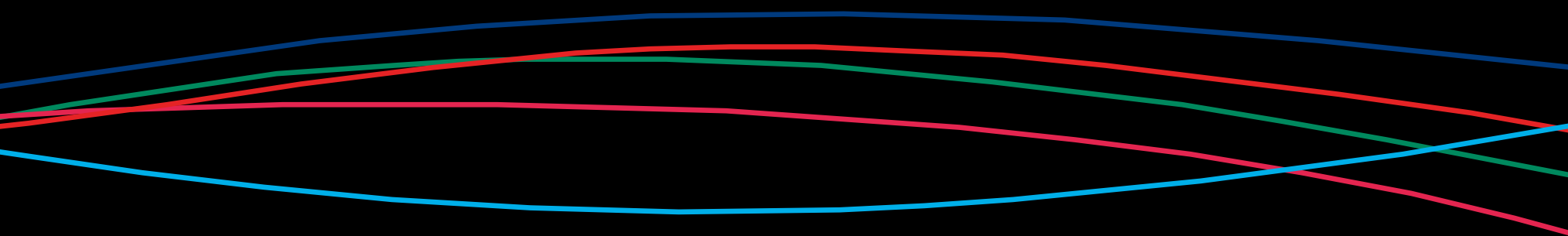
A handwritten signature in black ink, appearing to read 'Ian Pearson'.

IAN PEARSON, MP

Minister with responsibility for Enterprise, Trade and Investment

June 2003





executive summary

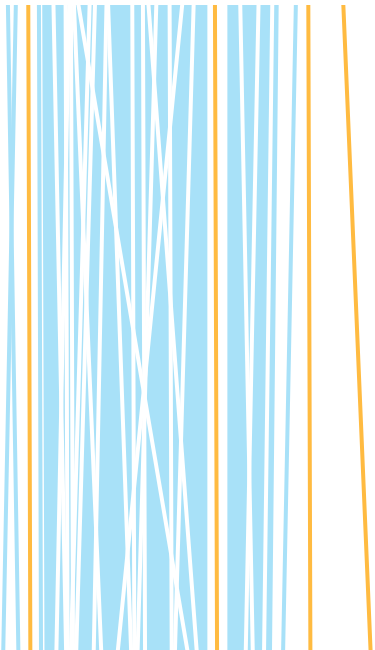

Executive Summary

1. In December 1999 the Northern Ireland Economic Council (NIEC) recommended that a research, development and innovation strategy should be developed as a key component of future economic and social development for Northern Ireland. The NI Executive endorsed this recommendation and a commitment for DETI to lead on the development of a Regional Innovation Strategy was entered into the 2001 - 2004 Programme for Government. An Inter-Departmental Working Group (IDWG) with membership from each NI Government Department and Invest NI, under the Chairmanship of DETI, was established and this group has developed a range of recommendations which are intended to stimulate and co-ordinate the development of a world-class regional innovation system in Northern Ireland.

2. Contemporary economic research shows that a modern, competitive economy is driven less by natural resources, physical capital and low-skill labour, and more by the access to, and quality of, knowledge within the economic region. The IDWG agreed that Northern Ireland should seek to deploy its science/technology driven and knowledge-based strengths to best advantage by focusing on both business innovation and a capability funded R&D and innovation infrastructure. Northern Ireland's regional innovation system should be underpinned by the continuous development of new and disruptive research and development possibilities, supported by clear mechanisms to bring innovations to commercialisation. Ever stronger links must be encouraged between higher and further education and the business sector, supported by an increased focus on design and creativity, with a general commitment to improving company productivity. The Vision for this Regional Innovation Strategy, therefore, is:

“To create a culture and environment within which Northern Ireland will prosper by using its knowledge, skills and capacity to innovate”

3. Innovation encompasses both 'radical' innovation activity usually associated with 'blue skies' research and disruptive new products, and the more common incremental activities that are carried out by most organisations on a daily basis. The DTI describes it thus: "Innovation is the motor of the modern economy, turning ideas and knowledge into products and services". The CBI defines innovation simply as "the successful exploitation of new ideas".

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4. Over the past decade there has been a trend for increasing levels of R&D spending in Northern Ireland and the NI share of UK R&D spending rose from less than 0.5% in 1993 to over 1.2% in 2001. While this is encouraging, over 60% of all NI business R&D spend is accounted for by only 10 firms. This indicates that R&D spending in Northern Ireland is concentrated in a small number of companies which invest heavily, while the much larger number of companies are investing well below the local average. Compared to the UK, R&D spending by government, businesses and the universities in NI is below the UK average. Given that the UK itself falls short of international best practice when it comes to R&D spending, the challenge for Northern Ireland and a new Regional Innovation Strategy is considerable.
 5. However, Northern Ireland does have some key elements of a successful regional innovation system already. The two main universities in Northern Ireland carry out some genuinely world-class research and development work, and have made some steps towards interacting with industry in a commercially focused way, with an increasing number of university 'spin-out' companies resulting. The universities also produce some of the most highly-qualified graduates in the UK, and our Further Education sector is increasingly focused on creating the well-qualified, highly skilled workforce which is necessary for a 'new' economy. Therefore, central to the success of a strategy to build on this are the three broad "stakeholder" groups: the private sector, the HE and FE sectors, and government, and each has a series of specific challenges to address.
 6. In addition to these three key stakeholder groups it is important to recognise the interests of the people of Northern Ireland. The citizens of Northern Ireland require the research, development and innovation activities in the economy to provide them with employment opportunities, investments in the environment, telecommunications and energy as well as the opportunity to gain new skills and realise their potential within their communities, as well as wider social benefits including, for example, healthcare.

7. The IDWG has identified four key Priorities and eight related Action Areas which should assist the development and maintenance of a world-class innovation system for Northern Ireland. These are:

Priority 1: Create a Coherent R&D and Innovation Infrastructure

Action Aim One: To establish priorities for academic and other publicly funded R&D.

Action Aim Two: To encourage and facilitate the commercial exploitation of publicly funded R&D.

The key issue with this Priority is to bring existing R&D and innovation activities under the central co-ordinating umbrella of the Regional Innovation Strategy.

Priority 2: Enhance the Use of R&D and Innovation by the Business Sector

Action Aim Three: To increase the proportion and quality of R&D and innovation activity in Northern Ireland.

Action Aim Four: To target public support into areas of future potential, emphasising skills and resources.

Priority 2 is focused on encouraging more and better use of R&D and innovation by NI firms, through partnership with academia and government.

Priority 3: Develop a Culture of Innovation and Enterprise

Action Aim Five: To promote innovation – in its broadest sense – at every level of the Northern Ireland education, vocational training, and skills development system.



Action Aim Six: To encourage the NI financial support sector and the business community to collaborate in new and innovative ways.

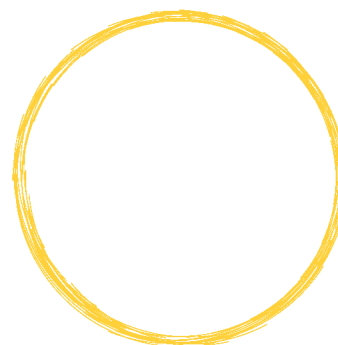
Priority 3 emphasises the need for more effort across the education and training sectors to help develop a more innovative way of thinking about business and employment generally. It also highlights the need for the business community and the providers of private sector financial support to establish new ways of interacting with one another.

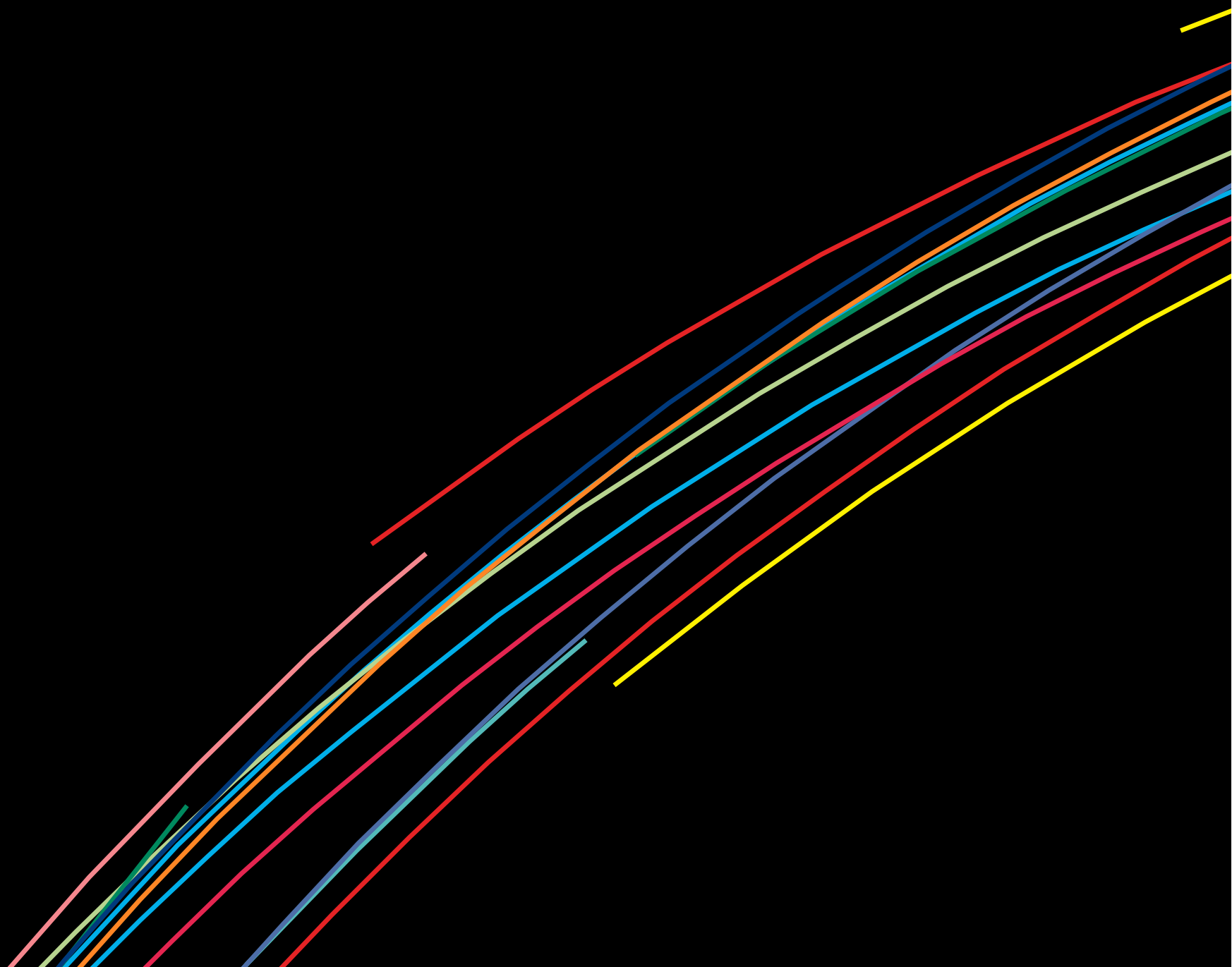
Priority 4: Sustaining the regional innovation system

Action Aim Seven: To put in place a coherent and effective co-ordination and leadership mechanism for the Regional Innovation Strategy.

Action Aim Eight: To establish and exploit inter-regional linkages and new potential partnerships so that Northern Ireland's RIS does not exist in isolation.

Priority 4 concerns the need to support the evolving regional innovation system by putting in place a mechanism which will reflect the needs of all the key stakeholders and build on existing structures. It also recognises that a truly innovating region will interact with and learn from other regions, sharing knowledge resources and working to implement best practice wherever it can be found.







background

Why does Northern Ireland need a Regional Innovation Strategy?

In December 1999 the Northern Ireland Economic Council (NIEC) published a report in which it recommended that a research, development and innovation strategy for Northern Ireland be prepared. NIEC set out the argument in favour of a strategic approach to research, development and innovation in Northern Ireland concluding that:

'It is vital that Northern Ireland has a research and development and innovation strategy, given the close connections between research and development, innovation and economic performance'

The NI Executive endorsed the formulation of a Regional Innovation Strategy for Northern Ireland and a commitment for DETI to lead on its development was entered into the 2001 - 2004 Programme for Government.

The development of this Strategy draws on a number of sources:

- the work of a cross Departmental group involving all the NI Government Departments (the IDWG);
- a widespread process of consultation with government, academia, private companies and business and voluntary organisations;
- the work of the Economic Development Forum, its Medium Term Strategic Priorities for the NI economy, published in June 2002 and Action Plan published in March 2003 (www.edfni.com);
- a desktop review of relevant international, national and regional innovation reports and policy statements;
- international comparisons and benchmarks of activities carried out to support research development and innovation.

The Strategy sets out the R&D and innovation context and challenges for Northern Ireland and proposes a Vision and a framework for action comprising four key Priorities and eight Action Areas with a series of recommendations aimed at addressing research, development and innovation policy and activity in Northern Ireland; and considers how best to implement and monitor the RIS.

Importance of Innovation

In July 2002, the UK Government publication “Investing in Innovation – a strategy for science, engineering and technology” stated that:

“Innovation is at the heart of productivity growth and social gain... A vibrant innovation system is the key to reaping the gains from research, connecting science and technology with developments in market demand and social needs.”

WHAT IS INNOVATION?

Research, development and innovation can be viewed as steps along a continuum that leads from the creation of knowledge, through the adaptation of that knowledge to the final exploitation of knowledge:

- CREATION OF KNOWLEDGE
- ADAPTATION OF KNOWLEDGE
- EXPLOITATION OF KNOWLEDGE

Innovation encompasses both ‘radical’ innovation activity usually associated with ‘blue skies’ research and disruptive new products, and the more common incremental activities that are carried out by most organisations on a daily basis.

The UK Government White Paper on Science and Innovation (DTI, 2000) says that, “Innovation is the motor of the modern economy, turning ideas and knowledge into products and services”. The CBI defines innovation simply as “the successful exploitation of new ideas” and “a continuum from idea generation to value capture”.

Innovation can therefore be seen as a process and an attitude which is not restricted to knowledge sectors and universities but applicable much more widely in society.

Developing a regional research & development and innovation strategy for Northern Ireland has brought some key elements of modern economic reality sharply into focus. For example, the relentless pace of change accompanying the unprecedented expansion of the high technology and communications sector has changed forever the way we identify and achieve competitive advantage as a regional economy. At the same time, a modern, competitive economy is driven less by natural resources, physical capital and low-skill labour, and more by

the access to, and quality of, knowledge within the economic region. It is therefore crucial that Northern Ireland's innovation system and its business and academic capabilities promote research, development and innovation across all aspects of economic activity.

The most economically successful regions tend to have a systemic approach to innovation which is often described as a regional innovation system. The NIEC defines a regional innovation system as the means by which "firms, institutions and government - jointly and individually - contribute to promote the innovation process within a regional network". The interconnections between all the active parts of this network should be robust, self-renewing, and embedded in the economic and commercial culture of the region to the extent that all, or at least a preponderance, of businesses are innovative in their approach. In particular, any culture change must reach into the early educational process if we are to foster an enterprise environment at the start-up/small business level. This in turn should create an open and forward thinking regional network which includes firms; research and technology organisations; innovation support agencies; venture capitalists, the wider education system and local/central government bodies. Only a strategic approach can ultimately implement this sort of networking arrangement.

Evidence from around Europe and North America suggests that successful Regional Innovation Strategies differ in detail but fundamentally exhibit four key features:

- high policy priority from Government to public and private R&D, science & technology and innovation;
- full embedding of R&D policy into innovation, economic development and competitiveness strategy;
- mechanisms and institutions to ensure that the public R&D spend is continuously revised in response to changing priorities; and
- centralised institutions to implement and monitor this policy priority.

Arguably, the most important role in innovation in particular is that played by private sector companies for whom innovation is, or should be, part of their everyday activities. The private sector firms in the economy represent the “wealth creators” but for an innovation “system” to emerge that enables firms to become successful innovators, greater outward focus is required. The research and development efforts of the larger companies in Northern Ireland need to be recognised and enhanced, particularly those that use the research base for world wide markets.

THE CHARACTERISTICS OF INNOVATIVE AND WINNING COMPANIES

The CBI suggests that innovative companies of whatever size or sector can be identified by a range of key characteristics:

Leadership - are led by visionary, enthusiastic champions of change

Unlock the potential of their people

- *Creating a culture in which employees are genuinely empowered and focused on the customer*
- *Investing in people through good communications, teaming and training*
- *Flattening and inverting the organisational pyramid*

Know their customers

- *Constantly learning from others*
- *Welcoming the challenge of demanding customers to drive innovation and competitiveness*

Constantly introduce new, differentiated products and services

- *By deep knowledge of their competitors*
- *Encouraging innovation to successfully exploit new ideas*
- *Focusing on core businesses complemented by strategic alliances*

Exceed their customer expectations with new products and services

The conclusion from the discussion above is that any Regional Innovation Strategy for Northern Ireland will need to encourage and enable individuals and firms to absorb, adapt and exploit the research, development and innovation that is created and disseminated by the region’s universities, public sector and leading innovative firms. It will also be important to ensure that sufficient funds are made available to enable the universities to create the research and development outputs which can then be exploited by the private sector, or to enable the universities to exploit their own research through, for example, the establishment of spin-out companies. The process of creating the opportunities for investing in new products, services and skills needs to be seen within the context of the range of activities carried out in research, development and innovation - all elements that can be understood in terms of knowledge creation, adaptation and exploitation as well as in regard to the “stakeholders” that are involved in the process.

Economic Context

Over the last decade the NI economy has performed remarkably well against a number of economic indicators, notably employment growth. However, this disguises a number of weaknesses that are crucial to economic competitiveness within a knowledge-based economy. The economic and social performance of Northern Ireland has been strongly influenced by a number of factors, among them, the traditional but declining, heavy engineering base of the economy, the impact of the region's long history of political and civil turmoil and the reliance for new investment on foreign investors who create knowledge in their "home base" rather than in Northern Ireland.

Increasingly however, the basis for Northern Ireland's competitive position, in common with most other developed economies, is rapidly moving to a position where knowledge, skills and innovation capability, rather than the cost base, will be the key factors influencing future economic success.

Indeed Professor Michael Porter states, in the third DTI paper on "UK Competitiveness: Moving to the next Stage" (May 2003), that the UK as a whole has reached a transition point where it needs to move onto a new innovation driven development phase.

The imminence, speed and inevitability of the shift to a knowledge based economy has been described in numerous international, national and regional reports by government, think tanks and academics, and can be observed in the way in which foreign investors now seek a strong skills base and links with world-class research departments at universities much more enthusiastically than they seek a grants package or low cost premises. Growth in the economy will be achieved by a greater number of productive companies selling their goods and services in wider markets and achieving good levels of profits that they reinvest. Sustaining growth in a company cannot be achieved by continually lowering the cost base or prices in order to win business - long term productivity and profits can only be achieved by investing in the creation of new products, services and skills within the company.

Estimated GOR
breakdown of expenditure
on Intramural R&D in the
Business, Government
and Higher Education
sectors, 1999.

	R&D performed with business (BERD)		R&D performed within Government (GOVERD) ¹		R&D performed within Higher Education (HERD)	
	£m	% of regional GDP	£m	% of regional GDP	£m	% of regional GDP
United Kingdom	11,302	1.29	1,788	0.20	3,341	0.38
North East	164	0.55	2	0.01	113	0.38
North West and Merseyside	1,476	1.65	48	0.05	260	0.29
Yorkshire and the Humber	309	0.47	40	0.06	270	0.41
East Midlands	838	1.43	48	0.08	182	0.31
West Midlands	724	0.99	164	0.22	180	0.25
East	2,599	2.71	213	0.23	255	0.27
London	735	0.56	198	0.15	837	0.64
South East	2,916	2.07	557	0.40	493	0.35
South West	887	1.32	259	0.39	148	0.22
England	10,607	1.39	1,529	0.20	2,737	0.36
Wales	203	0.57	47	0.13	129	0.37
Scotland	393	0.53	200	0.27	411	0.56
Northern Ireland	99	0.50	12	0.06	64	0.33

1. Figures include estimates for those areas of Central Government not available from the Government Survey and local authorities.

Source: ONS

For Northern Ireland the shift to a knowledge-based economy is particularly challenging. The Best Report (NIEC, 2000) identified that in Northern Ireland, too few entrepreneurial firms, inadequate networking, low technology management capabilities and poor skills formation leads to a situation where the economy is not well-placed to meet the challenges posed by the so-called “knowledge economy”.

Some of the key R&D expenditure indicators in relation to Northern Ireland’s position relative to other regions of the UK are shown in the previous chart. Office of National Statistics research based on the 1999 UK-wide survey of R&D expenditure shows that Northern Ireland lags some way behind the UK average, and does not compare favourably with most other UK regions. Higher Education expenditure on R&D (HERD), based on a percentage of the regional GDP, is the area in which Northern Ireland performs best, coming a mid-table seventh out of the twelve UK regions. In terms of government expenditure on R&D (GOVERD), Northern Ireland ranks ninth out of twelve. However, it is the level of business expenditure on R&D (BERD) that is most concerning, with Northern Ireland coming in at eleventh out of twelve. Indeed, while the UK average for BERD is 1.29% of GDP, Northern Ireland’s private sector expenditure is only 0.5%.

Taken together, these statistics clearly suggest that Northern Ireland is firmly rooted in the lower quartile of the UK’s R&D expenditure league and international comparisons make it clear that the UK itself has levels of R&D investment substantially below international best practice. Indeed while on their own these figures show that total BERD in Northern Ireland is somewhat under half the UK average, this does not take account of the fact that government support to private sector R&D is much higher in Northern Ireland than elsewhere in the UK. For example, in 1999 11% of business related R&D in Northern Ireland was paid for with public money, while nationally the figure for such support was only 4.7%. While there is no doubt that during the 1990s some progress was made in terms of the growth of BERD, by 1999

the top ten R&D companies (mainly larger MNEs) still accounted for around 60% of all business related R&D activity - a figure which, despite a brief improvement in the mid-1990s, has barely altered since 1993.

The balance of strengths to weaknesses in relation to research, development and innovation shown overleaf indicate a weak overall performance compared to the rest of the UK and Europe. However, there are also positive features to note:

- despite coming from a low base, research expenditure by companies has been rising in recent years and inward investors have shown a propensity to invest in R&D activity;
- good linkages between industry and the universities are apparent; and
- the producer of raw material for research, development and innovation, the education and training infrastructure, has a strong record of achievement.

However, studies suggest that two factors limit the economic impact of current university research - R&D spending per capita within the NI university sector is below the UK average and relatively little of NI's knowledge generation capacity is oriented to the needs of local business; rather it addresses broader academic or scientific agendas.

An encouraging recent development is the substantial increase to recurrent research funding for the universities from government. DEL has increased the level of such funding from £27m in the Academic Year 2002/03 to over £36m for 2003/2004. In addition to this the Support Programme for University Research (SPUR), unique to Northern Ireland, will have invested a total of £90m over the lifetime of the initiatives, 2001 - 2007, enabling 13 University Centres of Excellence to be established.

strengths

Increased research expenditure by companies and government.

Good examples exist of co-location of R&D investments from inward investors with strong linkages to the universities.

Sectoral strengths reinforced by proactive development and network support.

weaknesses

Overall research and development expenditure is weak relative to the rest of the UK and is significantly below the levels of the more successful innovating regions and still below the UK average.

Concentration of expenditure in relatively few larger companies.

Northern Ireland's firms appear to have fewer innovation linkages when compared to other regions.

University sector actively engaging industry. Academic-industry interaction is relatively high. The Centres of Excellence programme, university spin-outs and others have helped academic industry links.

Strong education and training system and record of achievement comparing favourably with the UK levels of achievement.

Devolution highlighted the possibilities for 'joining up' policy and engagement of the wider community.

Opportunities exist for greater commercialisation of public sector research.

Patent applications are below the UK average and those of Europe's stronger regions.

Northern Ireland has low levels of start-up firms and entrepreneurial activity.

Capital invested by UK venture firms is behind comparator regions such as Wales and Scotland.

Low levels of enterprise activity and public sector commercial research.

Strategic Context

Significant policy statements, strategies and research reports from a range of European, UK, and Northern Ireland sources have informed the emerging R&D and innovation strategy for Northern Ireland.

At the European level, innovation and technology have been the subject of important policy 'communications', and also form an important part of the strategic goal set at the European Council Summit in Lisbon (March 2000) 'to make the European Union the most competitive and dynamic knowledge-based economy in the world'. Of particular significance is the 6th Framework Programme (2002-2006), known as FP6. Valued at €17.5 billion, FP6 is the EU's overarching mechanism for research funding in Europe.

At the UK level, there have been a series of White Papers and other strategy documents which are relevant to Northern Ireland's Regional Innovation Strategy. These include:

- 'Opportunity for all in a World of Change' (DTI and DFEE, 2000) and 'Excellence and Opportunity: a Science and Innovation Policy for the 21st Century' (DTI, 2000) both of which emphasised the opportunities associated with the knowledge-based economy.
- The joint DTI, HMT, DfES publication "Investing in Innovation - a strategy for science, engineering and technology" (July 2002) which stated that:

"Innovation is at the heart of productivity growth and social gain... A vibrant innovation system is the key to reaping the gains from research, connecting science and technology with developments in market demand and social needs."

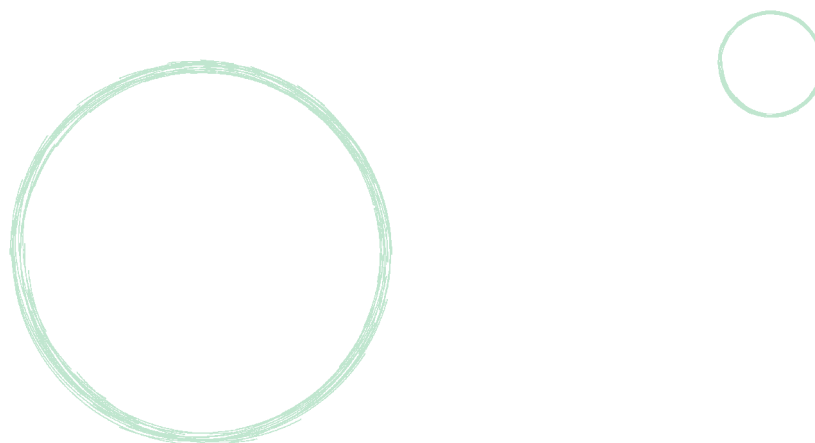
- The Baker report on 'Creating Knowledge Creating Wealth' (1999). This emphasises the importance of commercialising public sector research and the necessity of incentives for public sector workers.
- Sir Gareth Roberts' Review of the Supply of Scientists and Engineers Consultation Paper (2001), and its identification of key issues associated with the supply and demand for scientists and engineers.
- The Government's 'UK Online' programme (www.ukonline.gov.uk), including 'The Broadband Future' which emphasises the importance of high bandwidth networks and infrastructure to the innovative potential of companies and individuals.

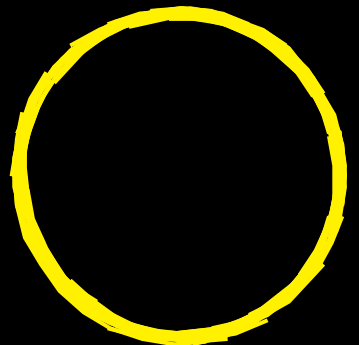
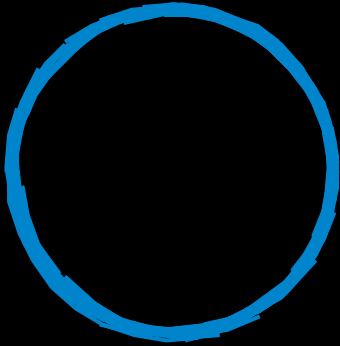
In addition the national reviews of innovation and university-business linkages being chaired by Lord Sainsbury and Richard Lambert respectively (due for publication in Autumn 2003) will help inform the outworking of think | create | innovate.

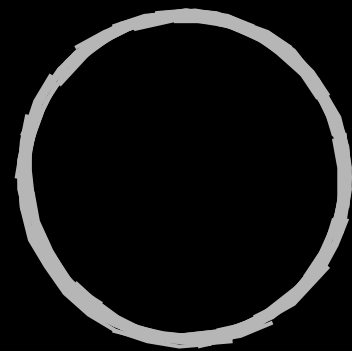
This focus on research and innovation policy is also evident in recent work commissioned by individual Government Departments in Northern Ireland, including the O'Hare report on arrangements for Higher Education and R&D in Agriculture and Food Science, and the 'Vision for the future of the agri-food industry'. The curriculum reviews being carried out by the Council for the Curriculum Examinations and Assessment for Northern Ireland (CCEA), which are currently examining the nature of work in the global economy and improving employability through the development of thinking, learning and technology related prospects (e.g. ICT skills) are further examples. There is also the R&D strategy (Research for Health and Wellbeing) published by R&D Office for the Northern Ireland Health and Personal Social Services in 1999 and current work to develop a twenty year regional strategy for health and wellbeing, as well as the work which has been led by the Department of Culture Arts and Leisure (DCAL) on the "*Unlocking Creativity*" agenda.

Such recent policy reviews are further supported by the growth of inter-departmental working at the strategic planning and policy level. Such a joined up approach was an important factor in developing think | create | innovate through the IDWG and is also a feature of a number of other recent strategies and initiatives that further underpin the role of research, development and innovation in Northern Ireland. Amongst these is the work of the Economic Development Forum, a partnership body that provides a formal mechanism through which a wider range of key organisations can advise Ministers on issues relating to the development and future competitiveness of the NI economy.

The next section outlines how collaborative working and partnership will be a key factor in delivering the Regional Innovation Strategy.







challenge

What is the Challenge for Northern Ireland?

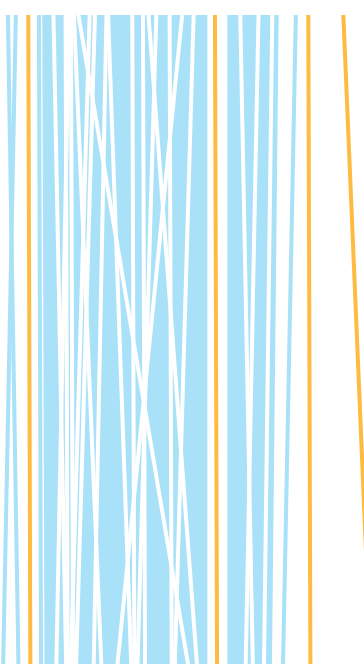
Current Strengths

Northern Ireland does have in place some of the central pillars of a truly competitive, knowledge-driven economy. Our education system produces some of the most highly-qualified graduates in the UK, and a higher proportion of eighteen year olds enter third level education in Northern Ireland than in any other UK region. Increasingly our Further Education Colleges (FEC) are focusing on the need to create a pool of well-qualified, skilled workers who can add value to the entrepreneurial firms necessary to create a 'new' economy. By working with the small business sector, the universities and local government, the FECs are increasingly contributing high quality knowledge resources and skills to enhance local enterprise and innovation networks.

The two universities in Northern Ireland carry out some genuinely world-class research and development work (evidenced by their scoring of 21 units at either 5 or 5* in the most recent Research Assessment Exercise), and indeed they have earned strong brand reputations nationally and internationally as a result. The focus on excellence of the SPUR initiative is also expected to increase the number of units assessed as being of an international standard in the next RAE. In recent years the universities and industry have begun to interact in a more structured and commercially focused way, and the increasing numbers of university 'spin-out' companies stands as a testimony to this awareness of the commercial potential from existing R&D. Some university initiatives, supported by government, such as NICAM, NICENT and NIBEC have put entrepreneurship and innovation firmly on the economic development agenda. The work of QUBIS Ltd and UUTECH Ltd, formed in 1984 and 1988 respectively, to commercialise the R&D work of the 2 universities and facilitate technology transfer, is also significant.

Other recent developments include the development of a major science park initiative - NISP. The Northern Ireland Science Park aims to provide support for an Innovation Centre at Titanic Quarter Belfast to cater for new spin-out companies from the universities and industry. It will seek to attract research and development units from indigenous companies and inward investors. It will also support linked developments elsewhere in Northern Ireland - the University of Ulster campuses at Magee, Jordanstown and Coleraine are key satellite sites.


A significant recent development at NISP was the establishment of the Queen's University Centre for Electronics, Communications and Information Technology (ECIT) - a £38.7m Centre of Excellence in the converging fields of computing, digital communication and electronics.



Additionally, Northern Ireland is participating in the UK University Challenge Fund, under which the universities will be able to provide much needed venture capital for 'spin-out' and 'spin-in' companies. There is also a special Northern Ireland R&D Challenge Fund which is designed to provide venture capital to meet the funding gaps faced by innovating firms based at the NI Science Park and elsewhere. Invest NI is actively developing new incubation and entrepreneurship strategies designed to maximise the impact of all the players in these areas.

The NI Foresight Programme has the potential to be a key driver and regional benchmarking tool for the outworking of the Strategy if it is future focused, outward looking and promotes international standards of excellence in business practices, academic research and government planning. Foresight offers a means to engage Northern Ireland's Regional Innovation Strategy with exemplar regional partners across Europe through EU Framework Programme Six (FP6), and the Innovating Regions in Europe (IRE) Group. This could include inter-regional networking; integrated projects and programmes with partner regions, and collaborative research projects across EU boundaries. These potential opportunities support the case for reviewing the remit of NI Foresight - notably in relation to economic planning and the targeting of technologies and business opportunities with high-promise R&D and innovation potential - and to exploring the growing promise of interregional collaborations on both the North/South and East/West axes.

Invest NI's Design Group has developed an action plan to demonstrate the importance of design and business creativity for future economic development in Northern Ireland. It is evident that design has become increasingly central to modern, innovative business planning, and employers and employees alike should be encouraged to develop a holistic and strategic appreciation of design as a key thinking and marketing tool. In a highly competitive, consumer driven marketplace, Northern Ireland businesses must recognise the need to develop distinctive products and services that are differentiated from their global competitors.



There is widespread acceptance that while innovation is a process, creativity is a behaviour and both can be fostered and developed in every environment from schools through to businesses. Through 'joined-up' cross-departmental initiatives, like the DCAL-led "*Unlocking Creativity*" agenda, a co-ordinated creativity policy has been developed which aims to deliver substantial social and economic benefits. A collaborative, government-led approach involving the business sector, academia and the wider education sector will help to integrate creativity, innovation and an appreciation of all forms of design into Northern Ireland's education policy, economic planning, in-company training and business development programmes. By following this co-ordinated agenda, innovative new ideas, disruptive new technologies and an entrepreneurial outlook can be brought together for the benefit of both the economy and society as a whole.

Through these significant initiatives, across Northern Ireland's economic system, there is growing evidence of a developing R&D infrastructure, and it is against this backdrop that the Regional Innovation Strategy can be put in place.

Northern Ireland is however, a small region and cannot afford to fund research in all fields of science and innovation activity in all areas of the economy. To be truly competitive in the global market, above average value must be obtained from the money invested in research and development activities. Choices will have to be made if the available resources are to be applied in an effective manner. In recognising that there are many competing priorities for such resources, every effort must be made to develop a regional innovation system which is effective in targeting resources into areas which have real economic and social value, both in terms of building or maintaining expertise at Northern Ireland's universities and in the FE sector, and creating/improving the competitiveness and capabilities of businesses in Northern Ireland.

An Innovation System

Sustainable knowledge-based growth in all industries in all parts of Northern Ireland is an ambitious and very worthwhile objective that can be shared by all in society. Knowledge creation and exploitation is not the preserve of a small elite; they are relevant in all spheres of life in Northern Ireland as long as there is a willingness to accept new ideas. R&D and innovation are also the keys to greater opportunity for young people, a balanced, sustainable economy, personal and professional achievement and a more prosperous future for N.I.

In addition, the research and development activity that is carried out as part of the health, wellbeing and social inclusion agendas being pursued by government and institutions in Northern Ireland can have particularly beneficial effects on the wider community. These may be greatly enhanced as a result of improved dissemination to researchers, practitioners and firms capable of absorbing and then exploiting the knowledge being created. Similarly, the environmental, agricultural and energy efficiency research undertaken in the region can provide significant commercial as well as quality of life benefits for Northern Ireland.

There is a consensus that Northern Ireland should seek to develop an innovation system which is fully interactive and inclusive, and draws together a balanced mix of R&D and innovation as carried out by small, medium and large firms (whether indigenous or foreign owned). These businesses should be encouraged to work in close co-operation with each other and with the full range of publicly funded R&D and innovation activity in NI. In turn these firms should

generate a high level of networking opportunities at local, regional, national, and international level. Simultaneously, there needs to be a holistic public sector system put in place to co-ordinate R&D and innovation as a mix of local, regional, and national initiatives. Such a co-ordinating mechanism should be based on a regional partnership between public and private sector interests.

The primary long-term objective of this system should be to create a culture of enterprise, entrepreneurship and innovation across Northern Ireland. It is a substantial undertaking and its success will require a sea change in the business culture of the region. It will begin by impressing the need for innovation on the business community; by weaving the concept of innovative thinking through the education system at all levels and in all disciplines; by government proactively seeking the exploitation of publicly funded R&D and innovation, and by taking forward the commercial potential of those technologies in which we already have competitive advantage and innovative practice, such as ICTs, nanotechnology, and biotechnology.

Northern Ireland's economy is predominantly based on SMEs. Such smaller businesses are unlikely to have either the time or the resources to engage directly with the science and technology sector on an ongoing basis. And small companies are also less likely to manage the very real risks often associated with adopting disruptive new technologies and innovative new business practices. Any successful regional innovation system must therefore focus on developing sectoral clusters and informal representative groups from within the SME sector - supported by MNEs and government - to ensure that the small business sector is engaged with the science and technology base and can adopt new innovations in a sensible and mutually effective manner.

Within the context of an SME dominated economy, the Further Education sector has an important role to play in creating the highly skilled and flexible workforce necessary to sustain development and innovation in a modern knowledge driven economy. Further Education Colleges should work within their local environment with small businesses, local councils and the universities to create successful local innovation clusters. These local innovation systems, based around the FECs, should exploit a range of initiatives including local business incubation strategies; the creation of structured innovation, design and creativity training programmes; and local innovation networks.

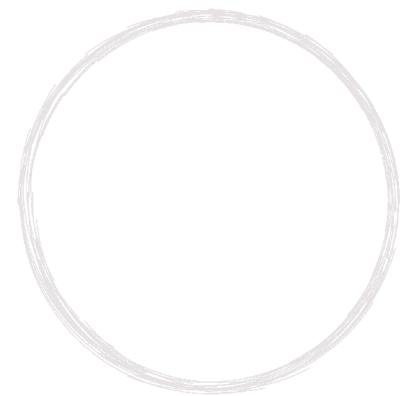
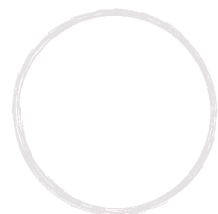
Industry and academia must be encouraged to work more closely together within the region, becoming increasingly attuned to one another's basic needs. Such proximity can contribute to ensuring the early exploitation of research findings through innovative commercial applications. This has the advantage of ensuring that world-class research carried out in Northern Ireland is

less likely to be exploited elsewhere. Ideally an “industrial pull” and “university push” dynamic will develop if closer interaction can be stimulated and sustained. To support this relationship, attention must be given to developing means by which to disseminate research findings to industry, while simultaneously securing the appropriate exploitation of Intellectual Property for the benefit of the researcher and the research institution.

The Strategy outlined in this document aspires to bring universities, business, and the public sector together in closer partnership to exploit and commercialise the research currently available. It sets down the key elements for the creation of a culture of entrepreneurship and innovation from the development of business and public sector research networks to instilling a sense of the value of an enterprising, knowledge based economy in all tiers of the education system. In short, the key objective must be to provide a framework through which greater focus can be applied to the creation of a globally competitive, knowledge driven economy in Northern Ireland.

Key Stakeholders

This Strategy for Northern Ireland acknowledges that a range of different participants in the economy hold stakes in the successful achievement of a knowledge-based economy and that their input to, and relationship with, the Strategy may not always coincide. There are therefore a series of different but inter-related challenges for each. For example:



PRIVATE SECTOR

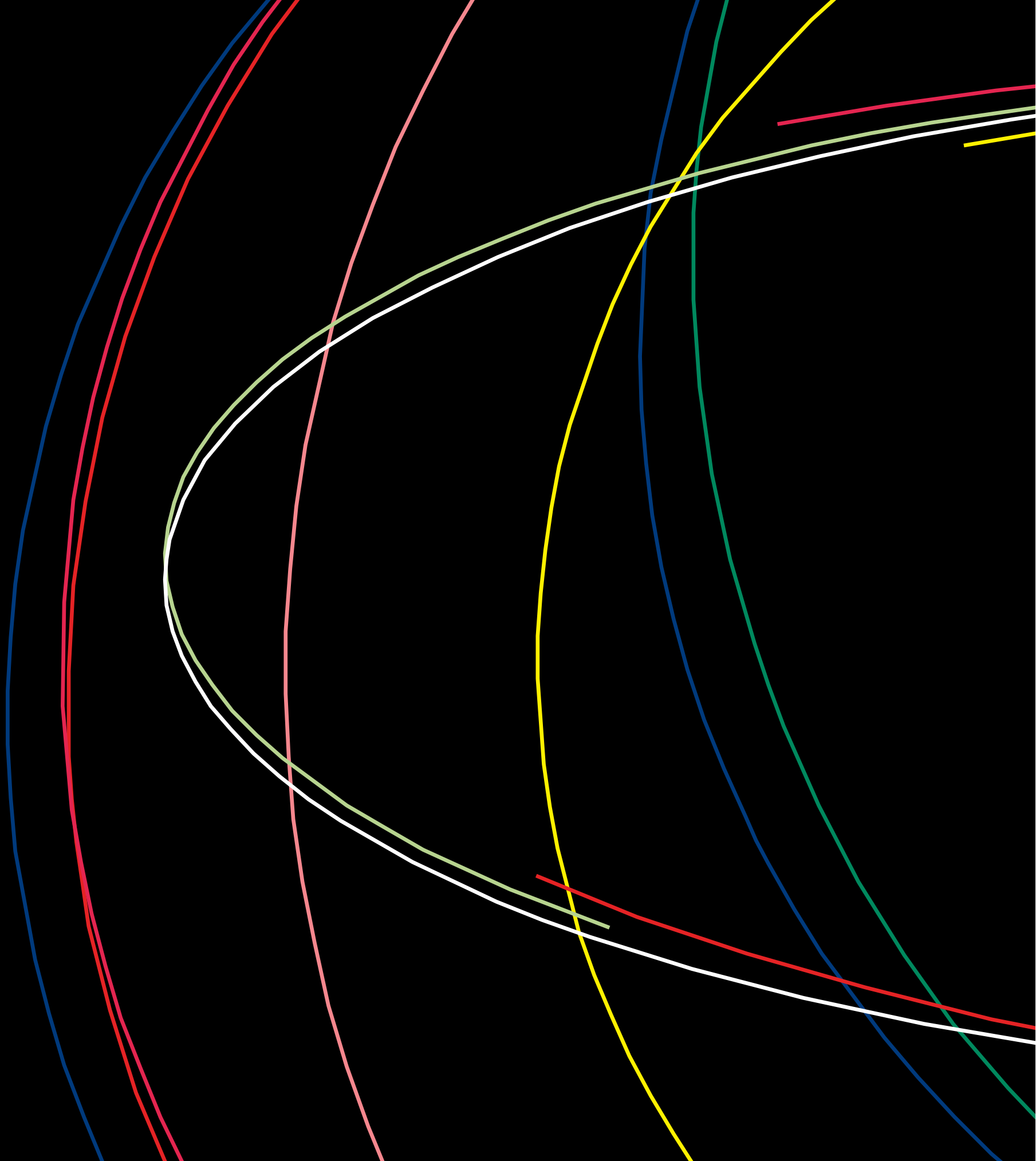
R&D activity in Northern Ireland is concentrated in a small number of large firms. The involvement of small firms in research is likely to be at a low level or very specialised – they are more usually concerned with “incremental” innovation, the small gradual changes in the design and manufacture of their products, processes and services. In an increasingly knowledge-based economy however, small firms also have the opportunity to use their creativity and innovative impulses to reach world-wide markets and to complement the research and development efforts of the larger companies in Northern Ireland, particularly those that are foreign owned that use Northern Ireland very successfully as a research base for their world-wide markets.

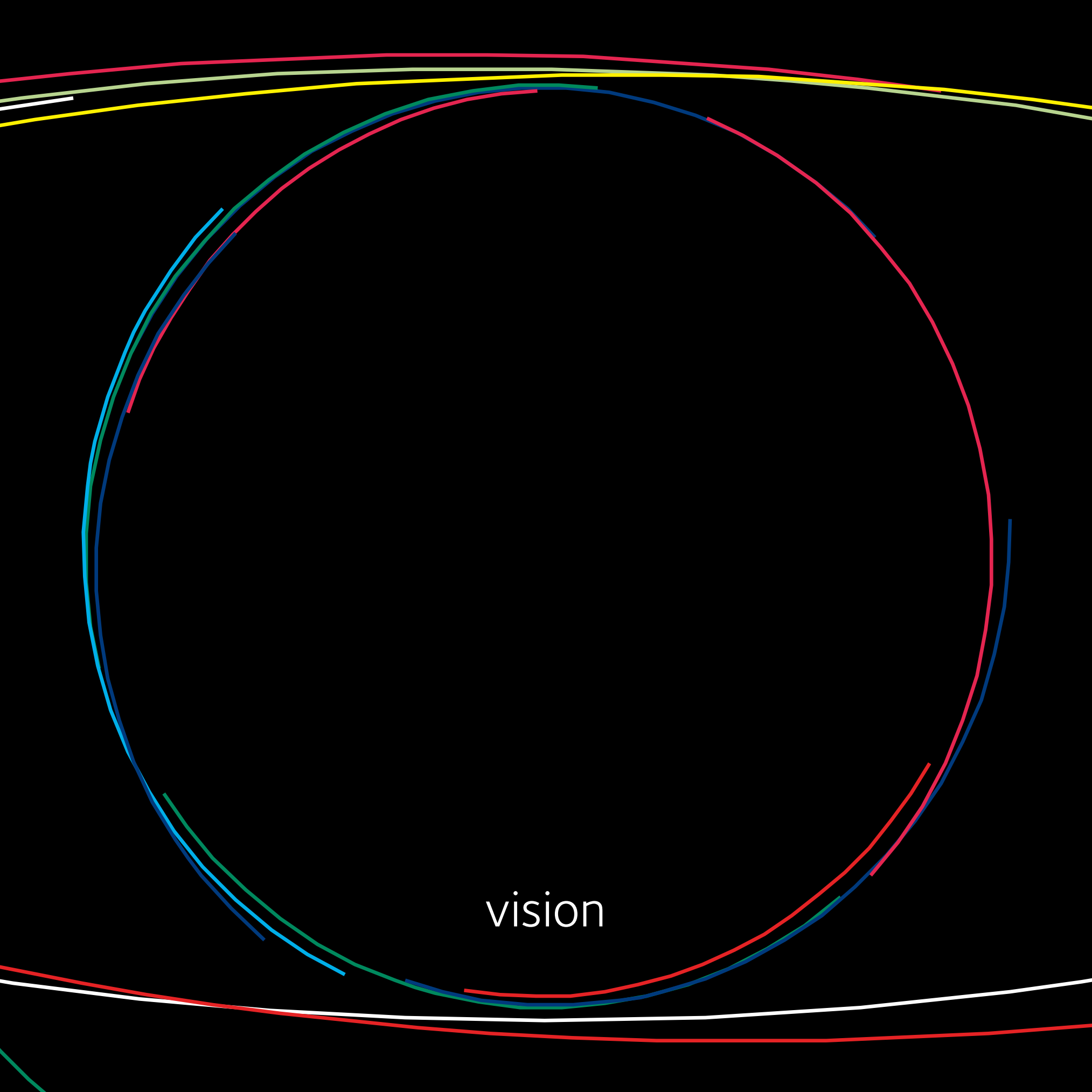
ACADEMIA

Universities carry out high quality, world-class research thus creating new knowledge but they also, and increasingly, transfer the new knowledge into real products and processes. It is crucial that the results of such research are transferred from the science base to companies and into wider society to improve the quality of life for all. However, the output of the Further and Higher education establishments that will have the greatest impact on the creation of a knowledge-based economy in Northern Ireland are the young men and women that receive world class education and training and then contribute to the creative and innovative culture that is needed to underpin the Northern Ireland economy and society. It is important that the whole spectrum of basic research is funded and in today's funding climate both government and industry must be prepared to pay the full cost of research commissioned from universities.

PUBLIC SECTOR

Government is both a funder of research and a consumer of research results notably in respect of the fulfillment of statutory and other responsibilities in the areas of health, social wellbeing, environment, energy and agriculture amongst others. Government also funds research capacity in the Universities and must sustain this capacity. Government Departments are in the process of reviewing and designing their own individual research, development and innovation strategies that will complement and support this strategy and create greater transparency and co-ordination amongst Departmental activities. Government also has the responsibility to create the environment, stimulate investments and improve the co-ordination of policy and the linkages between public and private research, development and innovation. It can also act as an exemplar both in terms of innovative policy and practice and through greater commercialisation of public sector research.





vision

What is the Vision and how will it be achieved?

The Vision for this Regional Innovation Strategy is:

“To create a culture and environment within which Northern Ireland will prosper by using its knowledge, skills and capacity to innovate”

Achievement of the Strategy’s Vision requires the improved co-ordination of the private and public sectors and the university sector who each have a role in moving closer to the creation of a culture and environment conducive to an innovative region. Setting out a framework for improved cohesion and a more holistic and joined up approach is where government can play a lead role.

Each of these key “stakeholders” can contribute to improving this co-ordination in order to realise the Vision in various ways including:

Role in realising the Vision

Private sector Innovation should be a part of everyday activity for successful firms who must engage with universities and the public sector to create an innovation system.

Enterprise and entrepreneurship must be valued and encouraged throughout the economy.

Firms need to recognise government grants are an inadequate foundation upon which to build an innovative economy. This raises challenges for those who provide financial support to the business community too - the need for balanced risk-taking.

Companies need to promote innovation champions and take a leadership role in developing an innovation system whilst concentrating on becoming more innovative themselves.

Companies need to form strategic alliances and collaborative partnerships to maximise R&D and innovation opportunities.

Academia The Universities should pursue world-class research in areas of relevance to the economy and social fabric of Northern Ireland.

University research organisations and firms should co-operate to set priorities and map out strategies to commercially exploit and apply the results.

The Universities must be more pro-active in promoting their activities, particularly with the business sector with which they must engage more systematically.

The FE sector should play a role, particularly with smaller firms, to assist in R&D and innovation activities, especially at local level.

Government Government bodies should improve co-ordination of research and innovation policy and the linkages between public and private R&D and innovation.

Allocation of additional resources should be made in relevant research areas. This includes developing opportunities to commercialise public sector research.

Government needs to adopt a different approach which will encourage R&D, innovation and entrepreneurial activity - balanced risk taking.

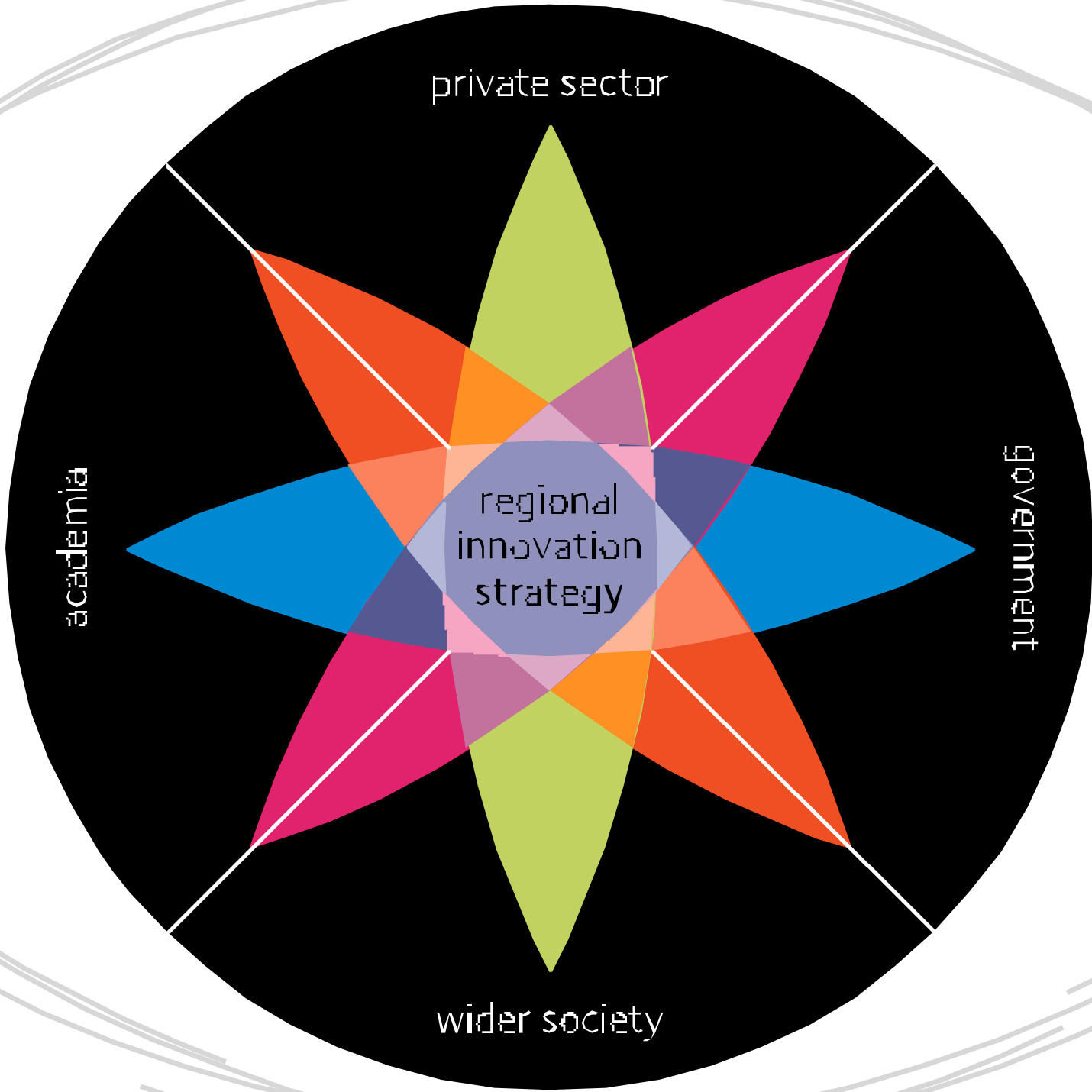
Government must sustain the capacity of the Universities to undertake research which has the potential to benefit the NI economy.

Other aspects of research relating to social, community and health activities that can have wider benefits to the economy need to be supported. In determining areas and priorities for government support for research, wider socio-economic benefits need to be taken into account.

Responsibility for the overall framework for the Regional Innovation Strategy and the creation of opportunities for development of sectors, clusters and an innovation management system rests with Government.

It is clear that any framework for action requires the involvement of all the main 'stakeholders' in Northern Ireland in respect of research, development and innovation - Government Departments, the universities and the private sector.

In addition to these three key stakeholder groups it is important to recognise the interests of the people of Northern Ireland as the model overleaf illustrates. The citizens of Northern Ireland require the research, development and innovation activities in the economy to provide them with employment opportunities, investments in the environment, telecommunications and energy as well as the opportunity to gain new skills and realise their potential within their communities and in their chosen employment or profession with no fear of discrimination or social exclusion.



The framework for action in research, development and innovation therefore sits within the context of a complex set of relationships and expectations where a limited range of financial and institutional inputs must produce a wide range of challenging outputs.

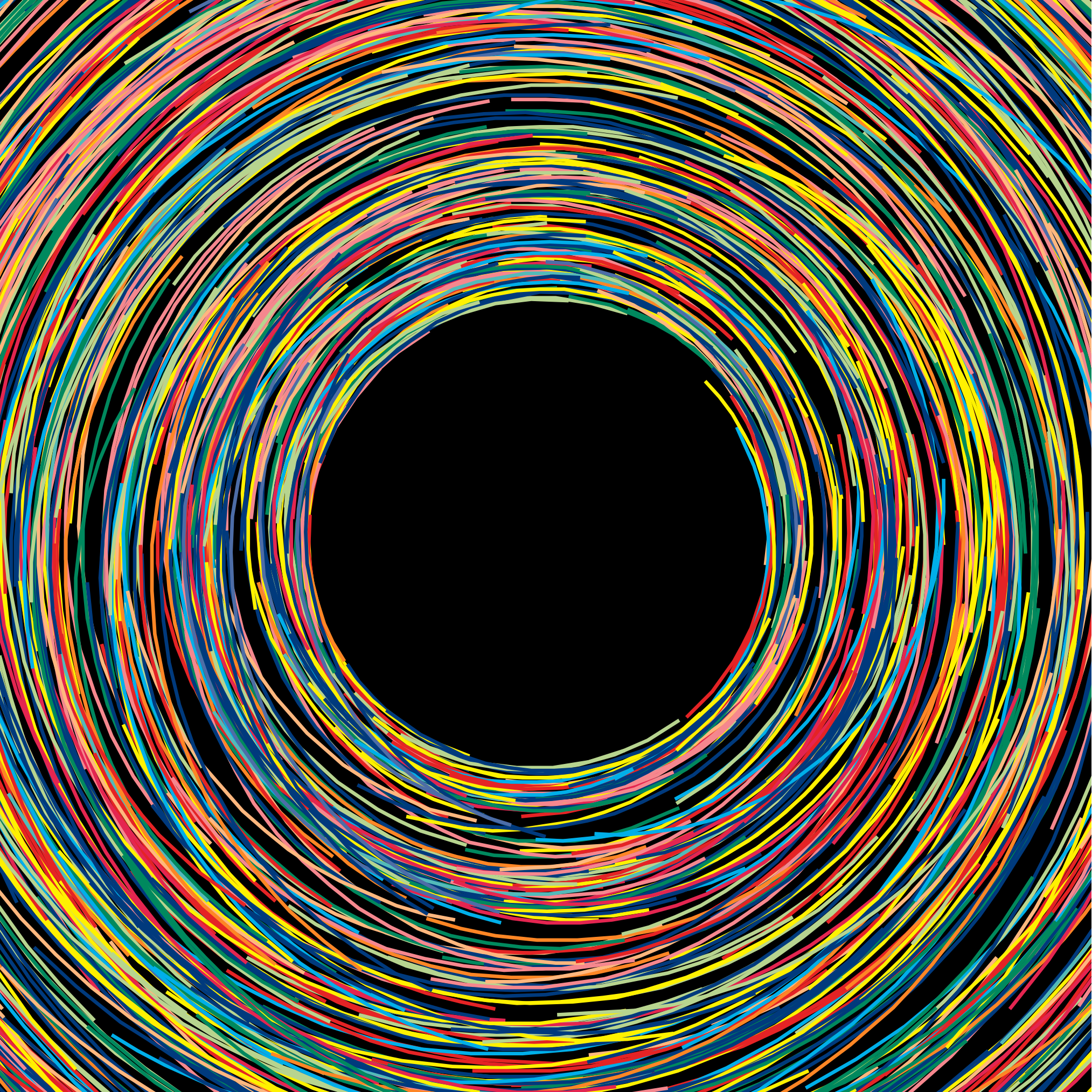
It is, in fact, consistent with much of Porter's policy agenda for overall UK competitiveness in that it: emphasises enhanced networking and closer interaction between the business organisations and economic development agencies to promote networks and clusters; involves economic development "collaboration institutions", such as the Economic Development Forum, to agree strategic priorities and accelerate action; stresses the importance of increased investment in R&D, skills, IT and the key roles of the universities; seeks to build on enterprise and innovation activities throughout the education system and with the business community (including through the Accelerating Entrepreneurship strategy and the Enterprising Education Action Plan); and builds on the need for changes in business support packages from government, with the increasing emphasis on Venture Capital and rebalancing of incentives away from capacity to capability mechanisms.

Underlying Principles

The importance of enhanced co-operation between all the key stakeholders has already been stressed as a fundamental prerequisite for the success of the Regional Innovation Strategy. In addition a number of basic principles underlie and indeed underpin the Strategy. These are:

- (i) the need to continue to place a high priority on the quality of basic research carried out in Northern Ireland;
- (ii) the economic importance of Northern Ireland's clean and green environment and the agri-food industry;
- (iii) the continuing emphasis on skills issues - from the long tail of underachievement in schools, to the importance of key skills needed by the business community and the value of a continuing supply of high calibre graduates from the universities;
- (iv) the quality of the NI healthcare sector and its strong links to the universities; and
- (v) the need to ensure that the wider socio-economic benefits of the new RIS are spread as widely as possible throughout Northern Ireland.

With these principles in mind, the Strategy identifies 4 key Priorities for Action and 8 related Action Areas aimed at assisting the development and maintenance of a world-class innovation system for Northern Ireland. These Priorities and Actions are outlined in the next section.





actions

How will the Strategy be moved forward?

The Action Plan which follows represents a comprehensive strategic framework for co-ordinated activity by all key stakeholders. think | create | innovate has been developed in partnership with all the NI Government Departments and, following an extensive public consultation exercise, has buy-in from across the business community and the FE and HE sectors. All these players will be involved in implementing the Action Plan. Without their continued co-operation and collective efforts the Strategy will not have the required and lasting impact on levels of R&D and innovation in Northern Ireland.

The **InterDepartmental Working Group (IDWG)** will continue to play a central role in co-ordinating and monitoring the progress of the Action Plan as it is taken forward by the various players. DETI will continue to lead this group of senior representatives from all Government Departments.

The **Business Alliance** (CBI (NI), IoD, NICCI and C for C) is taking a lead role in developing a range of innovation and R&D support activities, working with government and academia, and is considering how it can best interface with the key stakeholders. A Business Innovation Forum is one option being considered.

The **UU and QUB Joint Advisory Committee** on HEROBC is already in place and has a remit to facilitate dialogue between the universities and partners in the economic, social, cultural and public sectors and to consider how best they can develop their reach-out activity. It could also act as a mechanism to consider and feedback on progress in implementing relevant aspects of the RIS.

The **Economic Development Forum** comprises representatives from all the social partners and many of the recommendations in its Action Plan (March 2003) are also reflected in the RIS. There is some overlap in EDF representation from the Business Alliance, the Universities and the key Government Departments involved in the RIS and the Universities' Joint Advisory Committee. This offers valuable continuity across all the groups mentioned above.

Invest NI will play a lead role in relation to much of the Strategy's implementation and particularly in driving out the innovation process at local level working with the other key players including the FE colleges, the District Councils and the Enterprise Network to maximise local synergies and opportunities.

The Strategy does emphasise the need to consider outward-looking partnerships. NI membership of the Innovating Regions in Europe (IRE) and involvement with the UK's Innovation Liaison Group and Regional Innovation Network (RINet), coupled with the work of *IntertradeIreland* will bring in expertise and wider contacts and offer opportunities for strategic partnerships and funding. However, there is still a need to harness direct expertise in R&D and innovation matters from cutting edge practitioners. This is particularly important in relation to global trends and best practice. The role of **NI Foresight** is currently being reviewed. A Foresight panel which would draw in external players with international experience could be established specifically to bring this wider dimension to the Strategy's ongoing development and implementation.

Further consideration, in discussion with all the key stakeholder groups, will be given to the most appropriate and effective structure to ensure that the Regional Innovation Strategy is delivered and further developed to achieve its Vision. Progress with its implementation will be reviewed in June 2004 in relation to the effectiveness of the various groups outlined above.

priorities for **action**

- create a coherent R&D and innovation infrastructure;
- enhance the use of R&D and innovation by the business sector;
- develop a culture of innovation and enterprise; and
- sustain the regional innovation system.

Priority 1 **aim 1 & 2**

Create a Coherent R&D and Innovation Infrastructure

Rationale

Government, public agencies, academia and the Northern Ireland business sector, must interact at all levels of the R&D and innovation system to ensure that policy, delivery mechanisms and outputs are co-ordinated and agreed and that there is more direct involvement with the private sector. Many of the implementation steps under Priority 1 are either underway or are planned. The key issue with this Priority is to bring existing R&D and innovation activities under the central co-ordinating umbrella of the Regional Innovation Strategy.

Establish priorities for academic and other publicly funded R&D.

Encourage and facilitate the commercial exploitation of publicly funded R&D.

Priority 1: Create a Coherent R&D and Innovation Infrastructure

AIM 1: To establish priorities for academic and other publicly funded R&D.

Action Areas	Lead Organisations	Deliverables	Targets
(i) Future university funding, while continuing to reward research excellence, should reflect the disproportionate significance of high-value areas of R&D.	DEL / UNIVERSITIES	Consideration of alternative funding mechanisms with a view to deploying in Northern Ireland through agreement with the universities and establishment of identifiable targets.	Provisionally to be in place by 2004/05 DEL will also review research funding methodology
	DEL / UNIVERSITIES	Application of Sir Gareth Roberts' Review of Research Assessment Exercise.	Review NI (QR) research funding methodology in the light of this - NB - Roberts' Review not implemented until 2007/08.
	DHSSPS / UNIVERSITIES	Links will continue to be enhanced between the HPSS R&D Office and the universities in relation to relevant research.	Ongoing.
	DARD	DARD-commissioned research to be conducted by new DARD NDPB, and retained DARD emergency core. Independent expert advisory group to be established to advise on DARD funded R&D.	New NDPB fully operational by 2006
	DARD / UNIVERSITIES	College of Agriculture, Food and Rural Enterprise (within DARD) to be responsible for knowledge and technology transfer to the agri-food industry. New NDPB to maximise the commercial potential of research in agri-food.	April 2004 for College New NDPB by 2006
	DARD / DEL / UNIVERSITIES	Funding for SAFS (School of Agriculture and Food Science) will largely be transferred from DARD to DEL.	To be completed by 2005
	BUSINESS ALLIANCE	Establish a high-level liaison between business organisations and further and higher education representatives to meet regularly to develop and monitor common policy issues.	As per EDF Action Plan
	DARD	Continue to enhance ongoing links with the universities, and specifically with QUESTOR, to align appropriate research with the needs of the water sector.	Ongoing

AIM 2: To encourage and facilitate the commercial exploitation of publicly funded R&D

(i) A closer and more co-ordinated business / university interface should be established across Northern Ireland, and research clusters should be encouraged and enhanced.	INVEST NI / DEL / UNIVERSITIES	Development of the RTD Centres of Excellence base to direct university research on commercially focused outcomes and to encourage interaction with, and technology transfer to, industry.	Establishment of 20 RTD Centres of Excellence by 31 March 2004.
	INVEST NI / DEL / UNIVERSITIES	To explore how a Northern Ireland Higher Education Innovation Fund (HEIF) could be utilised to promote and support an enhanced university / industry interface.	Recommendations by 31 October 2003.
	INVEST NI	To respond to those elements of the Government White Paper "Investing in Innovation" which hold the potential to provide for a more effective university / industry interface.	Proposals by 31 October 2003.
	DHSSPS	Support for the Health Technology Devices Programme, involving HPSS, universities and healthcare device industry.	Ongoing
(ii) Industry and the universities should work together to capitalise on the commercial potential of university based R&D.	DHSSPS	"Recognised Research Groups" to continue to develop multi-disciplinary and multi-organisational research groupings which improve co-operation between the HPSS and universities.	Ongoing
	DHSSPS	Clinical Research Support Centre and the All-Ireland Cancer Research Network will facilitate and support clinical trials in Northern Ireland including those sponsored by pharmaceutical industry.	Ongoing
	INVEST NI	Development of a new NITECH Fund designed to increase the level of knowledge and technology transfer into the commercial environment.	25 participants by 31 December 2004.
	INVEST NI / UNIVERSITIES	Development of a new "Proof of Concept" initiative to assist the development and emergence of ideas/proposals from the university R&D base into industry.	Fund established by 31 October 2003.
	DEL	"SPUR" (1&2) PPP to establish research centres of excellence. Projects include commercially exploitable research areas	6 Research Centres worth £43.4m under SPUR1 by 2005. 7 Research Centres worth £50m under SPUR by 2007. Monitoring and Evaluation process to take account of commercial outputs.
	INVEST NI	Increased level of University-Industry collaborative research projects assisted under the START Programme	5% annual increase in University-Industry collaborative projects.
	INVEST NI / UNIVERSITIES	Increased participation in Knowledge Transfer Partnerships (KTP)	40 new partnerships p.a.
	INVEST NI / DEL / UNIVERSITIES / BUSINESS ALLIANCE	Establishment of a University/Industry Working Group that will investigate and recommend ways to enhance the transfer of technology and knowledge into industry.	Agree a way forward by 31 July 2003 and, if appropriate, Working Group to report by 31 December 2003.
	INVEST NI / DEL / UNIVERSITIES	To explore how the Higher Education Innovation Fund (HEIF) could be used to increase the levels of Technology and Knowledge Transfer from the universities into competitive businesses and to support the universities' establishment of their own spin-out companies.	Recommendations by 31 October 2003.
	HPSS R&D OFFICE	HPSS R&D Office to maintain close liaison with university research offices.	Potential utilisation of next round of DTI PSRE (Public Sector Research Establishments) funding.
	HPSS R&D OFFICE/INVEST NI	HPSS R&D Office and Invest NI to liaise to secure effective IP and technology transfer facilities within Bio-Northern Ireland for HPSS, SMEs and Universities and to consider the application of KTP to the health sector in consultation with ESRC.	Ongoing
	DARD	Prototype testing of commercial products and technologies by Water Service NI in a real operational environment, to bridge the gap between research and market acceptance, and support commercial exploitation.	Test two products of potential commercial significance by March 2004.
	HE / FE SECTORS	Business representative organisations to be provided with details of R&D activities undertaken by universities so that they might better inform local companies of the R&D and innovation facilities universities can offer.	As per EDF Action Plan.
	HE/FE SECTORS	Companies (especially SMEs) to explore the potential to exploit the research/knowledge-base of the two NI universities (and FE Colleges) using the institutions as a R&D and innovation service/consultancy provider e.g. through establishment/use of Centres of Excellence.	As per EDF Action Plan.
	DARD	College of Agriculture, Food and Rural Enterprise to be responsible for knowledge and technology transfer to the agri-food sector.	April 2004.
	BUSINESS ALLIANCE	Companies to be encouraged to search locally for suppliers or seek to encourage / create local supply and look locally for collaborative ventures (e.g. marketing, R&D, joint production etc) with local partners (including FE colleges, universities).	As per EDF Action Plan.
(iii) The implications of the findings of the Baker Report regarding the commercial potential of R&D funded by the public sector in NI will be considered and an action plan developed accordingly.	DETI	A cross-departmental task group will be formed to consider the implications of the Baker Report in the Northern Ireland context and an action plan will be developed to maximise the commercial potential of public sector supported R&D.	October 2003.

Priority 2 aim 3&4

Enhance the use of R&D and innovation by the Business Sector

Rationale

Northern Ireland's business community must make more and better use of R&D and innovation, through partnership with academia and Government. The NI business sector exhibits a comparatively low level of R&D activity, coupled with a lack of awareness of best practice in business innovation. The disproportionately large SME base of the NI economy, and the subsequent dependency on university-based R&D, further exacerbates this situation.

Increase the proportion and quality of R&D and innovation activity in Northern Ireland.

Target public support into areas of future potential, emphasising skills and resources.

Priority 2: Enhance the use of R&D and innovation by the Business Sector

AIM 3: To increase the proportion and quality of R&D and innovation activity in Northern Ireland

Action Areas	Lead Organisations	Deliverables	Targets
(i) Business Alliance will take the lead in developing a range of innovation and R&D promotional and support activities for the NI business sector	BUSINESS ALLIANCE / HE & FE BUSINESS ALLIANCE / UNIVERSITIES BUSINESS ALLIANCE / UNIVERSITIES BUSINESS ALLIANCE BUSINESS ALLIANCE	Develop programmes to enhance Business-to-Business and Education-to-Business links across all sectors of the NI business community. Develop and maintain sectoral innovation and R&D networks and establish a programme of networking activities. Establish a range of "signposting" activities to support business in identifying priorities and support in R&D and innovation. Identify and promote a range of best practice case studies and R&D and innovation "champions". R&D and innovation to be heavily promoted and companies to be encouraged to undertake and spend more on commercially relevant R&D and innovation. Case studies to be used to promote awareness of how best to secure commercial advantage by undertaking new or building on good quality research.	Ongoing. 2004 By January 2004 By January 2004 As per EDF Action Plan
(ii) Support programmes should be developed and extended to encourage more companies to make greater use of R&D activities (particularly near-market). New best practice, strategic mechanisms for evaluating the economic benefits of R&D projects should also be developed.	INVEST NI INVEST NI INVEST NI INVEST NI INVEST NI BUSINESS ALLIANCE	Increase the uptake of Invest NI R&D support mechanisms. Consider and develop new support programmes to increase the uptake of R&D activities. Consider the appropriateness of FASTTRACK COMPETE pilot to other industrial sectors. Develop and establish a new strategic mechanism for the evaluation, export, of the economic benefit deriving from research and development projects. New efforts will be made at Invest NI Local Office level to encourage businesses to get involved in R&D. Business representative organisations to act as an information link (possibly a "knowledge exchange") to companies on R&D and innovation matters and increase promotion of R&D and innovation through newsletters and event programmes.	Increase by 5% pa. Develop a new 'Proof of Concept' Initiative by 31 October 2003. Review of pilot by 30 June 2004 and assess outcomes. Agree mechanism by 30 September 2003. 30 projects by 31 March 2004. As per EDF Action Plan
(iii) Government, its agencies, academia and local business representatives should work increasingly closely to develop an innovation network in NI.	BUSINESS ALLIANCE	Business representative organisations to encourage companies to share knowledge with other companies with whom they are not in competition.	As per EDF Action Plan
(iv) Efforts to secure future Foreign Direct Investment should be focused on companies which will enhance the development of R&D and/or Innovation Infrastructure by strengthening and deepening NI's technology base.	INVEST NI / DETI INVEST NI / DEL / HE-FE SECTORS	Develop key sectoral strategies which will place strong emphasis on the promotion and exploitation of R&D/innovation capability. Review the provision of incubation space in NI with a view to enhancing the innovation network within NI.	6 sectoral strategies (including nanotechnology ICT biotechnology), with an innovation emphasis completed by 31 March 2004. New Incubation Strategy by 31 December 2003.
(v) New efforts should be made to seek out innovative ideas within local companies and to nurture the development of businesses from these.	INVEST NI BUSINESS ALLIANCE DEL	A process for identifying companies with innovative ideas will be established in line with the recommendations made in the "Accelerating Entrepreneurship" strategy. Develop a business-led "mentoring programme". Develop a Northern Ireland response with all key stakeholders in business, academia and the public sector, for addressing the broad issues arising from the Roberts' Review.	31 March 2004 Pilot with 10 local companies to be in place by January 2004 March 2004
A cross-departmental group within the Northern Ireland Civil Service, will be established to develop an action-plan to implement the findings of the Roberts' Review of the Supply of Scientists and Engineers.	DEL		
AIM 4: To target public support into areas of future potential, emphasising skills and resources.			
(i) NI Foresight will be reviewed to determine future arrangements for Northern Ireland.	INVEST NI / DETI	Development of a new NI Foresight strategy.	September 2003
(ii) Work with the private sector, and the Higher and Further Education sectors to ensure NI has the R&D infrastructure necessary to exploit the commercial potential of emerging technologies.	INVEST NI INVEST NI / DETI INVEST NI / DETI	Establish Centre of Excellence in Electronics, Communications and IT (ECTI). Ensure NI is integrated into the UK Micro and Nanotechnology network being developed through DTI. Encourage the effective use of ICT best practice in business, emphasising the benefits of Broadband.	Centre of Excellence built and operational by 30 September 2004. Ongoing Establish a team of Broadband Advisors by 30 June 2003 and hold 15 Broadband Awareness events (750 companies) during 2003/04 Establish 5 sectoral Broadband networks of 30 company clusters during 2003/04. Evaluation of Seed Fund in first quarter of 2003/04 and consideration of options for 2004/05 and beyond.
(iii) SMEs should take steps to link with innovative MNEs through mutually beneficial networks and formal clusters at sectoral level, with the support of Business Alliance and Invest NI.	DCAL DCAL DARD INVEST NI / BUSINESS ALLIANCE INVEST NI / BUSINESS ALLIANCE CENTRE FOR COMPETITIVENESS	Build on the Creative Enterprise research project by developing a strategic action plan to support the growth of the creative and cultural sector. Development of further life-long learning programmes to encourage diversification in rural areas. Focus a number of 'Business to Business Bridge' programmes at innovation Include 'Innovation' as an element within Supply Chain Development Group initiative. The process of clustering and encouraging collaboration between companies in areas of mutual benefit (e.g. joint marketing, R&D etc), encouraging local supplier linkages and sharing of knowledge to be promoted in as many industries as possible.	January 2004. Ongoing 5 'pilot' Business to Business bridge innovation projects by September 2003. 2 pilot Supply Chain Development Groups, each involving up to 10 SMEs, to be completed by August 2003. As per EDF Action Plan
(iv) The importance of 'Design' and its commercial potential should continue to be promoted through programmes raising awareness and developing design capability and integrated into business development programmes.	INVEST NI INVEST NI DEL DCAL	Campaign to demonstrate the benefits and application of design principles through events, case studies, media and web Delivery of a series of Design Capability Development Programmes for both small and large companies. "Value of Design in Higher Education" Report - examining the impact of design standards in recently completed HE buildings, on the recruitment/retention of students as well as the quality of teaching, research, and other outcomes. Develop an agreed medium-term action plan to take forward the Unlocking Creativity Strategy.	Reach and communicate to 150 businesses each year 25 new companies each year with an effective design and product development process. April 2004 January 2004 (as per EDF Action Plan)
(v) University and FE Colleges' linkages with SMEs should be encouraged and developed through targeted programmes, with support from government.	DEL DEL DEL / DETI / INVEST NI BUSINESS ALLIANCE	HEROBC Partnership Fund and SME pilot. DEL Centres of Excellence initiative to continue to be extended into new areas such as software engineering and construction and the build environment with a focus for projects to have a commercial component. Introduction of NI HEIF initiative. A scheme to be established to provide college principals with boardroom experience.	SME projects to be under way by December 2003 Ongoing To be implemented 2004/05, following consideration of English HEIF proposals and ensuring continuity with HEROBC through interim funding. 2004

Priority 3 aim 5&6

Develop a Culture of Innovation and Enterprise

Rationale

In order to achieve long-term success, the NI economy needs to be based on the ability to create more and better entrepreneurs and a world-class innovative workforce. More effort is needed across the education and training sectors to help develop a more innovative way of thinking about business and employment generally. This can be extended into the work of the community and voluntary sectors as well. The business community and those who provide financial support to business must provide new ways of interacting with one another. A genuine culture of enterprise and innovation must begin by expanding private sector activity and reducing reliance on public sector financial support.

Promote innovation - in its broadest sense - at every level of the Northern Ireland education, vocational training, and skills development system.

Encourage the Northern Ireland financial support sector and the business community to collaborate in new and innovative ways.

Priority 3: Develop a Culture of Innovation and Enterprise

AIM 5: To promote innovation – in its broadest sense – at every level of the Northern Ireland education, vocational training, and skills development system.

Action Areas	Lead Organisations	Deliverables	Targets
(i) Education and vocational training deliverers should target resources on developing the knowledge and skills necessary to enhance the selected areas of high promise for R&D and Innovation.	DE / DEL / DETI DEL DE DE DE / DEL DARD DCAL DEL BUSINESS ALLIANCE	Implement the Enterprise & Entrepreneurship Action Plan. CCEA to develop a programme for all full-time students in FE leading to a Certificate of Enterprise. CCEA Curriculum Review ongoing. DE to consider proposals and develop new curriculum. Several CCEA lead pilot schemes to commence. Timetable for full roll-out of revised curriculum dependent on detail of proposals and resource implications Review of Government funded Business Education activities and the role of NIBEP to be commissioned. DARD education programme to be kept under review to ensure that they maximise their focus on required skills and knowledge for employers. DARD will also continue to ensure that education/training policy is complemented by university education. Development of new <i>Unlocking Creativity</i> action plan will include consideration of how to promote creativity in education Multi-media provision to be developed in a number of colleges Greater involvement / commitment by business in promoting enterprise in schools (e.g. through NIBEP). Successful case studies to be used to highlight the benefits of greater enterprise.	Ongoing Pilot to commence in 3 colleges September 2003 Ongoing Commence September 2003 April 2004 Ongoing January 2004 Selected FE Colleges to continue to develop Foundation Degrees in multi-media and web design; Centres of Excellence in Software Engineering to be established April 2003. As per EDF Action Plan
(ii) NI businesses should take more steps to develop internal staff development programmes aimed at increasing innovation and creativity in the workforce	INVEST NI BUSINESS ALLIANCE	Ensure that innovation and creativity are explicitly considered in CDP assistance. To promote a culture of competitiveness / investment within NI business, the benefits of upgrading skills to be promoted through case studies to encourage companies to spend more and undertake more training to raise skills as part of a strategy to improve business competitiveness.	25% of CDP projects to include assistance relating to creativity or continuous improvement. As per EDF Action Plan
(iii) Regional exemplars of innovation and design excellence should be publicised and deployed as champions of business success and exemplars in the knowledge driven economy.	INVEST NI BUSINESS ALLIANCE	Identification of regional exemplars. Identify and promote a range of best practice case studies and R&D and innovation "champions".	10 regional champions of innovation to be identified and used to publicise the benefits of innovation. 4 design cases identified and publicised each year. January 2004

AIM 6: To encourage the Northern Ireland financial support sector and the business community to collaborate in new and innovative ways.

(i) NI business should make better use of UK initiatives intended to improve R&D and innovation-based activities in smaller firms. These measures, introduced by DTI and HM Treasury (such as the R&D Tax Credit), should be more widely publicised and promoted by business organisations and by government and its relevant agencies.	INVEST NI DETI / DEL / INVEST NI AND UNIVERSITIES	Encourage the use of R&D Tax Credit scheme in Northern Ireland Implement appropriate recommendations from the Sainsbury and Lambert Reviews	Ongoing Reviews due for completion by Autumn 2003
(ii) Regional exemplars of innovation and design excellence should be publicised and deployed as champions of business success and exemplars in the knowledge driven economy.	INVEST NI DARD / INVEST NI	Corporate Finance training to be included in Invest NI client executive training. DARD and Invest NI will participate in refining and promoting the availability of venture capital for agri/food SMEs.	30 June 2003 Ongoing
(iii) The availability of debt and equity products in the local financial markets should be monitored and regular discussions held with the local financial institutions on the appropriateness of financial support available to new and existing businesses. The private sector should be encouraged to develop innovative products to meet the needs of new and rapidly expanding technology – orientated companies	Invest NI	Implementation of relevant recommendations of the Ulster Society of Chartered Accountants Study into NI Financial Sector.	December 2003
(iv) Initiatives should be taken, where necessary, with the private sector to ensure the adequate availability of venture capital and in particular seed capital for Technology-Based Start up Firms with future development potential.	Invest NI	New venture capital fund covering deal sizes £250k to £1m. Scoping study for technology based venture capital fund. Promote use of the NITECH Fund.	December 2003 October 2003 25 participants by 31 December 2004.
(v) Actions should be taken to make clear that the primary responsibility for financing industry in NI rests with the private sector and that firms should be encouraged to make greater use of both debt and equity finance. It should be emphasised that the primary role of grants is to help companies develop their capability to compete in the market place.	Invest NI Business Alliance	Publication of Invest NI Principles for Business Support. Business representative organisations to organise seminars and presentations to promote the use of business angels. Business representative organisations to be fully conversant with and actively promote Invest NIs Business Support Principles and DETI/Invest NIs venture capital strategy.	Published in March 2003 – Deliver 5 Regional Briefing Seminars to client companies and business advisers by 30 June 2003. As per EDF Action Plan As per EDF Action Plan

Priority 4 aim 7&8

Sustaining the regional innovation system

Rationale

The evolving regional innovation system must be supported by an appropriate governance model which will reflect the needs of all the key stakeholders. A truly innovating region will interact with and learn from other regions, sharing knowledge-resources and working to implement best practice wherever it can be found. Northern Ireland has opportunities to interact with other innovating regions in the UK, on the island of Ireland, across Europe, and, indeed, beyond. These linkages are a key economic resource in the modern global economic context and must be exploited.

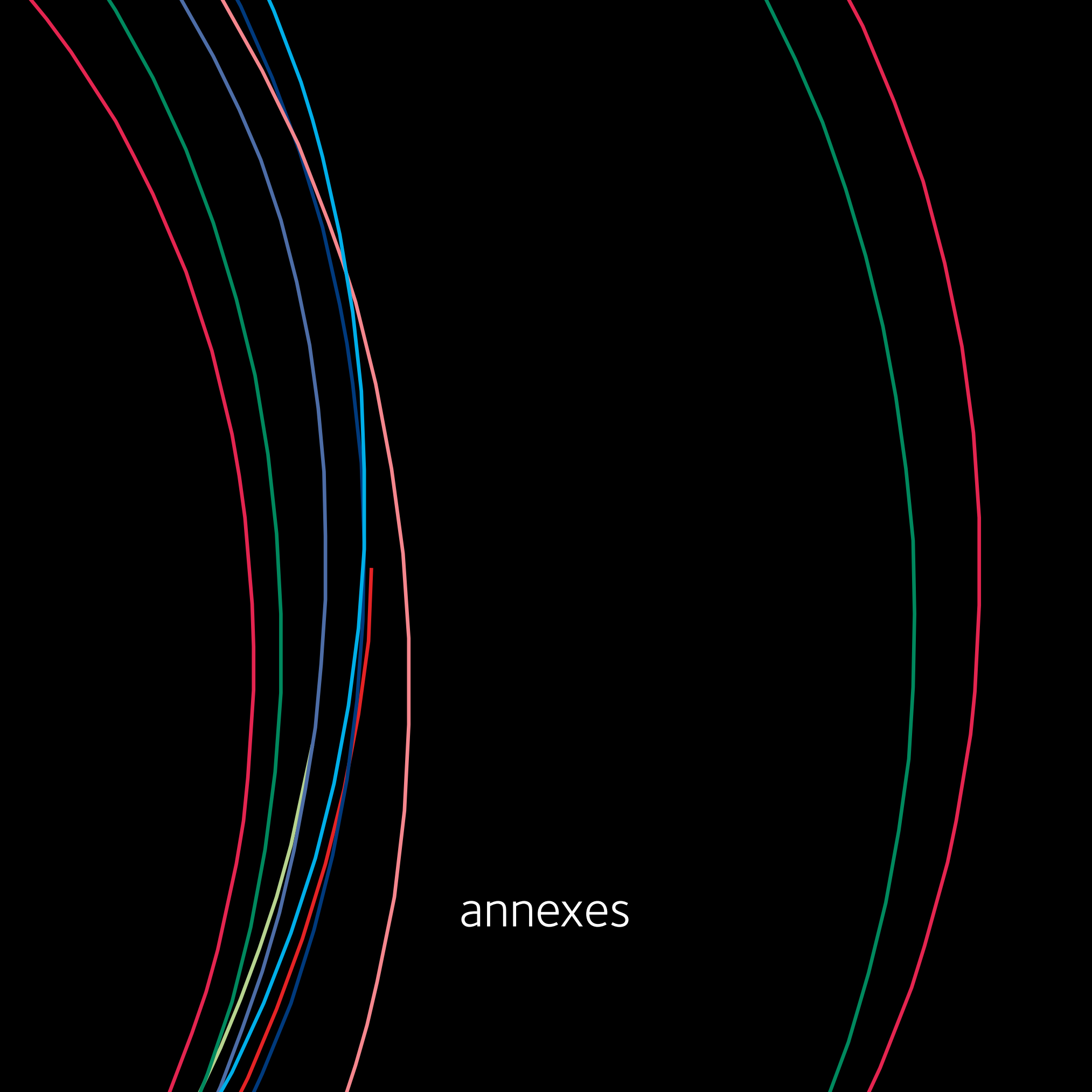
Put in place a coherent and effective co-ordination and leadership mechanism for the Regional Innovation Strategy.

Establish and exploit inter-regional linkages and new potential partnerships so that Northern Ireland's RIS does not exist in isolation.

Priority 4: Sustaining the regional innovation system

AIM 7: To put in place a coherent and effective co-ordination and leadership mechanism for the Regional Innovation Strategy.

Action Areas	Lead Organisations	Deliverables	Targets
<p>(i) Establish a co-ordinated governance structure to oversee the implementation and review of "think create innovate"</p> <p>(ii) Business Alliance and the NI Federation of Small Business, will establish and maintain a "Business Innovation Forum" to promote the advantages of company innovation and R&D to local businesses and to help improve Northern Ireland's innovation system and culture of innovation and enterprise.</p> <p>(iii) The innovation process needs to be developed and driven through formal partnerships at local level, involving local government, education & local firms.</p>	<p>IDWG</p> <p>BUSINESS ALLIANCE</p> <p>INVEST NI / INTERTRADEIRELAND</p> <p>INVEST NI</p>	<p>Governance structure to include representation from NICS interdepartmental working group; the Economic Development Forum; the Business Alliance; HE and FE institutions; and NI Foresight.</p> <p>The Business Innovation Forum should be used as a vehicle to promote and enhance innovation networks across business sectors in NI.</p> <p>Develop a cross border regional innovation programme for the North-West in partnership with appropriate agencies and in line with the principles of "think create innovate" to exploit synergies at local level.</p> <p>Development of Regional Economic Development Plans, covering the areas serviced by each of Invest NI's main local offices. These Plans will set out proposals for local economic development, in line with local needs, and for maximising inward investment opportunities.</p>	<p>December 2003</p> <p>December 2003</p> <p>Proposal by June 2003.</p> <p>5 Regional Plans to be developed by 31 March 2004.</p>
<p>AIM 8: To establish and exploit inter-regional linkages and new potential partnerships.</p> <p>(i) NI businesses, universities and FECs should be encouraged to exploit international connections, and to further existing and new R&D and innovation connections to North America and the Far East (including the NI Technology Development Centres).</p> <p>(ii) NI will establish and enhance mutually beneficial linkages with innovating regions across the UK, the island of Ireland and Europe</p> <p>(iii) An innovation action plan should be developed with InterTradeIreland to ensure that mutually beneficial cross-border innovation and networking with businesses, academia, the FE sector and the public sector is exploited effectively.</p>	<p>INVEST NI / UNIVERSITIES/FE SECTOR</p> <p>INVEST NI / UNIVERSITIES</p> <p>INVEST NI / UNIVERSITIES</p> <p>INVEST NI</p> <p>INVEST NI</p> <p>DEL / INVEST NI / UNIVERSITIES</p> <p>IDWG</p> <p>DETI</p> <p>DETI / INVEST NI / INTERTRADEIRELAND</p> <p>DETI / INVEST NI</p> <p>DARD</p>	<p>Establish 2nd Northern Ireland Technology and Development Centre (NITDC) in USA.</p> <p>Organise a pilot programme of Technology Missions for academia and business.</p> <p>Promote trans-national Technology Transfer through the Innovation Relay Centre.</p> <p>Promote partnership development through involvement by NI companies in the RTD Networking programme and 6th Framework (FP6).</p> <p>Develop business - university links through US-Ireland Research Partnership Taskforce.</p> <p>Active participation in the UK-wide Regional Innovation Network (RINET) and the Europe-wide Innovating Regions of Europe (IRE) will be stepped up once "think create innovate" has been launched.</p> <p>DETI will commission a research study to map/benchmark the components (at a practical on-the-ground level) of other successful R&D regions, particularly smaller regions, and to identify how these various components interact to produce success.</p> <p>Cross-Border Innovation Action Plan to be developed.</p> <p>North/South research programmes under the EU Peace and Reconciliation in NI and the Border Region Programme to be taken forward.</p> <p>DARD to take forward collaboration with researchers in Rol. Future activity will be planned and co-ordinated appropriately e.g. in plant and animal health research.</p>	<p>Operational by 31 December 2003.</p> <p>3 Missions by March 2004</p> <p>150 Knowledge matches and 4 Technology transfer agreements pa.</p> <p>40 Framework 6 applications pa.</p> <p>Assist local companies and research organisations to secure £14m for NI under Framework 6.</p> <p>Ongoing</p> <p>June 2003</p> <p>As per EDF Action Plan</p> <p>Autumn 2003</p> <p>Ongoing</p> <p>Autumn 2003</p>



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Performance Indicators

A Knowledge-based Economy

For this Strategy the knowledge-based economy has been broken down into five key elements, which follows a similar format to the EU Innovation Scoreboard 2001. These are:

- knowledge resources;
- knowledge creation;
- knowledge transfer;
- knowledge application; and
- knowledge output.

Within each knowledge category a number of appropriate indicators were selected. The indicators have been guided by data availability and comparability and have been divided into primary and secondary indicators. The primary indicators will be used for benchmarking purposes, against other regions and countries, while the secondary indicators will be seen to support the primary indicators and are more region specific.

Knowledge Resources (KR)

This category incorporates human capital, finance and infrastructure.

Human Capital - The scale and quality of human capital are major determinants of both the creation of new knowledge and its diffusion throughout the economy. The Science and Engineering Graduates indicator reflects the importance of a ready supply of people with science, technology, engineering and mathematic skills for future research and development and innovation performance. Current levels of employment within knowledge intensive services, high-tech and medium-tech manufacturing also provides a good indication of the human capital resources available to any regional innovation system. KRKO1 and KRKO2 are included as both indicators of knowledge resources (inputs) and knowledge outputs.

Finance - The UK Innovation Survey 2001 highlighted that the main constraint on innovation was direct cost closely followed by the cost and availability of finance. Clearly the supply of venture capital (VC), particularly high-tech VC is an essential requirement for turning R&D into commercial products, processes and services and is reflected in all of the aforementioned publications.

Infrastructure - One of the EU priorities identified at the Lisbon Summit, to boost the knowledge-based economy, is to prioritise and implement eEurope2 actions to deliver broadband Europe. It is also important for NI to develop this necessary infrastructure.

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Performance Indicators

A Knowledge-based Economy

Knowledge Creation (KC)

A key determinant of knowledge creation is the investment in R&D. R&D performance (either per employee or relative to GDP) is a common indicator in the benchmarking literature. A variety of indicators have been chosen to reflect the variety of R&D such as Business expenditure on R&D (BERD), Government expenditure on R&D (GOVERD), Higher Education expenditure on R&D (HERD) etc. In addition indicators that illustrate the R&D performance amongst SME's are also included.

Knowledge Transfer (KT)

Investment in research provides much of the foundation for innovation and the new products and services that result. However, such exploitation depends on the ideas and skills transferring between universities, other research organisations and businesses. This requires the strengthening of innovation linkages within the economy.

Indicators relating to new innovation linkages both business-to-business and business-to-universities / colleges are included. Furthermore, the geographical source of these linkages is also important, particularly international linkages. These offer valuable channels for the flow of world-wide best practice. As a result, local, cross-border and international linkages will all be monitored.

Knowledge Application (KA)

This area covers innovation activities outside formal invention, such as the adaptation of new equipment, processes etc and the creation of new products and services. Given the broad nature of innovation indicators of product, process and organisational innovation have been selected. Indicators highlighted the application of ICT skills are also included together with an indicator of business exploitation of longer term 'basic' or 'primary' research.

Knowledge Output (KO)

Given that innovation lies at the heart of productivity growth, improvements in the former will lead to improvements in the latter - hence the selection of a productivity indicator. Another innovation output is the percentage of sales from new or improved products or traded services. Some of the indicators are not matched up to the implementation steps due to the difficulty in identifying a direct relationship. This is particularly apparent with the Knowledge Output indicators. These indicators should be viewed as overall outputs emanating from the R&D and innovation system as a whole and not the result of one or two implementation steps in isolation.

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Performance Indicators

RIS Indicators

Themes	Primary Indicators	Secondary Indicators
Knowledge Resources	<p>Human Capital KR1: R&D employment as a % of total employment [EU Research Measure] KR2: Science & Engineering (S&E) graduates as a % of total graduates [Invest NI PIF] KR3: S&E graduates in employment as a % of total employment</p> <p>Finance KR4: % of UK venture capital invested in NI</p> <p>Infrastructure KR5: % of Invest NI client companies (proxy for NI as a whole) with Broadband access [EDF]</p>	<p>Human Capital KR6: Business R&D employment as a % of total employment [Invest NI PIF] KRKO1: Employment within high-tech and medium-tech manufacturing KRKO2: Employment within knowledge-intensive services</p> <p>Finance KR7: Growth in VC investment - VC per employee [EDF]</p> <p>Infrastructure KR8: Number of Invest NI Centres of Excellence and number of researchers</p>
Knowledge Creation	<p>KC1: Total R&D relative to GDP & per employee [Invest NI PIF] KC2: GOVERD relative to GDP & per employee [Invest NI PIF] KC3: HERD relative to GDP & per employee KC4: BERD relative to GDP & per employee [Invest NI PIF]</p>	<p>KC5: Business R&D expenditure growth [EDF] KC6: Patent applications per employee [Invest NI PIF] KC7: SME Focus - Total BERD by small (<50) firms (£ per employee) [Invest NI PIF] KC8: SME Focus - Business R&D expenditure by small (<50) firms as a % of total BERD KC9: % of firms undertaking R&D projects [Invest NI PIF] KC10: Experimental development R&D per employee [EDF]</p>
Knowledge Transfer	<p>KT1: % of all firms with innovation linkages to universities, colleges, companies and suppliers [Invest NI PIF] 1. Business to business 2. Business to universities</p>	<p>KT2: % of all firms with innovation linkages to universities, colleges, companies and suppliers [Invest NI PIF] 1. Local linkages 2. Cross-border linkages 3. International linkages</p>
Knowledge Application	<p>KA1: Product Innovation - % of all firms introducing new or improved products or traded services in last 3 years [Invest NI PIF] KA2: Process Innovation - % of all companies introducing new / improved processes over 3 years (%) [Invest NI PIF]</p>	<p>ICT Measures [Invest NI PIF] KA3: Progress on ICT Sophistication Index</p> <p>KA4: Organisational Innovation - % of firms using / adopting best practice techniques [Invest NI PIF] KA5: % of all businesses in NI which are exploiting 'primary' or 'basic' research [Invest NI PIF]</p>
Knowledge Output	<p>KO1: Sales - % of sales from products or traded services, new or improved in the last 3 years (%) [Invest NI PIF] KO2: Employment - Knowledge-Based Employment Indicator [EU or DTI Measure & appears in Invest NI PIF] KO3: Productivity - NI's productivity levels relative to the UK for both manufacturing & private sector services [EDF]</p>	<p>KO4: Sales - Sales in knowledge-based industries (%) [Invest NI PIF] KO5: Exports - Exports in knowledge-based industries (%) [Invest NI PIF] KRO1: Manufacturing Employment - Employment within High-tech and medium-tech manufacturing KRO2: Service Sector Employment - Employment within knowledge-intensive services</p>

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Glossary of Terms

Glossary of Terms

BERD	Business Expenditure on R&D
CCEA	Council for Curriculum, Examinations and Assessments
C for C	Northern Ireland Centre for Competitiveness
DARD	Department of Agriculture and Rural Development
DCAL	Department of Culture, Arts & Leisure
DE	Department of Education
DEL	Department for Employment and Learning
DETI	Department of Enterprise, Trade and Investment
DFES	Department for Education and Skills (UK)
DFP	Department of Finance and Personnel
DHSSPS	Department of Health, Social Services and Public Safety
DOE	Department of the Environment
DSD	Department of Social Development
DRD	Department for Regional Development
DTI	Department of Trade and Industry (UK)
EDF	Economic Development Forum
ESRC	Economic & Social Research Council
EU	European Union
FDI	Foreign Direct Investment
FE	Further Education
FEC	Further Education College
FOREN	Foresight for Regional Development Network (EU)
FP6	EU Framework Programme Six
GDP	Gross Domestic Product
GERD	Gross (Domestic) Expenditure on R&D
GOR	Government Office Regions
GOVERD	Government Expenditure on R&D
HE	Higher Education
HEI	Higher Education Institution
HERD	Higher Education Expenditure on R&D
HMT	Her Majesty's Treasury
HPSS	Health & Personal Social Services (NI)
ICT	Information and communications technologies
IDB	Industrial Development Board
IDWG	Inter-Departmental Working Group
INI	Invest Northern Ireland

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Glossary of Terms

Glossary of Terms


IPR	Intellectual property rights
IRE	Innovating Regions in Europe
IRTU	Industrial Research and Technology Unit
LEDU	Local Enterprise Development Unit
MNE	Multi-National Enterprise
NI	Northern Ireland
NIBEC	Northern Ireland Bio-Engineering Centre
NICAM	Northern Ireland Centre for Advanced Materials
NICENT	Northern Ireland Centre for Entrepreneurship
NIEC	Northern Ireland Economic Council
NIERC	Northern Ireland Economic Research Centre
NIERI	Northern Ireland Economic Research Institute
NISP	Northern Ireland Science Park
NITB	Northern Ireland Tourist Board
OFMDFM	Office of the First Minister and Deputy First Minister
OST	Office of Science & Technology (UK-DTI)
PIF	Performance Information Framework
PFI	Private Financial Initiative
PPP	Public Private Partnership
QUB	Queen's University, Belfast
QUBIS	Queen's University, Belfast Incubator System
RAE	Research Assessment Exercise
R&D	Research and development
RIS	Regional Innovation Strategy
RINET	Regional Innovation Network Group
RoI	Republic of Ireland
SME	Small and Medium sized enterprise
S&T	Science & Technology
TCS	Teaching Company Scheme
UK	United Kingdom
UU	University of Ulster
UUSRP	University of Ulster Science Research Park
UUTECH	University of Ulster Technology Transfer

annex d

List of Respondents to Consultation

List of Respondents to Consultation

In addition to the comments and feedback of the two hundred or so attendees at the think | create | innovate seminars held in Newry, Londonderry and Belfast as part of the public consultation exercise, the following respondents provided written comments:



Adria Ltd	Innovation Lab Ireland
AMTEC Medical Ltd	Institute of Directors
Analog Devices	Institution of Electrical Engineers
Antrim Borough Council	InterTradeIreland
Ards Borough Council	JT Solutions
Armagh City Council	Kainos Software
Association of Northern Ireland Colleges	LEDCOM
Banbridge District Council	Limavady College of Further & Higher Education
Banjax	Marsh UK Ltd
Ralph Bauer	MTF Ltd
BDG Group	The National Trust
Beattie Consultancy	Newry & Kilkeel Institute of Further Education
Office of Roy Beggs MP	Newry & Mourne District Council
Belfast City Council	NI Chamber of Commerce and Industry
Belfast Institute of Further & Higher Education	NI Economic Council
Belfast Telegraph	NI Business Education Partnership
Esmond Birnie MLA	Dr Norman Apsley
Confederation of British Industry (NI)	NORIBIC
Centre Information Technology Unit NI	North Down & Ards Institute of Further Education
Centre for Competitiveness	North West Institute of Further & Higher Education
Centre for Creative Industries	Omagh Enterprise Company Ltd
Chartered Institute of Personnel & Development	Performance Enhancement
Corporate Lifecycles	Peter Calvert & Associates
Craigavon Borough Council	Queen's University Belfast
John Dallat MLA	QUBIS Ltd
Devenish Nutrition Ltd	RFD Ltd
DuPont (UK) Ltd	Rural Development Council
Dungannon & South Tyrone Borough Council	Prof Peter Schuddeboom
E & I Engineering	Save the British Science Society
East Down Institute	SEED
Eastern Health & Social Services Board	Sperrin Lakeland HSS Trust
Getting online Ltd	University of Ulster
Hill Engineering	Workers Educational Association
Hillsborough Consultancy	Upper Bann Institute of Further & Higher Education
Independent Television Commission	Yardmaster
Inland Revenue NI	
Innovation North West	

Details of the written responses to the public consultation on think | create | innovate which ran from November 2002 to January 2003 are available on the DETI website: www.deti.gov.uk/thinkcreateinnovate

annex e

Members of the IDWG

Members of the Inter-Departmental Working Group

Mike Warnock (Chairman),	Department of Enterprise, Trade and Investment.
David McAuley,	Department for Employment and Learning.
Diarmuid McLean,	Invest Northern Ireland.
Dr. George McIlroy,	Department of Agriculture and Rural Development.
Prof. Bob Stout,	Research and Development Office for the NI Health & Personal Social Services.
Dr. Liz McWhirter,	Department of Health, Social Services and Public Safety.
David Mann,	Department of Education.
Carol Moore,	Department of Culture, Arts and Leisure.
Brandon McMaster,	Department of Finance and Personnel.
Raymond Cummings,	Department for Regional Development.
Ken Ledgerwood,	Department of Environment.
Jackie Johnston,	Department for Social Development.
Michael Brennan,	The Office of the First Minister and Deputy First Minister.
Jenny Pyper (Secretary),	Department of Enterprise, Trade and Investment.
Consultancy support to the IDWG was provided by CM International (www.cm-intl.com)	

For further information please contact the think | create | innovate team at:

Policy Innovation Unit

Department of Enterprise Trade and Investment
Netherleigh
Massey Avenue
BELFAST
BT4 2JP

e-mail: thinkcreateinnovate@detini.gov.uk

Tel: 028 90529565

Fax: 028 90529533

www.detini.gov.uk/thinkcreateinnovate

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