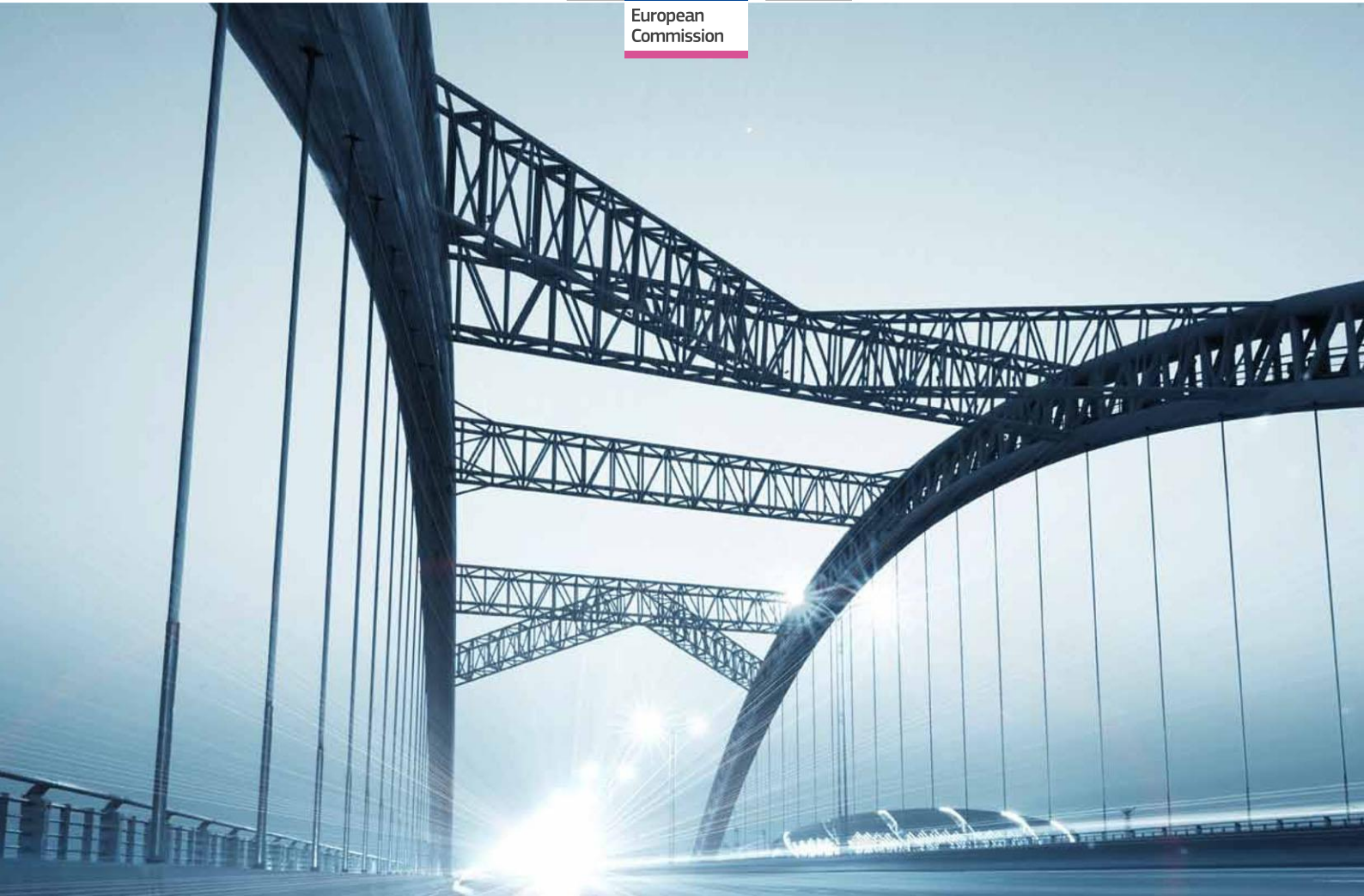




European
Commission



ESIC European Service Innovation Centre
REPORT

Summary Assessment of Northern Ireland

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ESIC in Brief

Increasingly service innovation plays an instrumental role in the transformation and upgrading of traditional economic sectors and industries into more productive, competitive and high value-added business ecosystems. Considered as being multi-dimensional in nature, service innovation comprises innovation in services, service sectors or service industries that are provided by service entrepreneurs and service firms. It also takes place in manufacturing industries, adding further value and contributing significantly to overall productivity and profitability. There is a growing need to assess, analyse and demonstrate what impact service innovation has on industrial change and to assist Member States and regions towards a greater understanding of service innovation as a driver of industrial transformation and future competitiveness.

The European Service Innovation Centre (ESIC) is a two-year initiative commissioned by the European Commission's Directorate-General for Enterprise and Industry to capture and demonstrate the dynamics and large-scale impact of service innovation as well as to assess how service innovation impacts on competitiveness, industrial structures and regional development. It will also focus on assessing the implications and impacts of service innovation on employment structures, economic patterns and on value creation.

Primarily, ESIC will provide customised advice to six selected model demonstrator regions (the Canary Islands, Emilia-Romagna, Limburg, Luxembourg, Northern Ireland and Upper Austria). The initiative will also help other Europe's regions and Member States to make better use of the transformative power of service innovation in strengthening existing and emerging industries and markets and to develop better industrial policies and smart specialisation / cluster strategies. The goal of creating a favourable eco-system for service innovation will boost supportive infrastructures and business conditions that, in turn, will facilitate the take-up of innovative services throughout the economy.



This work is a part of a service contract for the Enterprise and Industry Directorate-General of the European Commission.

The views expressed in this report, as well as the information included in it, do not necessarily reflect the opinion or position of the European Commission and in no way commit the institution.

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Introduction

A strong, healthy, high value-added services sector is essential for the efficient operation of a modern economy, for facilitating commercial transactions and for enabling the production and delivery of other high value added goods and services. Service innovation represents the systematic development, design and testing of new and/or improved service offerings, processes and business models, using multidisciplinary social science, engineering and technology-enabled models, methods and tools. As it addresses the whole economy and not only the service sector, service innovation is very relevant to achieving the EU2020 goals of smart, sustainable and inclusive growth.

In this context, the European Service Innovation Centre is instrumental in pointing up the innovation potential of service activities across Europe and supporting the assessment of how regions can both unlock their service innovation potential and increase their economic performance significantly.

The purpose of this summary assessment report is to assess whether the regional policy mix of Northern Ireland is conducive to the emergence of new business sectors/models or the transformation of existing sectors/models, via the application of service innovation processes and concepts. This includes a mapping of the economic change induced by service activities and service innovation and also an assessment of policy options and policy support measures. Based on the analysis, the report provides policy recommendations for a systemic approach to policies and better support for innovative companies, which offers a favourable business environment conducive to structural change.

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Executive Summary

Northern Ireland faces considerable challenges. Since 2009, the global recession has led to a significant deterioration in the regional labour market and increasing unemployment rates. Northern Ireland's economy remains dependent on its traditional industries. Over the last decade, the Northern Irish manufacturing sector has altered markedly as a result of technological changes and pressures from global competitors.

The most important regional business strengths are the relatively export-oriented culture and a significant registered increase in business expenditure on R&D (BERD), in 2010. In addition, the region has a competitive science and technology sector and an excellent recent record on foreign direct investment (FDI). On the other hand, the region suffers from a brain drain, as one-third of students choose to study elsewhere and less than half of these return to Northern Ireland when they obtain their degrees. Northern Ireland is also very reliant on a few large firms, a large amount of FDI in low value sectors and a relatively small private sector and thus it is over reliant on the public sector. A relative shortage of skilled people poses a major challenge to Northern Ireland.

Northern Ireland performs close to, or slightly below, the EU average on the five systemic functions of service innovation. However, it performs worse on certain indicators related to **financing innovation** and indicators for **collaboration and networking**. The service innovation-related structural indicators also reflect that while there are companies undertaking service innovation, this has not yet been exploited by existing manufacturing industries to make the most of the transformative power of service innovation.

Despite the recent effort to update the innovation strategy, which is currently out for consultation, **Northern Ireland does not have a specific strategic focus on service innovation**. However, intangible assets that are beyond the central policy focus on R&D, such as design, training, software and business processes are important parts of the innovation strategy.

The general awareness of innovation and service innovation and of its transformative power to promote structural changes in the regional economy has only begun to grow very recently. In terms of the potential, there are a small number of companies that understand and use the concept, but the vast majority undertake service innovation without knowing what exactly they are doing, or without attaching a proper 'meaning' to the concept.

The existing policy mix is biased towards support for manufacturing R&D and technological innovation. The policy mix is dominated by technology-push measures, with a limited presence of demand side measures and this is a view shared by regional stakeholders. Service innovation is only a potential part of existing R&D and innovation measures. Regional stakeholders use several elements inherent to service innovation in public services and also in more outward-looking companies.

One of the major weaknesses of the policy mix lies in its fragmentation and lack of sectoral focus. During the ESIC study visit, stakeholders reported a need to adopt long-term targets for SMEs and to offer training on access to finance from regional and also European sources that would raise SMEs' awareness of these opportunities.

The current programmes have the capacity to address service innovation, but they do not have a sufficiently clear focus, as yet. Three programmes are seen to have the most potential to introduce service innovation into their operations. These are the Collaborative Networks, the Competence Centres, and the Knowledge Transfer Partnerships.

The Department of Enterprise, Trade and Investment¹ and Invest Northern Ireland² Horizon 2020 initiatives and the MATRIX panels are instruments that can help to promote more open innovation and collaboration in Northern Ireland. However, service innovation is a new concept for policy-makers and funding agencies and it needs to be developed and adapted to the context of the regional economy, primarily considering new policy approaches and an expected value added.

Stakeholders believe that institutional efficiency should be improved, both at programme and strategic planning levels.

Should the Northern Ireland Executive decide to give a higher priority to service innovation, the policy environment would have to be developed through institutional reorganisation and new policy instruments.

¹ <http://www.detini.gov.uk/>

² <http://www.investni.com/>



Currently, the NI authorities have picked up some elements of service innovation, but the primary focus of policy is on open innovation and increasing collaboration on R&D.

Invest Northern Ireland is the key regional delivery body for innovation in the region. However, coordination of different policy initiatives included in the Innovation Strategy involves a number of different actors. This complexity in the governance system might be a barrier to supporting service innovation effectively.

Stakeholders considered that funding was focussed on product development and that the same level of support was not available for service innovation. Stakeholders also reported that they felt the region lacked a creative and visible ecosystem, and an awareness of design opportunities. Furthermore, there was a view that there is limited funding for design. Businesses are dependent on networks and are not following any targeted goals or future expectations in relation to their design activities. It was suggested that the absence of a specific design policy was contributing to a lack of identity and thus, a lower awareness of the region's potential.

While there is no central strategy for service innovation, stakeholders reported that initiatives emerging from businesses themselves were formulating mini eco-systems. The **health care ecosystem** is a good example of how the regional economy could be boosted through service innovation.



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1. The Challenge

Northern Ireland's economy remains sector dependent on traditional industries such as food, construction and engineering. However, in the last 10-15 years the regional economic landscape has made significant progress in exploiting strengths within emerging sectors including software, business services and financial services. As such, the profile of the Northern Ireland (NI) economy is increasingly based on a balance of traditional industries complemented by emerging industries.

As a consequence of this constantly changing regional economic landscape, there is a growing and recognised need to further increase the innovative capacity and capability of NI businesses and especially of SMEs, which account for nearly 80% of employment and 75% of regional turnover. In addition, the transition of Higher Education (HE) innovations to economic growth is a concern for NI policy makers as there are often barriers to commercialising NI HE innovations due to a strong emphasis on technology push policies and weaknesses in routes to market.

NI needs to continue to develop strategic partnerships and recognise that traditional concepts such as differentiating between manufacturing and services have been superseded by 'joined up approach' strategies. Such strategies use the positives and benefits of spill-over effects from emerging industries and employ technical and non-technical innovation hand in hand and not in isolation.

NI's challenge is to shift its evolving industrial landscape into a policy environment at a macro level that will position effective NI economic policies through consistent approaches. This would ensure inclusiveness and partnership for all stakeholders and would enable a cultural shift in perceptions, attitudes and actions of NI businesses and their stakeholders in terms of approaches to the wider innovation context and its potential benefits.

Taking into account these challenges and the level of regional awareness, the region wishes to focus its participation in the European Service Innovation Centre (ESIC) on its traditional manufacturing industries. The objective is to demonstrate the impact that service innovations can have in helping traditional sectors to maintain or gain a strong position in global value chains, such as by adding value through design or creativity or cross-sectoral co-operation. This will establish how service innovation can support the modernisation of NI's traditional sectors and facilitate the structural change from a manufacturing based to a modern economy.

Whilst isolated examples of the transformative power of service innovation can be found at an enterprise level, Invest NI is committed to developing a strategy and policy that looks at this concept from an holistic regional perspective. The specific concept that NI as a region wants to implement is one that supports its traditional sectors in a transition that will enhance the competitiveness of these sectors whilst transforming their environments. This will be addressed by developing NI's Smart Specialisation strategies at market level, through promoting spill-over effects using service innovation as a catalyst for regional structural change. This process should facilitate a paradigm shift of NI's traditional sectors to industrial modernisation.

NI as a region has concentrated the majority of its innovation resources and research policies on technological R&D. Invest NI recognises that the continuation of this approach could result in missed opportunities in meeting user-centred needs and demands. Developing a policy embracing the benefits of service innovation will help close the gap between technical innovation and market requirements within NI. This strategy will promote awareness and uptake of service innovation on the demand side, which will drive NI businesses and sectors towards more cross-sectoral collaboration and innovation.

Invest NI, in conjunction with the NI Executive, is ready to remove existing barriers to the broader take-up of service innovation and, where appropriate, reallocate funds in support of service innovation. The commitment from relevant stakeholders in academia and industry has been demonstrated and it is recognised that such commitment will be crucial in translating this strategy into reality and achieving substantial impact.

Participating as a demonstrator region in ESIC will facilitate Invest NI in shifting from analysing service innovation at firm level to a more macro-economic approach that analyses, for instance, how favourable the business environment and framework conditions are to support the strengthening and transformation of industrial structures through service innovation. This participation will also act as an enabler for the development of a systematic approach towards service innovation that will result in a large-scale impact. Such an approach will strengthen the design and practical implementation of NI's economic innovation policies and smart specialisation/cluster strategies.

At the end of this learning process, a clear policy strategy for providing coherent support for making better use of the transformative power of service innovation will result. This work will form a critical part of NI's RIS3 work in 2013.

2. Regional Performance and Potential

2.1. Socio-economic context for service innovation

Northern Ireland faces considerable challenges. Since 2009, the global recession has caused a significant deterioration in the regional labour market and increasing unemployment rates. However, the number of unemployment benefit claimants had decreased again by the end of June 2013. This increase in the overall level of economic activity during the second quarter of 2013 is a sign of the stabilisation in the local economy.

Sectoral Structure of the region

Northern Ireland's economy remains dependent on traditional industries. The most significant sectors in terms of employment and number of business establishments are wholesale and retail, real estate, construction, and hotels and restaurants. The most dynamic sectors during the period 2003-2009, measured by employment growth and increased number of business establishments, were traditional manufacturing sectors including: fabricated metal products; furniture; medical, precision and optical instruments; and electrical and optical equipment. A number of industries experienced growth in the number of employees between 1995 and 2009. In fact, real estate and overall business activities showed a significant rise in the number of employees during the 1990s and into the early 2000s, while other sectors such as health and social work and wholesale and retail showed steady growth into the 2000s.

Over the last decade, the Northern Irish manufacturing sector has undergone significant changes, as a result of technological changes and the pressures from competing businesses around the world. Manufacturing has seen one of the largest falls in employment in NI, with the sector employing 18.7% of the workforce in 1995 but only 10.65% in March 2013. However, in terms of industry sector GVA (2008), the manufacturing industry is the largest contributor to the total Northern Ireland GVA with 25% and its productivity per employee of £44,500 is significantly above the regional industry average £31,200 (DELNI, 2012). An analysis of employee jobs in traditional manufacturing industries (see Figure 1) indicates that food products account for about 23% of employee jobs in 2013, with an increased importance to the regional economy if compared to employment structures in the period 2000-2007. The manufacturing of equipment including electrical and optical, machinery and equipment and other transport, has remained vital since 2000, accounting for about 21% of the total from 2000-2007, and 23% in 2013. Computer electronic and optical products, and basic pharmaceutical products and pharmaceutical preparations are sectors that have recently become more important in the regional employment structure.

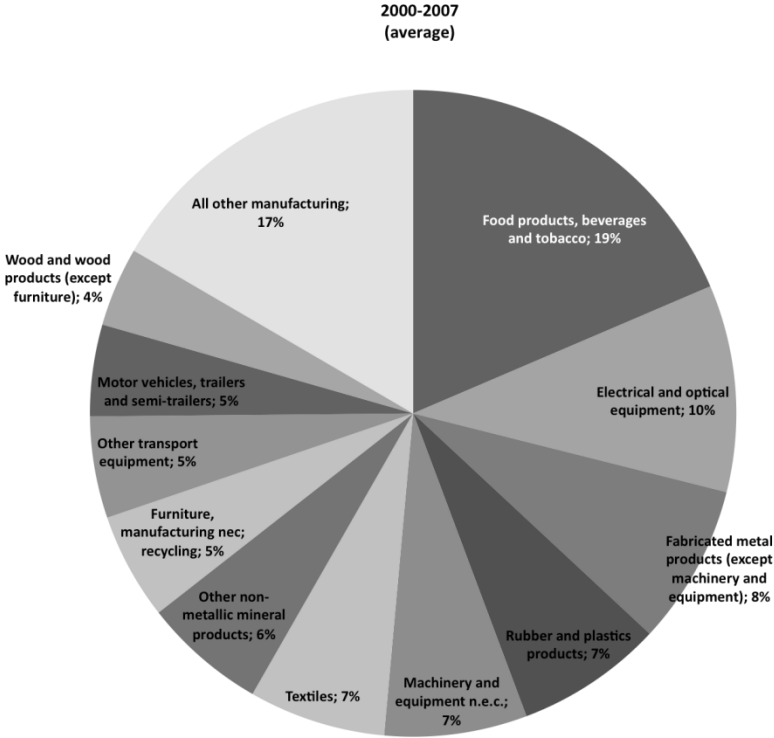
Other sectors, namely: mining and quarrying; the manufacture of non-metallic mineral products; and food products, beverages and tobacco, present a relative regional competitive advantage in comparison to UK averages.

In the last 10 years the economy of NI increasingly exploited regional strengths within emerging sectors, such as software, business services and financial services. Consequently, the regional economy is based now on a balance of traditional industries and emerging industries. Invest Northern Ireland estimates that the emerging industries of software, business services and financial services, together with the traditional food, construction and engineering sectors, account for almost 60% of employment within export-oriented businesses operating in NI.

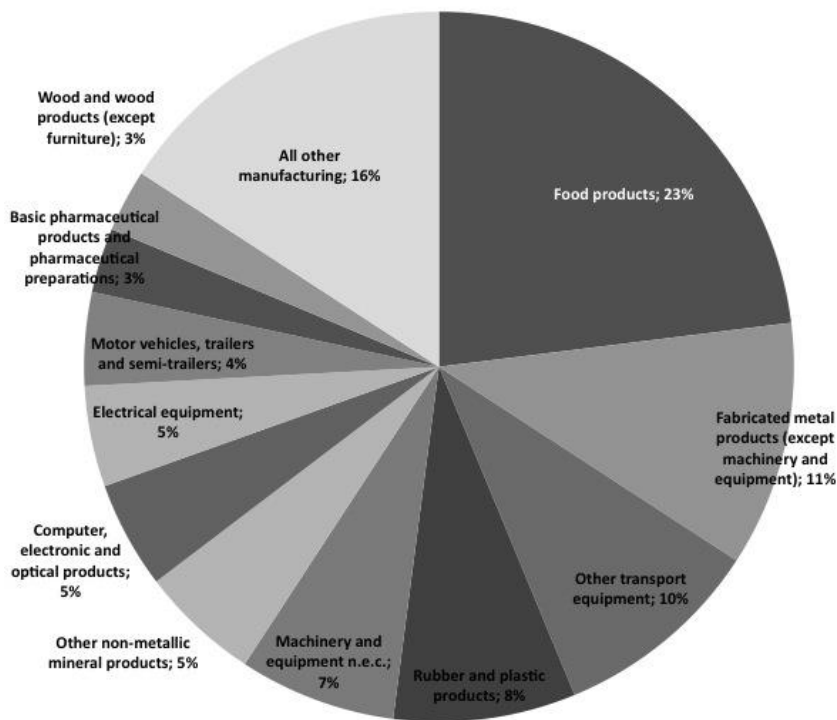
The most export-oriented sectors in the region are: food; beverages and tobacco; machinery and equipment and other transport equipment; and computer, electronic and optical equipment. These four sectors were also the most important in relation to the financial value of exports sales in the period 2011-2012. Due to the economic problems affecting Northern Ireland's key trading partners in Europe, the local export sector has encountered difficult trading conditions. In fact, the latest HMRC Regional Trade Statistics show that Northern Ireland goods' exports decreased by 5.5% in 2012-2013 against the previous year. However, exports of services such as business consultancy, computer services and architecture are growing in importance. The latest services export survey undertaken by the Northern Ireland Statistics and Research Agency (NISRA) reveals that services exports further increased by 11.9% in 2011, accounting for £496m.

The services industry was the main source of employment in NI in the period 2009-2012, although there has been a fall in the overall number of people employed in the sector. Sectoral diversity within the NI service sector is striking: a 2005 report on Innovation in Northern Ireland Tradable Services found that NI's service sector is massively diverse with levels of innovation above those in manufacturing in sectors such as computer financial services, and relatively uncommon in other sectors such as motor trades and retailing (InnovationLab, 2007). The computer services and the R&D sector, as well as other business services, were found to be more innovative in NI than the UK, while transport and communication, and real estate and renting were broadly in line with their UK counterparts.

Figure 1 Employee jobs in Northern Ireland's traditional manufacturing industries



2013



Source: OECD iLibrary, Regional Labour Market Statistics; and Department of Finance and Personnel (DFP) Northern Ireland

Regional priority sectors and clusters

Policy-makers have prioritised a number of sectors in recent years. In February 2012, the Minister for Employment and Learning identified food and drink processing, advanced manufacturing and advanced engineering as priority sectors because of their importance to the rebalancing of the regional economy.

The agri-food industry is worth £4.4b to the regional economy and employs around 100,000 people in Northern Ireland. The manufacture of food products employed about 16,540 people in 2013, while the export sales value of the manufacture of food, beverages and tobacco was equal to £1b in 2011-2012. Nine sub-sectors in the food and drinks processing sector experienced an increase in their gross turnover between 2011 and 2012. The largest increases are estimated to have occurred in the beef and sheep meat (+£103.9m) and pig meat (+£46.2m) sub-sectors, while the milk and milk products sub-sector declined (-£28m) over the same period (DARDNI, 2013). In May 2012, the Department for Regional Development and the Department for Enterprise, Trade and Investment appointed the Agri-Food Strategy Board (AFSB) to develop a long-term strategic plan for the sector. The plan was launched, in May 2013, with the objective of accelerating the growth of farming, fishing and food and drink processing in NI up to 2020 and beyond. The ambitious targets include growing sales to £7b, increasing employment by 15% to 115,000 people and a 75% growth in export sales to £4.5b.

Since 2007, advanced engineering, particularly in relation to the transport sector, has been identified as being key to the region. Northern Ireland has a strong tradition of manufacturing in the transport sector, within ship, aircraft, bus and car production. Advanced engineering in this context encompasses high value-added areas, including innovation and design that enable a move up the value chain in a commercially effective manner. The Sector Skills Council for the Advanced Manufacturing and Engineering Sectors

(SEMTA) estimates that there are 36,800 engineering employees and 2,800 employers in Northern Ireland. The sector accounts for 8.6% of total GVA within the region, and has a significantly above average GVA per employee, equal to £40k (DELNI, 2012). Looking at the occupational structure of the sector, the largest employment is in the metal products and mechanical equipment sub-sectors, and it is dominated by higher skilled occupations, with 40% of the jobs deemed as higher skilled jobs. The main occupations are in technical areas, including metalworking and maintenance fitters (11% of total), electricians (5%), process operatives (4%) and welding trades (4%).

In 2008, MATRIX, Northern Ireland's Science Industry Panel, also identified information and communications technology (ICTs), life and health sciences, telecoms and sustainable energy as priority sectors, in addition to agri-food, advanced manufacturing and advanced materials. Since then, regional policy-makers have monitored these sectors with an emphasis on making them horizontal articulators of the economy, cross-cutting more traditional manufacturing sectors.

The creative industries sector has emerged as one of the fastest growing and is increasingly important to the regional economy. The Department of Culture, Arts and Leisure (DCAL) estimates that there are 2,500 enterprises in the creative sector, employing around 36,000 people and accounting for 4.6% of the regional workforce. Sector growth is quite considerable with rates of between 5% annual growth for non-digital sector and 30% annual growth for the digital sector. In 2008, DCAL launched the Strategic Action Plan for the Creative Industries in Northern Ireland. The Action Plan guided the priorities for action of the Creative Industries Innovation Fund (CIIF) for the period 2008-2011. The CIIF 2 was launched in July 2011 and will provide support during 2011-15 for the innovative development of commercially viable content, products, services and experiences capable of competing in global markets. The sector is also one of the most dynamic in attracting foreign investment.

Identified by the European Cluster Observatory as one of Northern Ireland's 2-star clusters in 2010, the aerospace sector is strategically important for the region in terms of its commitment to advanced manufacturing, innovation, exports and skills. In 2010, NI's aerospace, defence and security sectors employed around 7,500 people, contributing to total sales of £960m. Over 90% of revenues come from exports, with 77% of these being exported outside the UK. Exports from aerospace, defence and security represent 12.8% of all NI manufacturing exports. However, the region contributes only 7.1% of the total UK aerospace output (ADS, 2011). At the core of the cluster are two of the industry's leaders, Bombardier and Thales. These companies are supported by a comprehensive infrastructure of local suppliers, particularly in precision engineering, and research centres of aerospace excellence at Queen's University Belfast and the University of Ulster.

Northern Ireland's innovation system

Table 1 provides an overview of Northern Ireland in terms of five functions of innovation systems, as defined in the ESIC Concept Note.

Table 1- Overview of regional structural indicators (based on the European Service Innovation Scoreboard and further regional statistics)

Function of innovation system	Structural indicators	Regional Value	EU 27 average	Dynamics/Change 2005-2011
Entrepreneurial activities	Share of self-employed people (2011)	15.1	15.1	-6% decreasing
	Share of people who think it is important to try new and different things (2010)	0.48	0.42	
	Share of people who think it is important to being creative (2010)	0.52	0.54	
	Labour productivity growth (2000-2010)	0.90	2.20	
Knowledge development and transfer	Share of employees with a higher education degree (in %age) (2011)	32.5	30.4	+13% increasing
	EPO patent applications (per million of population) (2008)	72	115	
	EPO high-tech applications (%age patent applications) (2008)	21	18	
Innovation and business model generation	Employment share in medium-high-tech and high-tech manufacturing (2010)	4.35	6.39	+3% increasing
	Employment share in knowledge intensive services (2010)	35.58	35.32	+2% increasing
	Employment share in service innovation intensive industries (2010)	4.3	4.85	+35% increasing
Financing innovation and growth	Total expenditure on R&D (GERD) (change in the %age of GDP) (2010)	1.45	1.68	+54% increasing
	Business expenditure on R&D (BERD) (%age of GERD) (2010)	63	61.3	+28% increasing
	Availability of seed and venture capital	n.a.	-	
Collaboration and networking	Specialisation in service-oriented clusters (2010)	0.97	-	

Table 1 indicates that **entrepreneurial activities** in Northern Ireland are approaching the European average. The levels of self-employment in the region are similar to the EU27 average, but have been decreasing in the last years. Though NI is not as productive if compared to the UK and other demonstrator regions, it has slightly higher productivity levels when compared to most similar regions. The productivity

gap between NI and the UK average reflects both lower individual sectoral productivity compared to the UK average and also an over-representation in NI of low productivity sectors.

Knowledge development and transfer in Northern Ireland scores slightly below the European average. The exception is that NI scores low in patent applications at the European Patent Office (EPO). GERD as a percentage of GDP has been increasing steadily in the last years. In terms of knowledge diffusion, survey respondents mention that broadband in rural communities is still poor and that more needs to be done to encourage 'aspirational' marketing and exports. The cultural attitudes to risk-taking were also mentioned, during interviews, as a barrier to knowledge development and transfer.

Innovation and business model generation in NI also scores slightly below the European average, notably in relation to the employment share in medium- high-tech and high-tech manufacturing, which is considerably below the European average. However, most of the indicators in this field have been increasing in the last years, towards reaching convergence with EU averages. Survey respondents characterised innovation and business model generation to be 'Fair' in the region. The lack of ambition and innovation culture is mentioned as a barrier, particularly because it is perceived that there is inadequate knowledge of what service innovation should look like in the region and thus, some companies could be prepared to set low standards.

No structural indicators are available for **financing innovation and growth**. Interviewed stakeholders considered the lack of new financial engineering means, the lack of seed and venture capital, and the limited indirect funds for R&D and business innovation to be major concerns for financing innovation and growth in Northern Ireland.

Collaboration and networking in Northern Ireland are judged as poor according to SAT respondents. Indeed, survey evidence, shows that only 45% of firms who innovate collaborate, and there are only a few cluster organisations. Chapter 3 indicates how this structural weakness is being tackled with several policy measures supporting networks and collaborations across sectors.

2.2. Regional benchmarking

Benchmark data from the European Service Innovation Scoreboard (ESIS), place the characterisations described in section 2.1 in a wider perspective. This section gives a broader picture of the relative performance of Northern Ireland's innovation system in comparison to the other demonstrator regions, similar European regions³, and the EU27 average. This overview of the regional specificities of Northern Ireland is useful when assessing which service innovation policy interventions are, or might be, appropriate. Figure 2 presents indexes (EU27=100) for several key indicators.

The benchmarking data reveals that Northern Ireland's GDP per capita is not only below the UK average but also that of other demonstrator regions and other similar regions. NI's employment rate is not converging with the UK rate, particularly its high levels of inactivity, and Gross Value Added per capita has remained about 20% lower than the UK average. Together, these benchmarks indicate that Northern Ireland faces persistent structural economic weaknesses, with low levels of GDP per capita, high levels of unemployment and self-employment, and low productivity. However, between 2000 and 2010 the region experienced a strong increase in the employment share in knowledge-intensive services at more than double the rate of that for the EU27. Employment in service innovation intensive industries has also grown but at a lower rate compared to the demonstrator regions and the EU27.

With GERD as a percentage of GDP at 1.45% in 2010, Northern Ireland has an above-average share of R&D expenditures compared to the benchmark regions but is below the EU27 average. Almost two-thirds of total R&D is spent by the business sector, a share comparable to that in the other regions. Regarding the number of patent applications to the EPO per million of inhabitants, NI has comparable levels to its most similar regions but well below that of the EU27 and demonstrator regions. However, the share of applications in high-tech patents at 20.6% is above average. Also, the share of employment in medium-high and hi-tech manufacturing (4.0%) is small compared to that of the EU27 (5.6%). These indicators reveal a low innovation and absorptive regional capacity, which is overly reliant on a small number of hi-tech firms and on public sector funding for business R&D.

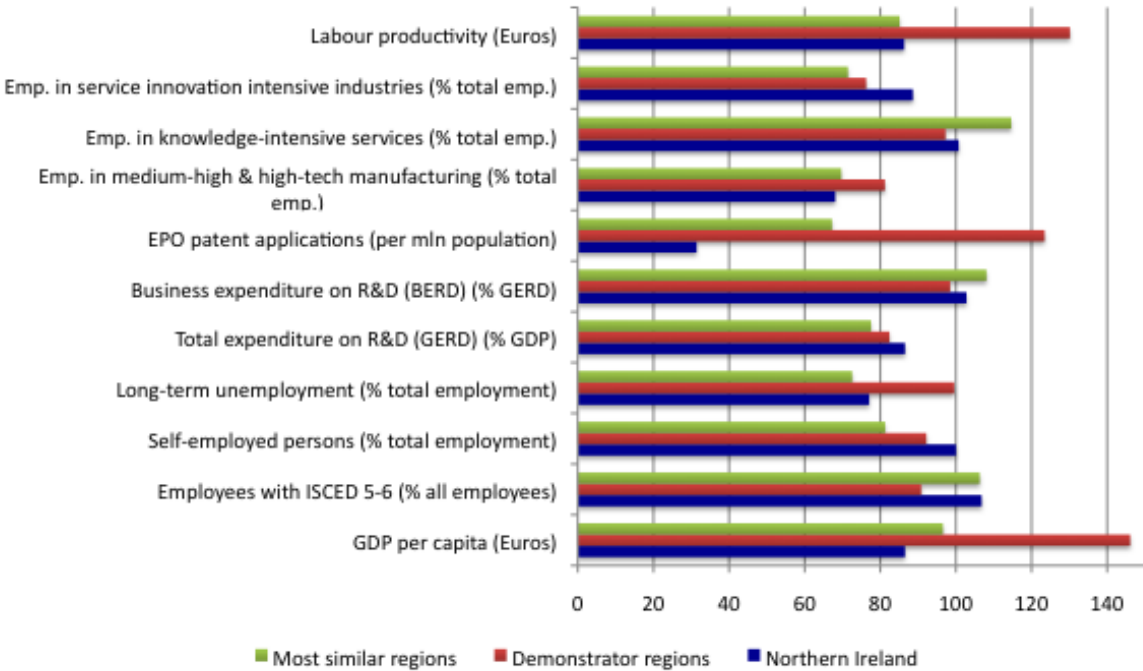
Northern Ireland has similar levels of employment in knowledge intensive services (35.6%) as the EU27 (35.3%) and the demonstrator regions (34.4%) but has a lower level of employment in this field compared

³ See Appendix C for clarification of how similar regions are identified.

to the most similar regions (40.5%). The specialisation in service-oriented clusters is above that of the demonstrator and most similar regions. Additionally, employment in service innovation-intensive industries is above the average of the demonstrator and similar regions, but below that of the EU27.

Regarding the availability of skills in the regional workforce, the share of employees with completed tertiary education has been growing continuously in the last 10 years, with only a slight decrease in 2011. These levels are above that of the demonstrator regions and the EU27. The region also outperforms the UK and the EU in secondary education. Moreover, most of the skills system available in the region is founded on industry needs. In contrast, the regional skill profile is still weak if compared to world leading economies, and there is still a high proportion of the workforce with no qualifications, which is reflected in the low levels of entrepreneurship in the region.

Figure 2 Index-based benchmark of Northern Ireland, EU27=100



Source: European Service Innovation Scoreboard

Regional strengths and weaknesses

In addition to the indicators analysed in the ESIS, a recent analysis of Porter’s diamond strengths and weaknesses in Northern Ireland (Lilley, 2012) reveals that the most important strengths in terms of firm structure and rivalry are in the relatively more export-oriented culture in regional companies and a large registered increase in Business Expenditure on R&D (BERD), in 2010. In addition, the region has a competitive science and technology sector, and an excellent recent record on foreign direct investment (FDI) (Lilley, 2012).

In contrast, the region suffers from brain drain and workforce migration; as one-third of students choose to study elsewhere and less than half of these return to NI when they obtain their degrees. Northern Ireland is very reliant on a few large firms, a large amount of FDI in low value sectors and a relatively small private sector with an over reliance on the public sector. In addition, DETI’s draft framework for Smart Specialisation (DETI, 2013) highlights, as the major regional structural weaknesses:

- The low number of firms innovating with only 27% of businesses being innovation active;

- The SME dominated economy with 80% of NI private sector employment in SMEs compared with under 60% for the UK;
- Only 22% of turnover is in large firms compared with 51% in the UK;
- The public sector dominated economy with 63% of GDP and high reliance on government support for BERD); t
- The poor access to finance and venture capital, which is the most problematic factor for doing business in NI based on the NI Competitiveness index 2012-2013; and
- The legacy of industrial decline in ship building, linen and textiles, as more than 100,000 manufacturing jobs have been lost since the 1970s.

The shortage of people and skills remains one of Northern Ireland's major challenges and it has a weak skill profile compared to world leading economies.

2.3. Opportunities and demands for service innovation

Based on the existing regional demand, and the socio-economic characteristics of Northern Ireland, the following are three different possible approaches to service innovation in the region.

Service Innovation in traditional industries: application to the food and drink sector

Although Northern Ireland has been developing its emerging industries in the last years, Invest NI, in the original application to participate in ESIC, indicated that it wished to focus on traditional manufacturing industries. The rationale being to identify how service innovation can support the modernisation of NI's traditional sectors and facilitate structural change towards a more service-oriented manufacturing economy.

Based on the socio-economic profile of the region presented in section 2.1, one relevant sector that provides ample opportunities for service innovation in NI, and also has a potential to create larger impact is the food and drink sector. In addition, focusing on this sector would create promising synergies with the Strategic Plan for the Agri-Food sector, launched in May 2013.

The food and drinks manufacturing industry has strong links with other sectors, such as agriculture, life sciences, packaging, logistics and retail, which could also help to open up opportunities for service innovation in the region. Service innovation could be used across the value chain, in terms of innovative design, marketing, logistics, packaging and retail. Examples of this type of service innovation include smart labels, improved packaging materials, faster and better food testing methods, eco-friendly production and innovations in logistics and transport. More advanced applications could target 'high-tech nutrition', by applying knowledge from different disciplines such as biotechnology and material science to innovate in food and drinks manufacturing. In fact, many inputs to innovation can also come from biotechnology, nano-sciences and medicine. These could also include new forms of production and products, such as personalised nutrition, functional foods based on nutrigenomic, epigenetic and neurological research, as well as medicinal food, 'customisable food' and food replacement products.

However, service innovation in this sector is limited to risk assessment, regulations and consumer preferences. Moreover, service innovation in this sector depends on the availability of highly specialised and interdisciplinary scientific and technical personnel. A recent study of the industry at EU level showed that many European food and drinks manufacturing industries, especially larger food companies, are experiencing a shortage of high-skilled workers, especially food scientists, food technologists and food engineers (Leis et al., 2011). The shortage of such skills hamper innovation at all levels

'Demand/Knowledge Base' driven approach to service innovation: the health and social care sector

The health and social care sector is one of the most active and booming sectors in Northern Ireland, in addition to being a knowledge and R&D intensive sector. An analysis by InterTradeIreland⁴ showed that 'life and health technologies' was the second most important research specialisation in NI. This is based on the R&D and business services provided by regional research organisations, representing 33% of total; preceded by ICT with 35%, and followed by environmental technologies with 19%.

Service innovation in the health and social care sector can spill over into other public and private sectors, and influences policy in areas such as integrated care, cooperation between health and social care and intergenerational projects. These include social innovation and education, innovation in parenting support and child policies, innovation in the reconciliation between family and working life, innovation in the support to mental health and innovation in old age and disability policies and challenges. In old age and disability policies issues include new technologies, new forms of housing and community care.

In Northern Ireland, the sector is populated by a series of regional organisations and initiatives that could support the introduction of service innovations. The Public Health Agency is the most relevant of these from a general perspective. Other initiatives such as the recently created Connected Health Innovation Centre at the University of Ulster could also support service innovation in the application of remote healthcare services.

⁴ Mapping Study of Research and Technological Development Centres on the Island of Ireland, 2007

BOX 1 - SYSTEMIC INTEGRATION OF SERVICE INNOVATION INTO TRADITIONAL INDUSTRIES IN NI: THE B9 ENERGY GROUP

The evolution from manufacturing toward more service orientated companies illustrates the role of service innovation in radically changing business activity. While the widely accepted case studies of Rolls Royce and Hewlett Packard highlight the higher potential returns from supplying services such as performance management and monitoring, B9 Energy in Northern Ireland provides a further insight into how these are being developed within the renewable energy generation sector.

B9 has been operating successfully in the renewable energy arena for over 20 years. The B9 Energy Group is headquartered in carbon neutral offices in Northern Ireland and has a global reach. B9 Energy Group companies are operating in key markets that are delivering innovative solutions to address the key challenges posed by international commitments to reduce carbon emissions.

Knowledge and experience coupled with the acute awareness that it needs to transition fast to effect a low carbon economy allows it to envision creative, pragmatic and swiftly implemented solutions. B9 is drawing lessons from the lean production processes that have operated successfully in other sectors, by companies such as Bombardier and Honda. B9 Shipping is working in collaboration with Rolls Royce and Tata in the development of 100% renewably powered commercially and technically viable sailing hybrid cargo ships. They are commercially viable today and future proofed for a 30-year lifespan. Design plays a significant part in ensuring the long-term financial value of the ships. Working with Tata, the ships will be made of materials whose value is forecast to increase over 30 years and so make reclamation more viable.

Within its operations and management arm they are adopting higher levels of flexibility in managing capacity and demand. In a blurring of the distinction between production and service provision, B9 Operations and Maintenance are moving beyond the corrective maintenance when faults occur, towards offering 'guarantees' for security availability, yield and more effective revenue management. This brings new challenges in designing and implementing effective business processes. Back office business services such as contract management, accounting and legal services are being introduced to manage delivery and are becoming an increasingly important elements in the service offering.

The B9 Energy Group, being one of leading partners in the MATRIX Sustainable Energy Horizon Panel of Northern Ireland, aims to: avoid expensive grid reinforcement through deployment of energy storage and intelligent energy systems; enhance security of supply; promote better use of indigenous energy; reduce dependence on imported fossil fuel; and provide energy price certainty into the medium and long-terms. B9 also aims to make use of organic waste streams from farms, factories, retail outlets and other parts of the food supply chain to generate sustainable energy and thereby, greatly reduce the carbon footprint associated with the food sector and the wider economy.

The Public Health Agency (PHA) was established in 2009 as part of the reforms to the Health and Social Care (HSC) in Northern Ireland. The agency is the major organisation for health protection and the improvement of health and social wellbeing. HSC R&D supports research that provides high quality evidence to improve the care for patients, clients and the general population, and adds to the region's understanding of health, disease, treatment and care. It works closely with clinical and academic researchers based in HSC Trusts and in the University of Ulster and Queen's University Belfast and also with further and higher education colleges, policy-makers and practitioners⁵.

The Connected Health Innovation Centre (CHIC) is an emerging model for healthcare delivery that uses technology to provide healthcare remotely. It has the potential to improve patient care and accelerate diagnosis and also to enable patients with long-term or chronic health conditions to be remotely monitored and advised by medical staff without having to visit a surgery or hospital. Launched in early September 2013, the CHIC will bring together leading academic and industry researchers to carry out research focused on connected health solutions. It is expected that this will result in joint innovations from businesses, universities and health providers to offer new products and services that will improve healthcare provision. The Centre receives an R&D grant from Invest Northern Ireland of £5m and a consortium of leading technology companies offers a further £1.8m of funding.

⁵ See <http://www.publichealth.hscni.net/directorate-public-health/hsc-research-and-development/useful-links>

Cross-regional initiatives are also taking place in the field of social care and customer-oriented services. In June 2013, the Minister of the Department of Health, Social Services and Public Safety in Northern Ireland (DHSSPS) agreed a Memorandum of Understanding (MoU) on Connected Health with the Finnish City of Oulu. The MoU prioritises promoting customer-oriented services with supporting technologies, and transforming health and social care models and working methods (NIE, 2013).

Another initiative in the field of social care is the Telemonitoring NI service. As a showcase project, provided by TF3⁶ in conjunction with the five Health and Social Care Trusts, it is funded by the Department of Health, Social Services and Public Safety (DHSSPS) and the Centre for Connected Health and Social Care (CCHSC). The telemonitoring NI service is a part of the PHA and set to benefit up to 20,000 people over six years by enabling better control over their own health and improving the care outcomes.

Combining both approaches: service innovation supporting 'healthy nutrition'

A third approach could be to combine both of the above approaches by focusing on service innovation in the food and drink sector, together with potential user-driven innovation from the health sector. This would exploit both, the opportunities led by the largest traditional manufacturing sector in the region, and the experience of one of the most active sectors in terms of knowledge creation.

The market for healthy food and drink products is estimated to be worth £20bn in the UK, and more than £300bn globally. Service innovation could support firms across the food and drink supply chain, for example, by:

- Maximising their opportunities in naturally healthy food and drink products;
- Developing new-to-market functional foods;
- Seeking to reformulate existing products for health including the reduction of fat, sugar and salt;
- Creating products targeting specific food intolerances such as gluten and lactose; and
- Finding ways to process foods with healthier ingredients or improving testing and process automation.

This would entail focusing on the most relevant sub-sectors of the food and drink industry, and across all facets of healthy product development.

More specific applications could also include the application of bioscience at different levels of the supply chain, the transformation of food waste into higher value products by adding value to food processing streams, the development of high-value natural products, high-pressure food processing (HPP) and the design of innovative multi-component mixtures.

Similar initiatives exist for instance in Scotland, with its Food and Health Innovation Service (FHIS). The FHIS provides a range of support mechanisms to firms trying to maximise the market opportunity in food and health. These include identifying market opportunities, resolving technical issues, scoping out new project ideas including finding new solutions and the best partners with which to work and identifying appropriate sources of funding to help support the proposed projects.

2.4. Assessment of regional performance

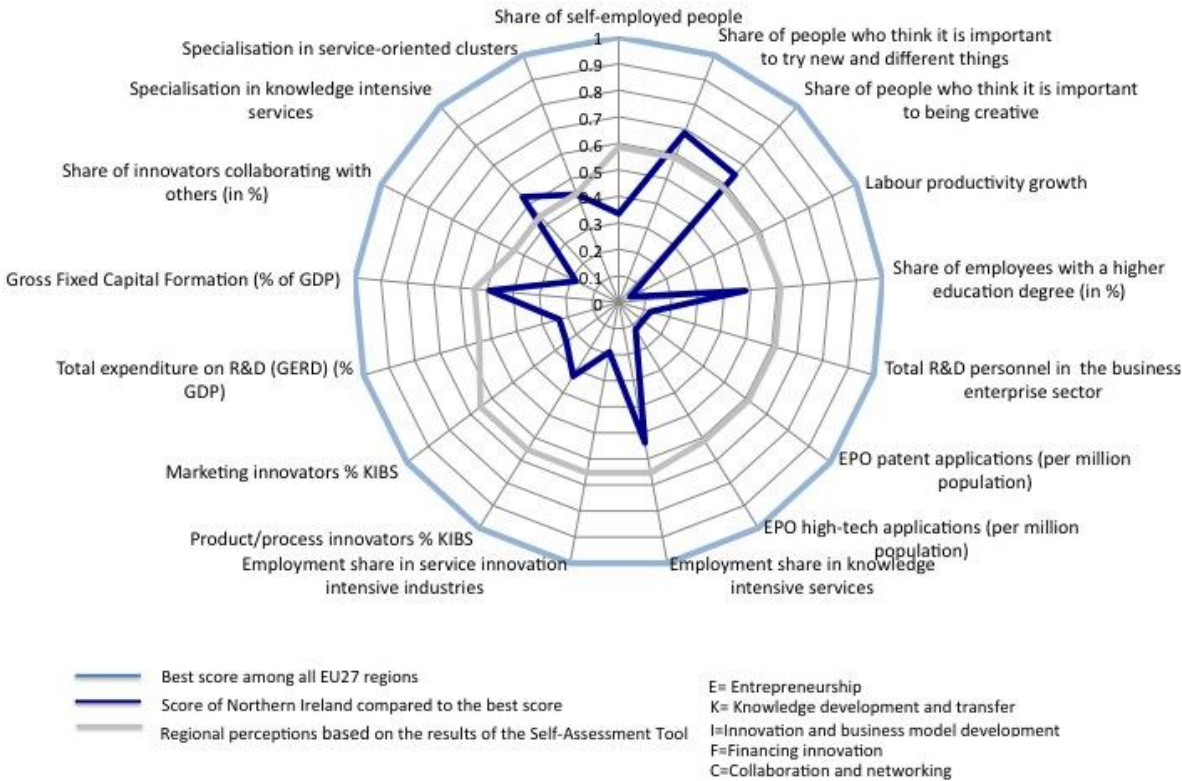
Figure 4 shows the summarised results of the structural indicators on a spider diagram, where values of the data from Northern Ireland are contrasted against the best score of all EU regions in the same year. Although the best scores represent regions with different background and framework conditions, this diagram depicts the region's distance from an 'ideal' situation. In addition, the results of the ESIC Self-Assessment Tool (SAT), a small-scale survey of key stakeholders Northern Ireland, have been also added to the graph, where the grey line represents the regional perception in terms of the five innovation system functions. Respondents were asked to assess, according to specific questions and on a scale from 1 to 5, if

⁶ The consortium comprises Tunstall Healthcare, Fold Housing Association and S3 group; TF3 provides a nationwide remote telemonitoring service to the NI HSC System.

the regional innovation system and its elements were conducive to a transformative shift in the regional economy towards higher value added products and services.

As already outlined in Section 2.1, Northern Ireland performs close to, but slightly below, the EU average on the five systemic functions. This is also reflected in the distance from the best scores. It is, however, performing worse in some of the indicators related to financing innovation and indicators related to collaboration and networking. The service innovation-related structural indicators also reflect that while there are companies with service innovation, this is not yet being exploited by existing manufacturing industries and therefore they are not optimising the transformative power of services.

Figure 3: Distance of Northern Ireland from the best performing regions in terms of service-innovation related structural indicators



The SAT results are much more positive with regards to all functions than that shown by the structural indicators. The only dimension that seems to be aligned with the quantitative data is the one 'Collaboration and networking' function, where respondents seem to be more pessimistic than the view provided by the indicators.

3. Regional Policy and Policy Mix

3.1. Innovation policy and institutional background

Service Innovation policy governance

Figure 4 presents an organisational chart of the key regional innovation actors, as illustrated in the Framework for Smart Specialisation 2013-2020 draft paper.

The Department of Trade and Investment (DETI) guides innovation policy in Northern Ireland⁷. DETI's stated goal is "*to grow a dynamic and innovative economy*". DETI is responsible for formulating and delivering economic development policy, including enterprise, social economy, innovation, energy, telecoms and tourism. In addition, the Department has the responsibility for ensuring a modern regulatory framework to support businesses and protect consumers. DETI led the development of a Regional Innovation Strategy in 2003, the review of this strategy in 2006 and is currently developing the draft Innovation Strategy 2013-2025, the Smart Specialisation Framework for Northern Ireland and 2013 Action Plan for Horizon 2020.

INVEST NI is responsible for the delivery of DETI's policies and strategies in relation to business support in Northern Ireland. These include encouraging investment, both foreign and indigenous; stimulating entrepreneurial activity; increasing exports and trade; promoting R&D/innovation; and providing development support. The agency principally supports businesses in the manufacturing and tradeable service sectors. ITI, working with Invest NI and its counterparts in the Republic of Ireland, also plays an important role as a facilitator of all-island competitiveness.

There are other intermediary organisations that actively support business development and innovation in Northern Ireland, including the Northern Ireland Science Park Foundation Limited (NISPF), established by DETI and two universities, and the Irish Venture Capital Association. At local authority level, Enterprise Northern Ireland (ENI)⁸ is the organisation representing the network of Local Enterprise Agencies (LEA) in Northern Ireland. The Digital Northern Ireland 2020 (DNI2020) Advisory Board⁹ was set up in 2010. It is supported by Invest NI and will co-exist with DETI, Matrix, WHISPLE and the Digital Network, as part of INI's Collaborative Network Programme.

From another side of the 'innovation spectrum', the main organisation that has the potential to influence the concept of service innovation is the Department of Employment and Learning (DEL). DEL aims to "*promote learning and skills, to prepare people for work and to support the economy*"¹⁰. In 2012, the 'Higher Education Strategy: Graduating to Success'¹¹ was launched and in 2011 the Skills Strategy 'Success through Skills – Transforming Futures'¹² was introduced. There is no separate higher education/research-funding agency, so DEL both designs and delivers policy interventions in these fields.

The sector-specific opportunities for Northern Ireland presented in section 2.3 focus on the food and drink sector, the health and social care sector and 'healthy nutrition' suggest that the service innovation governing structure could be extended to some other key players in the innovation ecosystem. The Agri-Food Strategy Board (AFSB)¹³ was established in May 2012 by the Department of Agriculture and Rural Development (DARD) and DETI to deliver the Executive's Programme for government targets to develop a strategic plan for the Agri-Food sector. DARD, DETI and Invest NI have joined efforts to establish the AFSB. The Board has worked out a strategic action plan 'Going for Growth – Investing in Success'¹⁴ in support of

⁷ <http://www.detini.gov.uk/>

⁸ <http://www.enterpriseni.com>

⁹ <http://www.dni2020.com>

¹⁰ <http://www.delni.gov.uk/index/about-the-dept.htm>

¹¹ http://planipolis.iiep.unesco.org/upload/UK/UK_Northern%20Ireland_Higher_Education_Strategy.pdf

¹² <http://www.delni.gov.uk/index/successthroughskills.htm>

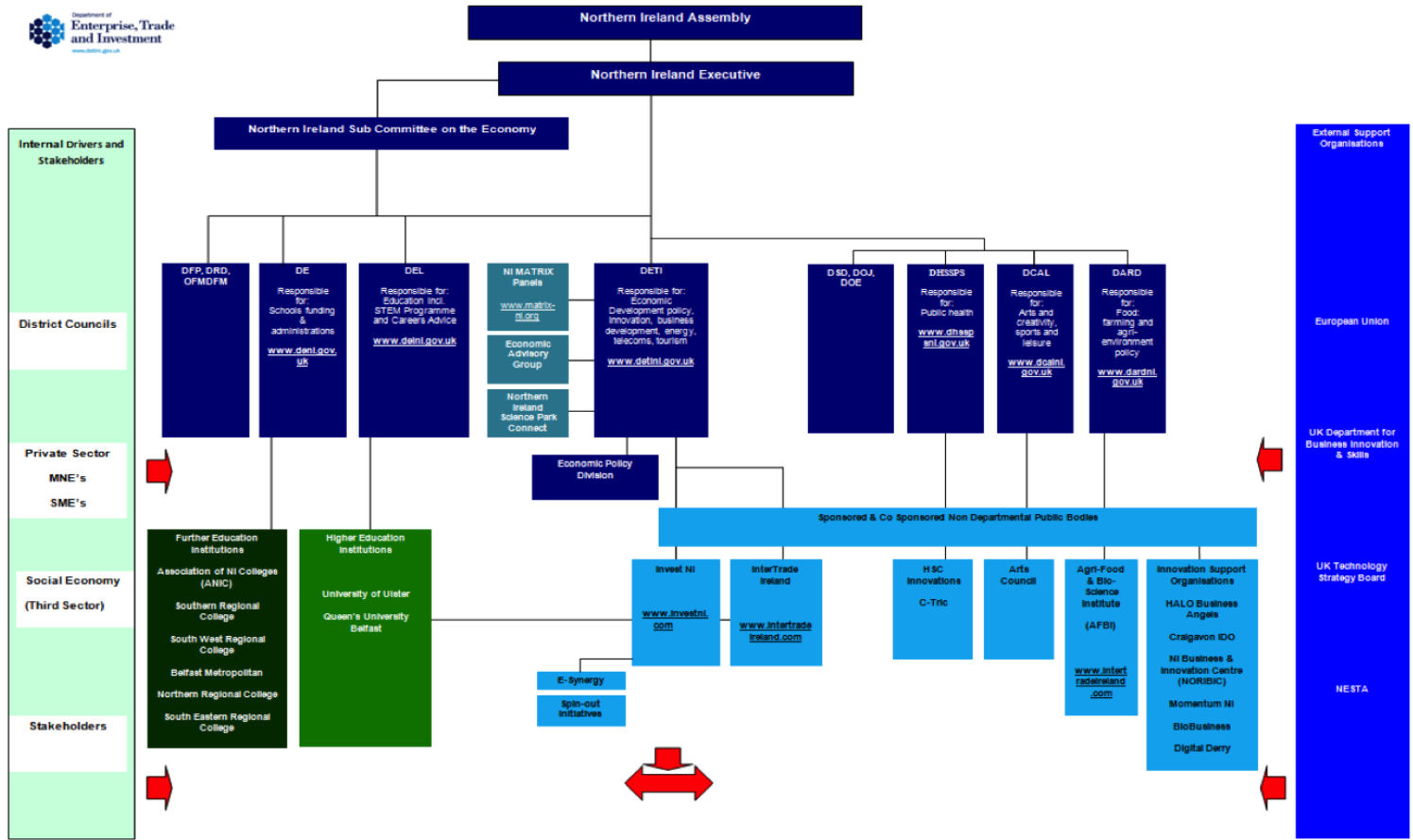
¹³ <http://www.agrifoodstrategyboard.org.uk>

¹⁴ <http://www.agrifoodstrategyboard.org.uk/uploads/Going%20for%20Growth%20-%20Web%20Version.PDF>

the Northern Ireland Agri-Food industry. The Agri-Food and Biosciences Institute (AFBI)¹⁵ is a DARD **non-departmental public body (NDPB)** and a leading provider of scientific research and services to government, non-governmental and commercial organisations.

¹⁵ <http://www.afbini.gov.uk>

Figure 4 Northern Ireland – research and innovation policy governance



Source: DETI 2013.

In the health and social care sector, there are a range of regional organisations and initiatives that could support service innovation. The Research and Development Office for the Department of Health, Social Services and Public Safety (DHSSPS) is responsible for the Strategic Action Plan 2007-2012¹⁶. The Public Health Agency (PHA)¹⁷ was established in 2009, as part of the reforms to Health and Social Care (HSC) in Northern Ireland. It collaborates closely with two universities, further education colleges and HSC Trusts. The National Institute for Health Research (NIHR)¹⁸ is a key driver of R&D research and funding for health, where the potential for service innovation is present. The Clinical Translational Research and Innovation Centre (C-tric)¹⁹ has constant interactions with industry and has joined academia, the business sector and clinical trials in the translational medicine sector.

The role of the Department of Culture, Arts and Leisure (DCAL) in introducing service innovation is horizontal by the nature of this body, which launched the 2008 Strategic Plan for Creative Industries²⁰. It has guided the priorities for action of the Creative Industries Innovation Funds I (2008-2011) and II (2011-2015), which have been led by the Arts Council of NI, the funding and development agency for the arts²¹. The Arts Council and Queen's University have currently joined efforts to identify arts organisations across NI for EU funding opportunities for arts, cultural heritage and cooperative projects.

There is close collaboration with the main UK agency, the Technology Strategy Board²², primarily in offering opportunities for Knowledge Transfer Partnerships (KTP) for industry and academia in Northern Ireland. Joint initiatives are also planned with NESTA²³, specifically in working out new types of vouchers for businesses to access services from the creative industries.

Innovation governance as a driver for service innovation

Does the governance system act as a driver for service innovation in Northern Ireland? In order to help co-ordinate the collective efforts of the various agencies and departments, the creation of an innovation council²⁴ has been proposed in the draft Innovation Strategy to provide leadership and drive focused cultural change. The council, chaired by the DETI Minister, would comprise senior members of government departments, industry experts, the third sector and academia. Key functions would include, in part, overseeing the implementation of the Innovation Strategy, increasing collaboration between organisations within Northern Ireland and internationally, while producing a road-map for a sustained initiative to grow a more innovative NI economy.

However, service innovation is a new concept for policy-makers and funding agencies that still needs to be developed and adapted to the context of the regional economy. Interviewees considered that service innovation was a challenge for the region and ought to be given higher prominence in the draft Innovation Strategy and the Horizon 2020 initiative.

Based on the study visit, DETI's and Invest NI Horizon 2020 initiative and the MATRIX panels can be regarded as potential means to promote service innovation related collaboration. The MATRIX panels tend to be driven by a technological R&D focus and have encouraged cooperation between academia and industry. This has helped to define priority sectors for the economy and develop targeted actions on a market-sector driven basis, with a view to developing Northern Irish business champions. Stakeholders interviewed consider MATRIX as a strong group at a high level policy but not in terms of operational delivery. The

¹⁶ http://www.dhsspsni.gov.uk/r_d2007.pdf

¹⁷ <http://www.publichealth.hscni.net>

¹⁸ <http://www.nihr.ac.uk/Pages/default.aspx>

¹⁹ <http://www.c-tric.com>

²⁰ www.dcalni.gov.uk/strategic_action_plan_for_creative_industries.doc

²¹ <http://www.artscouncil-ni.org/>

²² <https://www.innovateuk.org/northern-ireland>

²³ <http://www.nesta.org.uk/>

²⁴ http://www.detini.gov.uk/dt1_13_0160606_northern_ireland_innovation_council_-_evidence_pack_-_final.pdf

Horizon 2020 NICP will seek to introduce the service innovation concept through workshops and have already involved lots of SMEs in policy discussions, but as the concept is new and the content is not so clear, businesses have not been yet active in transforming and incorporating the key ideas into their daily businesses.

At sectoral level, the health care ecosystem is a good example of how service innovation could be enhanced in the region. The Northern Ireland Connected Health ECO System²⁵ is the forum that brings together stakeholders from the HSC, academia and businesses to discuss and develop connected health solutions in the region. The opportunities for similar initiatives are not fully exploited across all sectors. For instance, an ecosystem for the creative industries does not exist, which limits the visibility and awareness of design in industry. The absence of a design policy and related infrastructure with distinct policy targets limits the power of action of regional stakeholders in this area. Designers are too dependent on networks with different aims and targets and no common vision.

Stakeholders perceive institutional efficiency as something that could be improved, both at programme and strategic planning level. The governance system could be 'friendlier' for businesses if more efficient cross-departmental links were to be established at UK, NI and county levels.

Regional policies supporting the transformative power of service innovation

The draft Northern Ireland Innovation Strategy 2013-2025²⁶ is an ambitious plan for the region. The plan intends that by 2025 Northern Ireland should be recognised as an innovation hub and be one of the UK's leading high-growth, knowledge-based regions that embraces creativity and innovation at all levels of society. This strategy sets long-term objectives and actions to achieve significant changes in the economic structure, as well as an intense involvement of knowledge and skills in economic development. The strategy acknowledges that changes in approaches and behaviours are needed. Cultural change is a crosscutting aspect and needs to be fostered across all three innovation system functions - knowledge generation, exchange and exploitation. Medium-term indicators set out in the strategy include 27% of firms with innovation activity, 45% of all innovative firms engaged in innovation cooperation, 25% of the total turnover coming from innovative goods and services.

Service innovation is not distinguished or specifically mentioned in the strategy. Rather, the main focus is put on the MATRIX areas:

- Advanced engineering;
- Advanced materials;
- Agri-food;
- Life and health sciences;
- ICT and telecommunication; and
- Sustainable energy.

which are expected to make a major contribution to the development of a knowledge-based economy and to securing a leadership in specific technologies in the global market over the medium-term²⁷.

The Life and Health Science Horizon Panel has identified two overarching opportunities in the sector - Personalised Medicine and Home-Based Care. The ICT sector forms the 'backbone' of several industries in Northern Ireland, such as the financial services industry, and it is an important value-adding component of many consumer products and services across all sectors. In this sector, there are three key areas for Northern Ireland to develop: Packaged Application Software; Nearshoring; and High Performance Embedded Systems. There are four key opportunities emerging from the Advanced Engineering sector: Environmentally optimal products; Design for passenger safety and security; Use of lighter, stronger and more affordable materials; and the Efficient supply of more complex, customised and innovative solutions combining products and services. 'Going for Growth', the strategic action plan for the growth of agri-food up to 2020

²⁵ <http://www.nibec.ulster.ac.uk/news/article/168/northern-ireland-connected-health-eco-system-launched>

²⁶ May 2013

²⁷ First Report of MATRIX: the Northern Ireland Science Industry Panel. Volume 1, 10/2008.

and beyond has agreed targets that reflect the industry's ambitions for increased sales, especially outside Northern Ireland, as well as job creation. With the strategy, 15,000 new jobs could be created by 2020, with £1.3b (€1.547m) investments in growth projects from the agri-food industry over the first three years.

Creativity and design are seen important for a well-developed knowledge economy. On the initiative of DCAL and in cooperation with DETI and Invest Northern Ireland, the capacity of the region's Creative Learning Centres is to be increased. A Creative Northern Ireland Framework will also be developed in order to actively promote creative thinking. The Creative NI framework should catalyse and enhance collaboration, creativity, design and innovation within and across businesses, academia, third sectors and government. Design is presented as a key enabler and driver of innovation.

Innovation in services or its integration into manufacturing can be grown through regular collaboration between businesses and academia. New networks, such as the European Connected Health Alliance have the potential to exploit global market opportunities. The investments in establishing industry-led collaborative networks, particularly those focused on the MATRIX priorities, will be increased. The number of Knowledge Transfer Partnerships (KTPs) will also be increased through strengthening the engagement with the TSB's Knowledge Transfer Networks (KTN). Also, new types of vouchers called 'Creative Credit Vouchers' will be launched in cooperation with NESTA.

Key research institutes will get priority funding to forge strategic partnerships like ECIT (Institute of Electronics, Communications and Information Technology), NIACE (Northern Ireland Advanced Composites and Engineering) and C-TRIC (Clinical Translational Research and Innovation Centre). Competence centres will be supported in strategically important technologies where a clear industry need or emerging market opportunity is identified (see more details in section 3.2).

Invest NI, has a portfolio of programmes aligned to the Innovation Strategy driving themes²⁸. Some 43% of Invest NI financial support is used to stimulate innovation and creativity and this includes R&D, Competence Centres, Technology Transfer and Design Services²⁹. Another 9% of the budget is used to improve employability and the relevance and use of skills such as Management and Leadership, Assured Skills. A significant share of Invest NI activities is co-funded by the ERDF.

Service innovation as a catalyst to regional development and economic transformation has not been tackled in strategy documents or through targeted actions. Some earlier policy responses and analyses have raised opportunities for Northern Ireland from the service innovation perspective. One initial attempt from 2005, 'The Future of Private Services in Northern Ireland' commissioned by DETI/Invest NI³⁰, sought to identify/forecast where future expansion could occur, and where growth opportunities might exist in this sector. Given the findings that Northern Ireland remains under-represented in private services, a number of recommendations were made to the NIE on stimulating demand for services, developing indigenous suppliers of tradable services and high quality support services. Several of the recommendations were not acted upon.

In 2007, 'Innovation in Northern Ireland Tradable Services'³¹ was the first detailed examination of service sector innovation, drawing on the 2005 UK Innovation Survey. The report concerns innovation in the service sector rather than on service innovation, per se. However, it also referred to the current support for service innovation in NI, which was perceived as being underdeveloped and not systemic. It was also noted that there was a need for a more broadly based engagement of organisations within the NI innovation system in setting the service sector agenda.

²⁸ More information can be obtained from the Invest NI Corporate Plan 2011-2015.

²⁹ <http://www.investni.com/index/already/product/design.htm>

³⁰ http://www.detini.gov.uk/the_policy_response_document.pdf

³¹ Report prepared by Stephen Roper and Nola Hewitt-Dundas (InnovationLab (Ireland) Ltd) and Professor Jim Love (Aston Business School) for the DETI, 2007.

Public funding in support of service innovation

As the main players in the field of R&D and innovation, DETI and DEL accounted for 10% of the NIE's budget in 2010-2011³² (compared to 41% the Department for health, social services, public safety. The following table presents the annual indicative budget in support of innovation in Northern Ireland. According to the Draft Strategic Framework for Smart Specialisation 2013-2020, there are 71 single programmes that support innovation in the region, and of these 23 are supported through Invest Northern Ireland with 60.5% of total indicative innovation funding that covers competence centres and grants for R&D. The table includes regional and national, and EU funding through ERDF and Interreg.

Table 2 - Annual innovation budget in Northern Ireland (indicative, financial year 2011/12)

Organisation/Division	Annual Innovation Budget (£m)	Annual Innovation Budget (% of total)	No of Programmes
Invest NI	62.9	60.5	22
TSB	0.8	0.8	1
HM Revenue & Customs	19.2	18.5	1
DEL, UU, QUB - higher education	6.9	6.6	10
DETI - ERDF	0.6	0.6	12
SEUPB - Interreg	6.0	5.8	9
NISP	1.4	1.4	4
InterTradeIreland	4.3	4.1	4
DCAL	1.2	1.2	1
Carbon Trust	0.0	0.0	2
DHSSPS - HSC	0.0	0.0	2
DETI - MATRIX	0.0	0.0	1
AFBI	0.3	0.3	1
DARD	0.5	0.4	1
TOTAL NI	104.0	100	71

Source: DETI, A Strategic Framework for Smart Specialisation 2013-2020, DRAFT

Table 3 below illustrates the allocation of funds by innovation policy type. The major part of funding is targeted on knowledge generation, which primarily includes funding for collaborative R&D.

³² http://www.northernireland.gov.uk/revised_budget_-_website_version.pdf

Table 3 - NI annual innovation budget by policy type (indicative, financial year 2011/12)

Policy type	Budget (£m; % of annual innovation budget)
Knowledge Generation	50.97m; 49%
Knowledge Exchange	9.78m; 9.4%
Knowledge Exploitation	23.72m; 22.8%
Cross-Policy	19.57m; 18.8%

Source: DETI, A Strategic Framework for Smart Specialisation 2013-2020, DRAFT

The measures that received the largest shares of funding from the total annual innovation budget are the R&D grants at around £20-25m (€23.8m-€29.75m), the R&D Tax Credits with £20 (€23.8m) and the Fund of Funds with £10m (€11.9m). The measures fostering cooperation, such as INNOVA, FUSION, KTPs and the Collaborative Networks have a smaller budget share of around £1-3m (€1.19-3.57m). The overall annual budget for competence centres is £4m (€4.76m) or £5m over five years for each competence centre³³.

A sectoral breakdown of INVEST NI assistance for R&D³⁴ is provided in Table 4. Comparing 2002/03 and 2011/12, the percentage of R&D assistance directed at business services has increased, particularly in recent years. However, business service companies are not particularly important recipients of R&D assistance from INVEST NI with 3% going to foreign-owned and 9% to domestic-owned companies. Computer software & services and business services have received about £80m (€95.2m) and £60m (€71.4m) of R&D support through INVEST NI in the same period, which is considerably less than other large sectors such as life sciences, transport, electrical & electronics.

Table 4 - Invest NI R&D assistance by sectors and by ownership of companies (2002/03 to 2011/12)

Rank	External	Local
1	Transport (32%)	TSO/Universities (28%)
2	Electrical & Electronics (25%)	Life sciences (21%)
3	Computer Software & Services (12%)	Computer Software & Services (10%)
4	Telecoms (9%)	Business Services (9%)
5	Life sciences (6%)	Construction Products (6%)
6	Materials/Quarrying (4%)	Engineering (5%)
7	Business Services (3%)	Materials/Quarrying (4%)
8	General Manufacturing (2%)	Food (3%)

Source: Where has Invest NI assistance for R&D been directed? An analysis of R&D support (2002/2003 to 2011/12)

³³ See also Appendix F.

³⁴ Where has Invest NI assistance for R&D been directed? An analysis of R&D support (2002/2003 to 2011/12)

Table 5 shows the proportion of business R&D expenditure in the manufacturing and service sectors. Large companies account for only a small share of R&D expenditure in services. SMEs perform much better but considering the size of the service sector in NI, the total expenditure remains low.

Table 5 - BERD in NI, 2012

	Large companies	SME's	Total %
Manufacturing R&D	80.6%	19.4%	73.4%
Service R&D	14.75%	85.15%	26.6%
All industries R&D	63%	37%	100%

Source: Northern Ireland R&D survey 2012

The capital share of 'in-house' business R&D, in real terms, has varied between 9-30% of total over the period 2006-2011. This share has increased by 106% while non-capital R&D expenditures have also increased by about 100%. The government budget financed approximately 14% of BERD in 2011³⁵.

Cross-border co-operation and promotion of service innovation

Three initiatives were identified to illustrate cooperation with other regions:

- The INNOVA Programme - North-South innovation ventures (ITI)³⁶;
- Creative Challenge Celtic Crescent North West (co-financed by the European Creative Industries Alliance)³⁷; and
- The Super-Connected Cities programme (Department of Culture, Media and Sport - DCMS, Belfast City Council)³⁸.

To date, InterTradeIreland has released more than €8m directly to companies North and South to commercialise existing partnerships through the INNOVA Programme. In particular, the programme is looking for collaborative projects in the following sectors: life and health sciences, polymers and plastics, agri-food, advanced engineering and advanced materials, telecoms, ICTs and the environmental sector. Partners can work in the same sector or come from different but complementary disciplines.

The Creative Challenge Celtic Crescent North West (4CNW) is a new business innovation support programme that demonstrates how public authorities can stimulate business innovation take-up, through service innovation that partners creative professionals with businesses in the wider economy. It has two key target groups, SMEs (demand) and creative companies (supply), which form part of a wider framework for integrated action involving enterprise and innovation support agencies, cross-sector partnerships, policy makers and creative sector cluster managers. The programme is targeting companies from four high growth industry sectors: Life Sciences, Tourism, Technology and Agri-food and encouraging practical collaboration and co-production between businesses in these sectors and the creative professionals.

At the local council level, the Super Connected Cities (SCCP)³⁹ initiative is seen as a key driver across sectors as it can create significant shifts in the adoption and use of technology. A key aim of the SCCP is to

³⁵ Northern Ireland Research & Development Statistics 2011, 14 December 2012. Statistics Bulletin.

³⁶ <http://siliconrepublic.com/innovation/item/31111-intertrade-ireland-reveals>

³⁷ <http://www.creativestatenorthwest.com/about/article/4cnw>

³⁸ <http://www.belfastcity.gov.uk/business/investinginbelfast/super-connected-belfast/superconnected-overview.aspx>

create widespread, fast and high-quality wireless connectivity through an investment of £150m (€178.5m). DCMS has worked through a process of identifying and analysing the options that SCCP cities, including Belfast, can use to support this aim and has identified three wireless options⁴⁰.

3.2. The policy mix

Service innovation and existing policy measures

The figure below presents the regional policy mix contextualised in the framework of systemic functions relevant for service innovation (see also Appendix D for a summary table presenting brief descriptions of all the measures and budgets where available). It includes both regional and UK wide programmes, which may have a potential for introducing service innovation. It adopts a classification for the way service innovation can be addressed by policies⁴¹, namely:

- Single embedded⁴² measures (E), which are focused on more active entrepreneurial activities like the Employer Support Programme for further education colleges and the Challenge Programme focusing on strategic and performance planning;
- Service-focused measures, like the Next Level Industry Development Programme that supports local tourism providers. These are specific to services, and are denoted as a demarcation measure (D);
- Knowledge development and transfer is channelled through assimilated⁴³ programmes (A) from measures, such as Innovation Vouchers, Knowledge Transfer Partnerships like KTP and FUSION, to more specialised measures including Competence Centres, the Connected Health ECO System, INNOVA, and Collaborative Networks.

There are two major constraints for Northern Ireland, as defined in the Strategic Policy Framework for Smart Specialisation. These are the small number of firms innovating and the poor access in the region to finance. Policy initiatives on Innovation and Business Model Generation and Financing Innovation Growth are developed specifically to tackle these two regional disadvantages. Alternative sources of finance, such as micro-financing, debt finance, venture capital, technology transfer and business angel funding, have not been widely available in Northern Ireland and this has limited business growth and development.

³⁹ <https://www.gov.uk/government/publications/super-connected-cities-programme-options-for-wireless-connectivity>

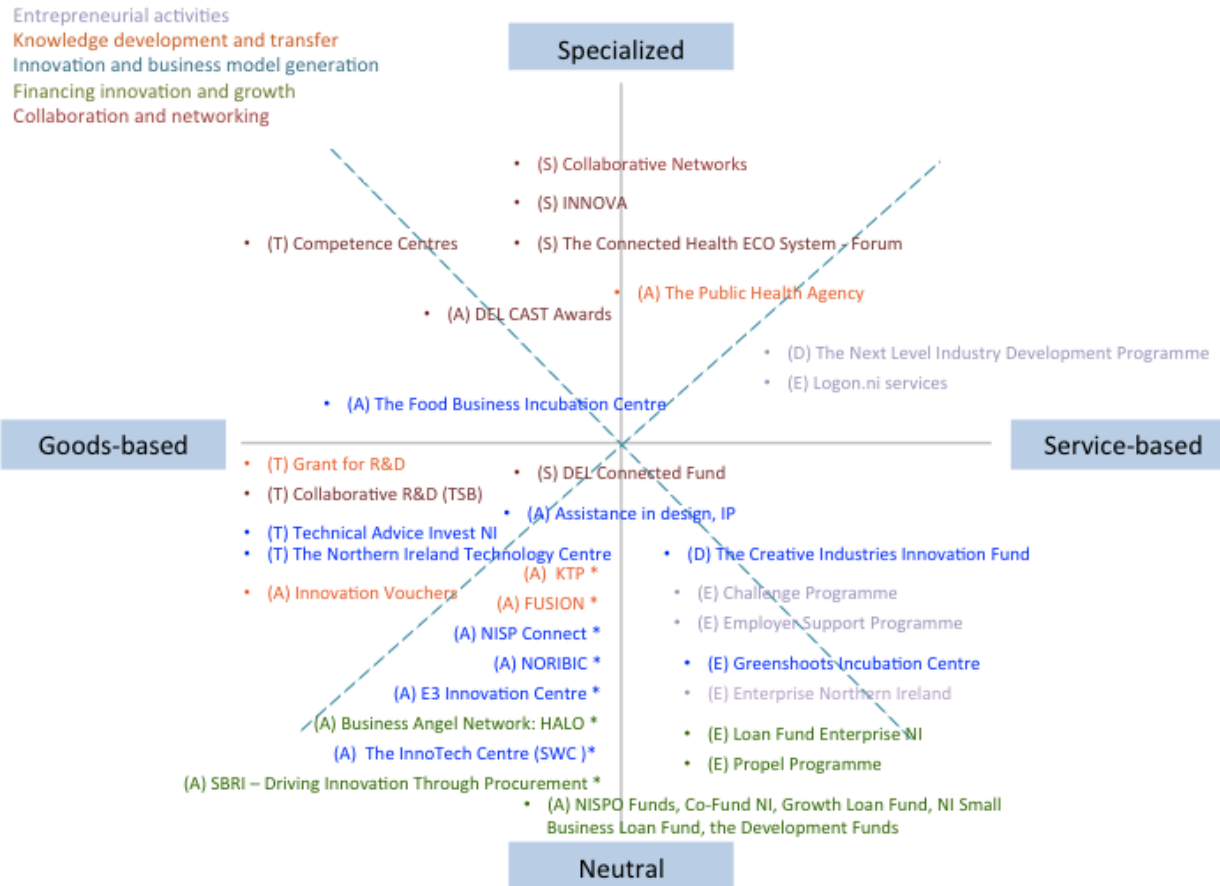
⁴⁰ See more at <https://www.gov.uk/government/publications/super-connected-cities-programme-options-for-wireless-connectivity/super-connected-cities-programme-options-for-wireless-connectivity>

⁴¹ The 'Service innovation approach', marked by the letters T (Technology-focused), E (Embedded), A (Assimilated), D (Demarcation), and S (Systemic) - Developed by Matthijs Janssen, 2013

⁴² Covering instruments that are neutral or unspecified by nature because they concern economic growth and markets in general rather than specifically innovation.

⁴³ Mixed: technology-based, extended to the domain of services

Figure 5 - Categorisation of regional policies in Northern Ireland



Measures supporting service innovation, directly or indirectly, are integrated into the first batch of policy actions. For example, the Design Service, managed by Invest NI, promote greater design awareness on the part of businesses and provide detailed design advice to develop long-term design capabilities. The Challenge Programme (E) of InterTrade Ireland, is another example of helping people to work in a way that is more creative, more commercially-oriented and more innovative. Thirdly, the Creative Industries Innovation Fund aims to stimulate RD&I and creativity in the economy and to encourage export-focused growth. The 'Access to Finance' initiative of INVEST NI includes debt or equity based financial instruments that provide over £100m (or €119m) of financing in total: NISPO Funds, Co-Fund NI, Growth Loan Fund, NI Small Business Loan Fund, and the Development Funds. The Halo Network, of the Northern Ireland Science Park, matches companies with growth potential with investors and business angels. NORIBIC⁴⁴ provides mentoring and business coaching to SMEs, micro-businesses and start-ups and innovation consultancy for those with new products and business models. NORIBIC provides services such as business support, business training, business innovation, product innovation, coaching and mentoring, and creative industry support

The 'Collaboration and networking' function is largely technology-based (T). There are a number of programmes that are available to support collaboration. For example, INVEST NI supports business-led collaborative networks that stimulate economic development. The objective is to expand the capability and capacity of these networks by attracting those private sector companies, investors, researchers and academia that will help them to maximise opportunities to develop new products, processes or services. In addition, the competence centres, INNOVA and the DEL Connected Fund are examples of systemic elements of the regional policy mix (S). A number of centres of excellence, subsequently called competence centres, have been funded over the last decade. These include the Connected Health Innovation Centre - CHIC, the Northern Ireland Advanced Engineering Competence Centre - NIACE or and the Centre for Advanced Sustainable Energy - CASE. The competence centres are considered as a key element in the regional policy framework since 2009, and they have the potential to make major contributions to the MATRIX priority sectors. Hence, there are elements in the policy mix that promote knowledge spill-overs and transfer between sectors and the fostering of new business models or service concepts. However, the measures do not target explicitly service innovation business models.

Synergies with UK and European policy measures

The Northern Ireland authorities work closely with the main UK agency, the Technology Strategy Board (TSB), to deliver programmes such as the Knowledge Transfer Partnerships (KTP)⁴⁵ and in the promotion of UK collaborative R&D and innovative initiatives. Other relevant UK initiatives include the Royal Society Industry Fellowships⁴⁶, the R&D Relief for Corporation Tax⁴⁷ and the UK Intellectual Property Office funded PATLIB centre at Belfast Central Library.

The Small Business Research Initiatives (SBRI)⁴⁸, managed by the TSB, is seen as a new opportunity for NI research groups and industry and is primarily important for stakeholders in sustainable energy and social care and health. SBRI enables the public sector to engage with industry during the early stages of

⁴⁴ <http://www.noribic.com>

⁴⁵ The KTP is a programme designed to help businesses deliver innovative projects by matching business leaders with academic specialists and talented graduates. A high-calibre graduate is recruited to work on a full-time basis in the project and is jointly supervised by the company and a senior academic. Through KTPs, companies can access a wealth of technological, scientific and managerial knowledge that is available in local academic institutes, including Queen's University Belfast and the University of Ulster.

⁴⁶ The Royal Society Industry Fellowships are funded by the Royal Society, the Engineering and Physical Sciences Research Council, the Biotechnology and Biological Sciences Research Council, the Natural Environment Research Council, Rolls-Royce plc and BP plc. They aim to enhance knowledge transfer between industry and academia in science and technology. A fellowship provides a basic salary for the researcher and a contribution towards research costs.

⁴⁷ <http://www.nibusinessinfo.co.uk/content/research-and-development-rd-relief-corporation-tax> According to indicative figures from DETI, 18% (£19.2m or €22.85m) of the total annual innovation support in Northern Ireland is channelled through R&D Reliefs for Corporation Tax, by the UK tax authority, HM Revenue and Customs (HMRC).

⁴⁸ <https://www.innovateuk.org/-/sbri>

development and supports projects through feasibility and prototyping. The government announced its intention in the 2013 Budget to expand the use of SBRI among key departments.

The Catapult Centres⁴⁹, a network of world-leading technology and innovation centres also administered by the TSB, have not yet extended their reach to Northern Ireland. Stakeholders highlighted the potential benefits that the programme could bring to the region, and suggested that regional policy-makers allocating funding to enable its development in NI. The programme is targeted on high value manufacturing, cell therapy, offshore renewable energy, satellite applications, connected digital economy, future cities, and transport systems.

European funding is sourced mainly through the ERDF and Interreg, which contributed around 7% (£6.9m/€8.2m) of the total innovation budget for NI, in 2012/2013. Interreg and FP7 have also enabled the competence centres to diversify their financing sources. While the research community has demonstrated greater interest and participation in FP7 collaboration projects, companies' engagement has remained modest. Participation from Northern Ireland is largest in the Higher Education sector. The three major barriers identified by SMEs in Northern Ireland to participation in FP7 are finding the right cooperation partner(s), accessing funding, and c) the cost of participating.

BOX 2 - THE POTENTIAL OF KNOWLEDGE TRANSFER PARTNERSHIPS (KTPS) IN PROMOTING SERVICE INNOVATION IN NORTHERN IRELAND

KTPs could be used more actively to support service innovation. One recently funded KTP, that involved the **Bombardier** aerospace company, resulted in new service business models focusing on design. Bombardier's new wing manufacturing and assembly facility in Belfast was opened in October 2013. The new wing facility has been certified to Gold level in the Leadership in Energy and Environmental Design (LEED)¹ rating system by the U.S. Green Building Council. The facility's sustainable initiatives include selection of appropriate building materials, the extensive use of natural light, energy efficiency, water saving and indoor environmental quality.

There are other examples of successful service-driven KTPs such as the KTP that was essentially an added value project to complement the core business of **B9 Energy O&M Ltd**¹. As a result of the work completed with the Queens University, B9 is now on target to begin production of digestate from the first commercial Anaerobic Digestion plant in Northern Ireland. In addition, waste material is now regarded as a valuable product that is commercially exploitable. The process also generated new knowledge about legislation, new capabilities in terms of technical knowledge and a strategy adopted for the identification and development of new products and processes.

Finally **Radox Laboratories Ltd**, in cooperation with Queens University Belfast¹, initiated an evaluation of a respiratory biochip array that can simultaneously detect bacterial and viral pathogens. Through the partnership, the company acquired substantial knowledge about current patient care pathways and background information about particular pathogens and sample collection and processing. A second KTP project with the School of Medicine at Queens University is now underway, as an extension of the activities of the first KTP.

3.3. Assessment of the regional policy mix

Regional structural weaknesses and the regional policy mix

The following table presents an analysis of how regional structural weaknesses are being tackled through existing policy interventions. The table summarises regional and national policies related to the six major policy concerns in Northern Ireland. The links between weaknesses and policy actions may not always seem straightforward but there are potential elements in the programmes listed below.

⁴⁹ <https://www.innovateuk.org/-/catapult-centres>

Table 6 - NI's structural weaknesses and the regional policy mix

Weakness	Policy interventions
Low number of firms innovating	Logon.ni services, Employer Support Programme, Challenge Programme, FUSION, Greenshoots Incubation Centre, the Food Business Incubation Centre, Invest NI Design Services, Technical Advice and IPR, NISPO, Creative Industries Innovation Fund, Enterprise Northern Ireland, NORIBIC, Propel Programme, R&D Relief for Corporation Tax
Low number of firms collaborating	Challenge Programme, Innovation Vouchers, KTP, FUSION, The Public Health Agency, NISP Connect, Collaborative Networks, Competence Centres, INNOVA, Collaborative R&D, DEL Connected Fund, The Creative Industries Innovation Fund, the Royal Society Industry Fellowships
SME dominated economy	SBRI (Small Business Research Initiatives), the Creative Industries Innovation Fund
Public sector dominated economy	Innovation centres (E3 Innovation Centre, The Northern Ireland Technology Centre, STEM, CREST, IMAGE, IDEA), Collaborative Networks, SBRI, DEL Connected Fund, Competence Centres
Poor access to finance and venture capital	Business Angel Network – Halo, NISPO Funds, Co-Fund NI, Growth Loan Fund, NI Small Business Loan Fund, The Development Funds
Legacy of industrial decline in ship building, linen and textiles	Collaborative Networks, KTP, INNOVA

There are a range of policy interventions to encourage entrepreneurship and innovation. Although, the regional economy is SME dominated, it is very dependent on a few larger companies. During the study visit, regional stakeholders highlighted the importance of SMEs and the need to maintain a focus on their engagement in innovation collaboration through INVEST NI Collaborative networks, the ITI Innova Programme and TSB SBRI. Hence, a major issue for regional policy lies in the attitudes towards both horizontal and vertical cooperation in the industrial and academic communities that would enable to exploit more effectively the region's advanced engineering sector or the growth potential in the agro-food, ICT, social care and health fields.

There are a number of sector-based initiatives, for instance, through the Connected Health Fund and the ECO system, the competence centres or targeted innovation centre in Agro-Food and the Food Business Innovation Centre at CAFRE. However, these are more R&D based than targeted at non-technological innovation or service innovation. Interviewees suggested that programmes like KTP or competence centres only have a limited impact on businesses. At the same time, the KTPs are considered to be one of the more successful means to create new industry-research links in Northern Ireland.

Stakeholders highlighted the quality of physical and digital infrastructure including broadband networks, mobile internet/wifi areas, science parks, and cluster organisations that can provide a basis for improving service innovation in Northern Ireland. However, the reach and/or the performance of broadband in rural communities remain poor. Interviewees considered that the creative industries are strong as both the physical and social environments favour creativity but cross-sectoral linkages should be improved. However, cultural attitudes toward collaboration were assessed as being fairly poor.

Businesses in Northern Ireland have limited access to finance and venture capital, with the latter faced by scale constraints for developing a regionally based VC industry. Generally, business angel networks and venture capital investors are focused on intellectual property (IP) driven investments, which is not wholly applicable to service innovation business models. Only recently, has the service model become more widely understood together with its intrinsic value.

During the study visit, stakeholders agreed on the need to adopt long-term targets for SMEs and to offer training on access to finance from regional and also European sources that would raise SMEs' awareness of these opportunities. Regional stakeholders emphasised the importance of the NI Horizon2020 Contact Point established in 2013⁵⁰, in raising business awareness of additional funding sources. The network is open to all potential applicants from Northern Ireland interested in engaging in Horizon 2020.

Stakeholders were of the view that more can be done to exploit the full potential of the regional innovation system, primarily from the universities as providers of consultancy services to industry. Collaborative networks, Innovation Vouchers, etc. highlight the large opportunities for introducing service innovation. However, active involvement in collaborative R&D is still an unrealistic aspiration for many SMEs. Cross-sectoral spill-overs are promoted through the competence centres but they are more product than service innovation based. The competence centres need to become more specialised in service-oriented activities.

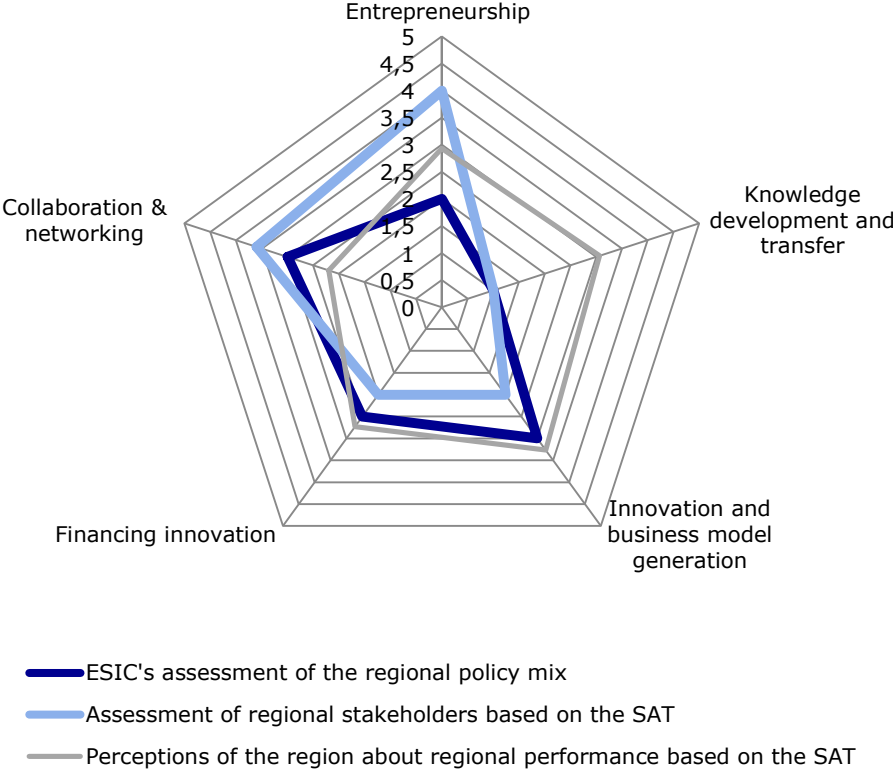
Self-assessment

The ESIC review of the policy mix is not completely in line with the self-assessment by regional stakeholders. The light blue line in Figure 6 shows the self-assessment of the regional policy mix in terms of its service-inclusiveness, whilst the dark blue line reflects the ESIC assessment. The difference is the largest for entrepreneurship, which respondents to the self-assessment survey considered more of a broad-based systemic policy. In general, the regional innovation policy is perceived as focused on cross-sectoral themes/challenges, with both services and manufacturing industries as the targets of entrepreneurship policies.

The regional stakeholders' perception of policies in support of **innovation and business model generation** is that these are focused on fostering the acquisition of new technologies in firms. This is in line with the ESIC assessment of an emphasis on technological R&D measures. However, none of the existing measures can be classified as being fully related to business model generation.

⁵⁰ For the list of NICP members see <http://www.detini.gov.uk/deti-eco-dev-index/deti-eco-dev-ni-horizon-2020.htm>

Figure 6 - Comparison of ESIC’s assessment and the regional stakeholders’ assessment of the service-inclusiveness of the regional policy mix



Knowledge development and transfer are perceived by both the regional stakeholders and the ESIC team as being focused on technologies that foster knowledge spill-overs between research institutions and businesses. There are no specific initiatives targeting service innovation or schemes that explicitly enable the testing of new services or the creation of service innovation approaches. There is no regional consensus on **collaboration and networking** schemes. Stakeholders’ views include such schemes being focused mainly on technology development, targeting internationalisation schemes for service industry firms or support services development in the region. There are elements in the policy mix that promote spill-over effects and knowledge circulation and transfer but these are not explicit targets.

Finally, in terms of the **financing of innovation and growth**, regional stakeholders believe that the concept of service innovation has been embedded in innovation financing schemes but does not have a specific thematic focus. The available funding mainly targets technology oriented companies, without necessarily taking into account opportunities for ‘hybrid innovations’.

To sum up, the existing policy mix is more biased towards R&D support and technological innovation (see also the budget allocations presented in section 3.1). The mix has a majority of technology-push policy measures, with a limited emphasis on technology-demand measures. A view shared by regional stakeholders interviewed for this study even if they also pointed to elements of service innovation in the public sector and in more forward-looking companies. The current policy mix has the potential to stimulate service innovation, but in operational terms there is not a sufficiently clear focus on this type of innovation. This would require changes to selection criteria and funding rules of current measures.

4. Large-Scale Demonstrator: Strategy for the Future

This chapter draws together the contributions and views of key stakeholders from businesses, academia and public sector institutions within Northern Ireland on the potential for service innovation in supporting structural change and economic growth. Drawing together a combination of interviews and responses to the Self-Assessment Toolkit (SAT) questionnaire, the commentary below distils views on three key issues: awareness of the regional potential for service innovation, the appropriateness of the current policy mix and the pre-requisites for implementing a service innovation strategy.

Currently **the region does not have a specific service innovation strategy**. Strategic direction on innovation is being provided by the draft Innovation Strategy, currently out for consultation. The contribution of the wider investments in intangible assets beyond a primary policy focus on R&D, such as design, training, software and business processes that are very evident in service sectors, are explicitly recognised.

The purpose of the interviews and assessments was to establish a view of the awareness of service innovation, the early opportunities and threats to its effective delivery and the suitability of the current policy environment.

The regional vision and strategy for service innovation

The Northern Ireland innovation strategy is based on the evidence that businesses are less innovative than counterparts in other regions. ESIC research found that while there was a general awareness of innovation and its impact on economic growth, there was **not an explicit identification of service innovation**.

The economic downturn has provided a focus for service innovation and businesses are becoming more aware than they were before the 2008 crash. Quantitative evidence of the impact of this increased public support over the last few years has still to emerge as the key innovation surveys only take place every couple of years, but softer indicators are indicating increased awareness and activity, although this is not uniform across all sectors. For example, in the agri-food sector activity continues to be weak despite evidence of the potential for service innovation in this sector from other regions. The role of MATRIX as drivers of the innovation strategy is acknowledged but it was again indicated that there was limited understanding of the distinction between service and more generic innovation.

The potential for service innovation was recognised by stakeholders who suggested some key lead markets. Service innovation could support the efforts to address the grand societal challenges, possibly using new analytics building on 'Big Data' with links to Connected Health and renewable energy generation. For instance, there are regional centres of excellence in advanced data mining and analytical techniques that could support medical research, smart grid technologies within renewable energy and monitoring in sport science.

Health was widely cited as a leading market for service innovation, particularly as the role of big data analytics is supporting patients in research trials and providing them with improved health outcomes. This involves effective data management including warehousing and 'honest brokering' to ensure confidentiality. This could involve cross-sectoral collaboration with cryptography and secure data networks. The link between design and data analytics in health care was also noted, with an increased contribution from design through data visualisation of large data sets in health care services.

In the field of personalised medicines this is a significant factor and there are two elements to be considered. Firstly, data analysis in terms of genetic mapping and there are two internationally recognised research centres for computational biology within Northern Ireland, which are increasingly in demand by international pharmaceutical companies. Secondly, there are other service needs, such as delivering detailed genetic analysis in biology. Northern Ireland has one of the best molecular research centres working on cancer treatment, which is funded by the private sector.

Another lead market where the region has potential is in distributed energy solutions and their integration into Smart Grid technologies. The aim here should be to build expertise to demonstrate the commercial scalability of these solutions to a global market. For example, B9 Energy is adopting more flexible service orientated solutions to manage energy demand. It is providing 'load on demand' with a system of arbitrage using existing technologies to more effectively coordinate energy demand with low input costs.

Appropriateness of the current policy mix

As outlined above, the overall view of those stakeholders interviewed was that the current policy mix does not explicitly support service innovation and there is awareness that existing programmes do not fully reflect emerging strategic thinking. Invest Northern Ireland is recognised as the key regional delivery body but it was noted that coordination of the policy initiatives was the responsibility of a number of different actors, with the central themes being driven by the wider Innovation Strategy. There are however some sector-specific strategies, for example ICT and Creative Industries, but service innovation within these is not explicitly identified.

Stakeholders reported that they felt funding was focused on product development and the same level of support was not available to service companies. Stakeholders also reported that they felt that the regional firms lacked a creative ecosystem, visibility and an awareness of design opportunities. While the region boasts high-level academic research programmes for product designers, their potential is not being realised and many participants find employment in unrelated fields.

In addition, there is a view that, despite a number of initiatives, more could be done to boost design as a driver of service innovation. Interviewees considered that the business design community is dispersed and there is not a shared vision on which a policy can concentrate. The region should draw on its history of design, as reflected in the Titanic Quarter, to project its traditions in innovative design.

Cross-sectoral and cross-regional initiatives are considered important, providing greater connectivity with Europe. Horizon 2020 was widely acknowledged as providing a large potential for the region to access funding and support that can be used to address the key societal challenges. This potential should be further explored, particularly in relation to SMEs. Through the national Horizon scanning and MATRIX initiatives, there is a recognition that the 'product' model is not enough but that a service model is needed that offers a full solution, such as in the case of B9 Energy.

More widely, it was acknowledged that the region was very experienced in international collaboration given its relationships with Ireland and in overcoming the costs and business challenges faced when conducting business with the UK mainland.

The Competence Centres are expected to move towards an arena of specialised service orientation and these are likely to be sector based. The Centres are viewed positively as places where businesses and universities can meet. While there is a risk is that academics will continue to be too distant from businesses, the Centres have the potential to facilitate mutual learning and an appreciation of business and academic needs.

There are other aspects of the existing policy mix that could be refined to more explicitly support service innovation. Knowledge Transfer Partnerships are considered to be a successful programme for increasing knowledge exchange and competitiveness in the region as in the wider UK. These programmes could be used to support service innovation if their presentation and application procedures were slightly refined.

Whilst there is not central strategy for service innovation, stakeholders reported initiatives that emerged from businesses themselves, which involved the formulation of mini eco-systems. The health care ecosystem is a good example of how the region could be enhanced through service innovation and this initiative was awarded funds through the CIP.

An important element in a systems approach to innovation is the role of infrastructure. In Belfast the Super Connected Cities programme is a key driver across sectors as it can create significant shifts in the adoption and use of technology, which extend to both the private and public sectors. For example, Belfast City Council is encouraging innovation through technology adoption, where councillors are using tablet devices to receive real time updates and other correspondence from constituents, which increase the accountability and transparency of local government.

Pre-requisites for implementing a service innovation regional strategy

From a systems perspective, a number of elements need to be in place, not just individually, but with effective networks and relationships build between them. Both institutional networks and informal networks underpinned by a common culture offer essential support to a service innovation system. An acceptance and understanding of how service innovation can affect structural change is needed, and a prerequisite to this is an awareness of what service innovation actually is. However, given the draft Innovation Strategy, there

were concerns that a separate service innovation strategy would create confusion. Rather service innovation should be integrated as one of the drivers of wider innovation and needs to be communicated as such.

Through the stakeholder interviews three main issues were identified, which reinforce the previous sections' findings. These were low levels of collaboration amongst businesses, a risk averse model for public funding and, finally but linked to funding, a focus on product over service companies.

Whilst collaboration was acknowledged as being essential, there were mixed views on how effective the region is in harnessing such collaboration to promote effective service innovation. At a regional strategic level, it was acknowledged that businesses resistance to collaboration is a cultural factor. Views were expressed by a number of stakeholders that the predominance of traditional family-owned businesses restricted economic potential because their growth aspirations were limited. This is also reflected in lower rates of R&D investment amongst locally-owned businesses as compared to foreign-owned enterprises. Evidence from the SAT indicated that there need to be improvements in involving users and employees in innovation networks and in physical and social environments that stimulate creativity and cross-sectoral collaboration. Businesses find collaboration to be a challenge. While many benefit from collaboration networks in terms of openness and cooperation across the supply chain, the smaller size of the region may result in competitors being engaged in the same collaborative network or programme.

The administration of public funding was indicated as a potential barrier. Some concerns were raised about the apparent variations in pro-activity amongst the different strategic bodies. From the perspective of the business sector, the support is not always accessible. Also, it does not always recognise future potential and tends to concentrate on 'safer' projects. An example cited was support for exports, as eligibility conditions require the existing export turnover to be about 25%, which suggests that these businesses are already positioned in export markets. This excludes companies in new sectors who are more embryonic but have the potential to export to growth markets. It is often these smaller and younger companies who need most support. There were no proposals to support riskier but higher value, and potentially transformative, firms and products and until funding schemes were administered more effectively, potentially using an investment orientated approach with staffing drawn from non-traditional public sector organisations, it is unlikely that the situation would change.

Another example, linked to the concerns about funding models, an inward investment was declined investment support as it didn't have a 'product'. This may reveal a gap in the understanding of the value of service companies. If too strict economic criteria are applied, there is a risk of missing out on the wider, higher order value contributions that such companies can make to the innovation ecosystem.

5. Conclusions and Recommendations

Service innovation is perceived as an opportunity to overcome the challenges created by the economic crisis, and as a way of making Northern Ireland more competitive globally. There is recognition the MATRIX process that the 'product model' may not be enough. The 'service model' is seen as an alternative, but is not yet found in any policy documents. In addition, looking at NI's budgets for RTDI, a large share of the total funds is allocated to R&D, mainly through grants. Collaborative R&D has been a major focus of policy-makers during the post-crisis period. Despite the lack of 'explicit' and direct support to service innovation, many private sector stakeholders are already undertaking service innovation without necessarily acknowledging it as such. This shows a lack of awareness about how innovation, other than technology-driven innovation, can be fostered.

In their original application to the ESIC, the Invest NI expressed a wish to focus the support to service innovation on one specific sector. However, there is not as yet any consensus on the best sector on which to focus. Traditional manufacturing industries were the main target in the application but in the assessment phase the ESIC team identified three other possible sectors. Following the study visit, the health and social care sector emerged as a leading sector for the promotion of service innovation, which could also benefit other sectors because of its horizontal nature. However, the ESIC team is clear that a service innovation strategy has to have a very strong focus, and with clear targets and niches, in order to avoid increasing the number of generalised innovation measures that are already available in the policy mix. Rather service innovation should be integrated more explicitly in the draft Innovation Strategy. At the operational level, Invest Northern Ireland should seek to play a role in the process of embedding service innovation explicitly in the overall policy mix via a 'market-driven' approach.

The existing policy mix is more product or good-based and offers few opportunities to promote service innovation. Some of the existing programmes can address service innovation but lack a clear focus. Support for service innovation could be made more explicit within policy measures supporting knowledge transfer and circulation. Service innovation can be also encouraged through public procurement, such as an obligation to invest in specific services. An initial exercise to move in this direction could involve identifying cross-priority synergies within programmes, in order to avoid duplication and unnecessary or additional bureaucracy. One aim of the ESIC peer-review process will be to develop a clearer picture of how the various policy measures and organisations could support the selected priorities for service innovation in the region. In particular, the lack of financing available for service innovation, or for innovative service companies, is a barrier to promoting and enabling a shift to hybrid service-based products, etc.

Cultural and social aspects, even if not easy to control and manage, can also impede the realisation of the full potential of service innovation. Among the main factors that hinder development are the lack of an entrepreneurial culture, as the public sector is very large, and the lack of trust amongst regional stakeholders. However, once trust mechanisms are in place, collaboration seems to happen in a rather systemic way among stakeholders. More mechanisms that support networking could provide situations in which trust could be increased effectively. Taking into account the history of the region, education and encouragement should not be limited to existing businesses but should also be fostered in schools and groups in the wider community. This would embed trust and confidence into the wider cultural system and make it more resilient.

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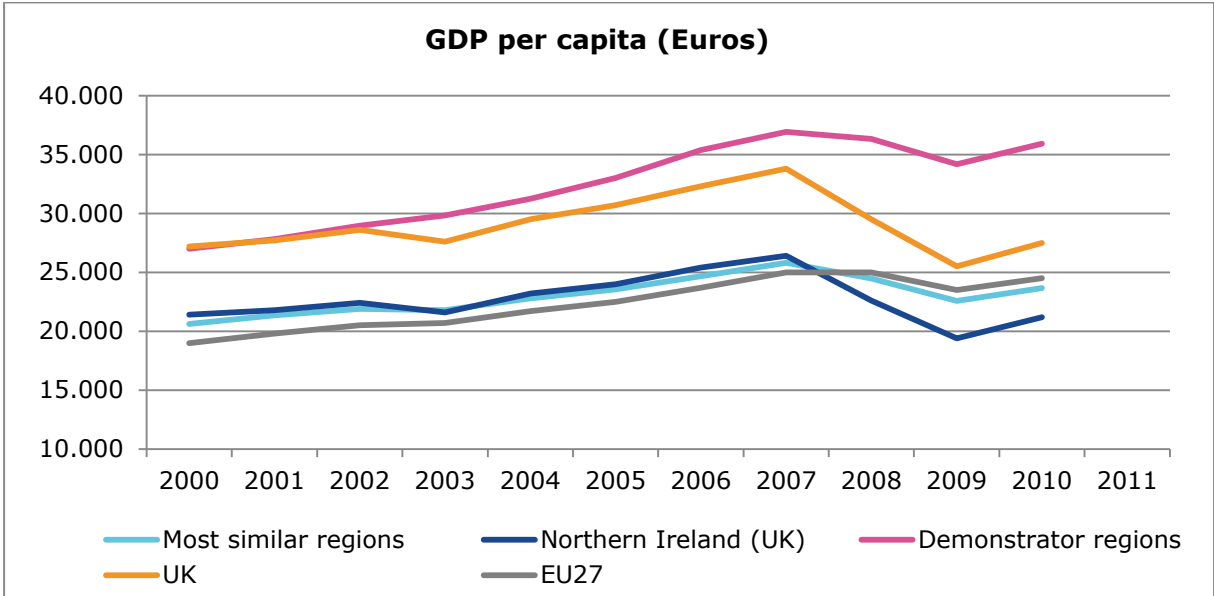
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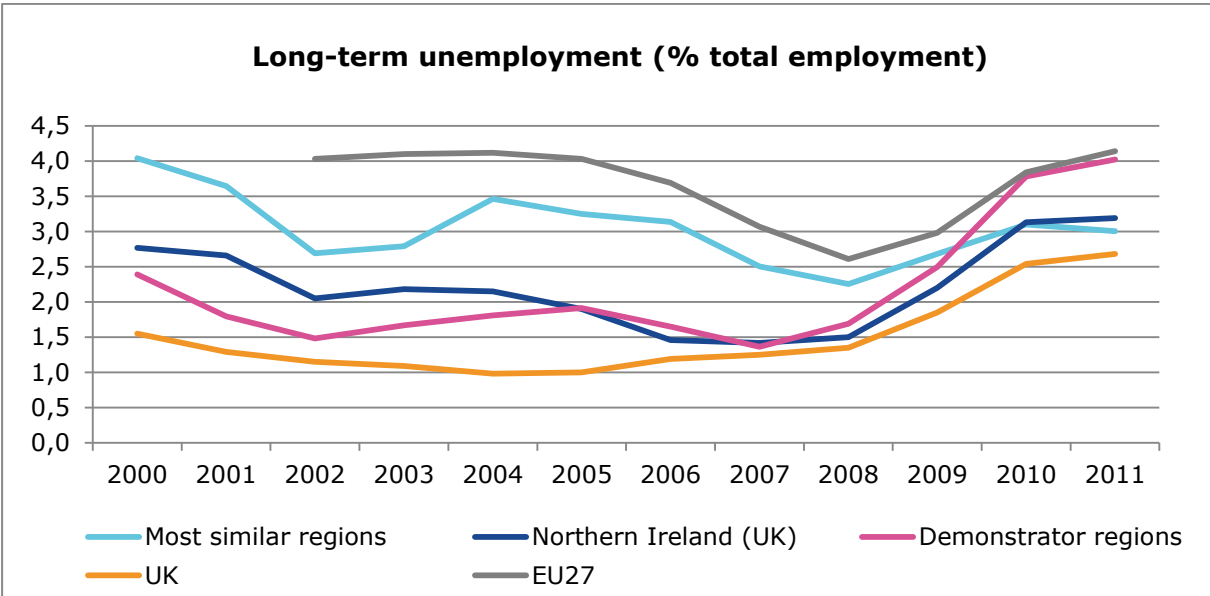
Appendix B - Stakeholders consulted

- a) Richard Christie, Design & Commercialisation Manager, INVEST NI (September -December 2013)
- b) Scott King, Manager, NIACE (15.10.2013)
- c) Stephen McComb, CHIC (17.10.2013)
- d) Sam McCloskey, Manager CASE (21.10.2013)
- e) Barry Henderson, Business Development Manager, C-TRIC (21.10.2013)
- f) Ciaran McGarrity, Head of Innovation Policy, DETI (21.10.2013)
- g) Shane Murphy, Head of Analytical Services, DETI (21.10.2013)
- h) David Surplus, Chairman, B9 Energy Group (22.10.2013)
- i) Ian Montgomery, Dean, Faculty of Art, Design and the Built Environment, University of Ulster (22.10.2013)
- j) Tom Edgar, Head of the Consultancy team, Queens University Belfast (22.10.2013)
- k) Bernadette Hannigan, Director of Research and Development, DHSSPH (22.10.2013)
- l) John Toner, CEO, Williams Industrial Services/Board Member, Northern Ireland Chamber of Commerce (22.10.2013)
- m) Richard Johnston, Associate Director, NICEP (22.10.2013)
- n) David McCleery, Safefood's Chief Microbiologist NICP Agri-food, AFBI (23.10.2013)
- o) Fergal Tuffy, Manager, The InnoTech Centre, South West College (23.10.2013)
- p) Brendan McGoran, Creative Industries Officer, Belfast City Council (23.10.2013)
- q) Olive Hill, Director of Innovation and Technical Solutions, INVEST NI (23.10.2013)
- r) Michael Lilley, Smart Specialisation Coordinator, DETI (31.10.2013)

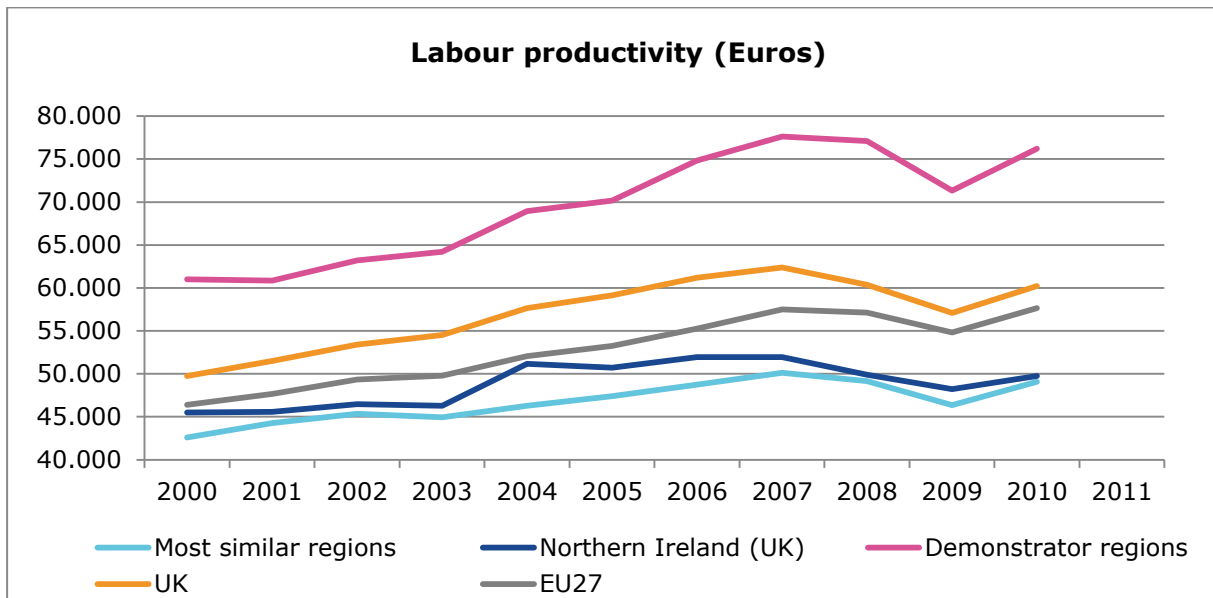
Appendix C - Regional benchmarking analysis



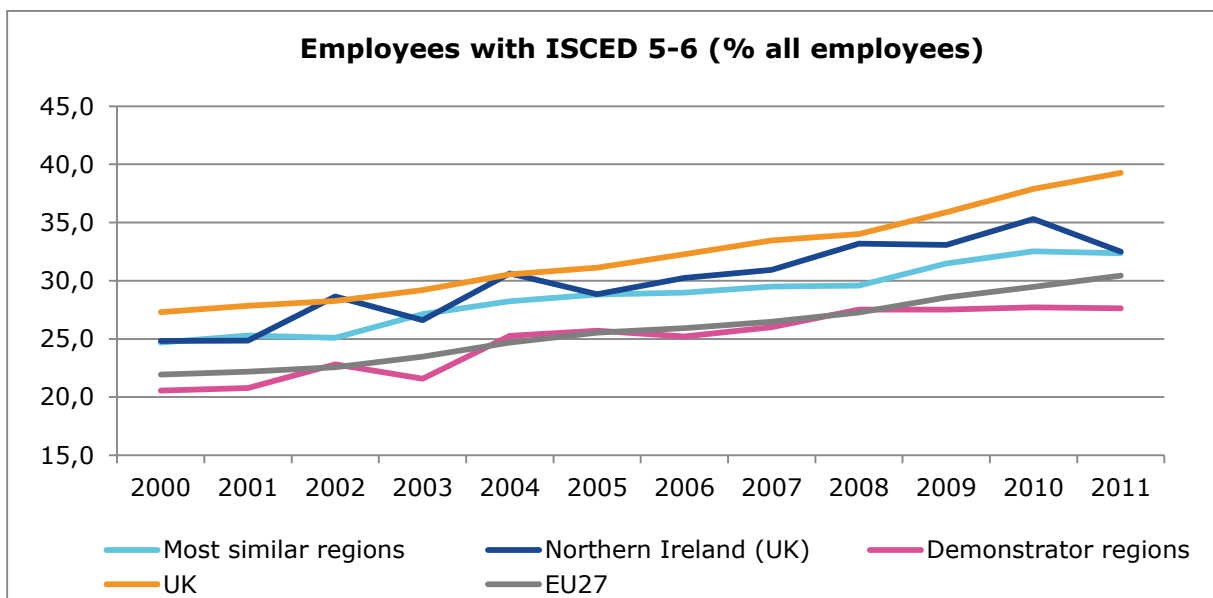
Northern Ireland saw an increase in per capita GDP until 2007, the start of the current economic crisis. From 2007 to 2009, per capita GDP decreased quickly by € 7,000 before showing an uptake in 2010. Despite this increase, per capita GDP in 2010 was at a comparable level to that in 2000. The change over time of per capita GDP has followed a similar pattern as in the other regions.



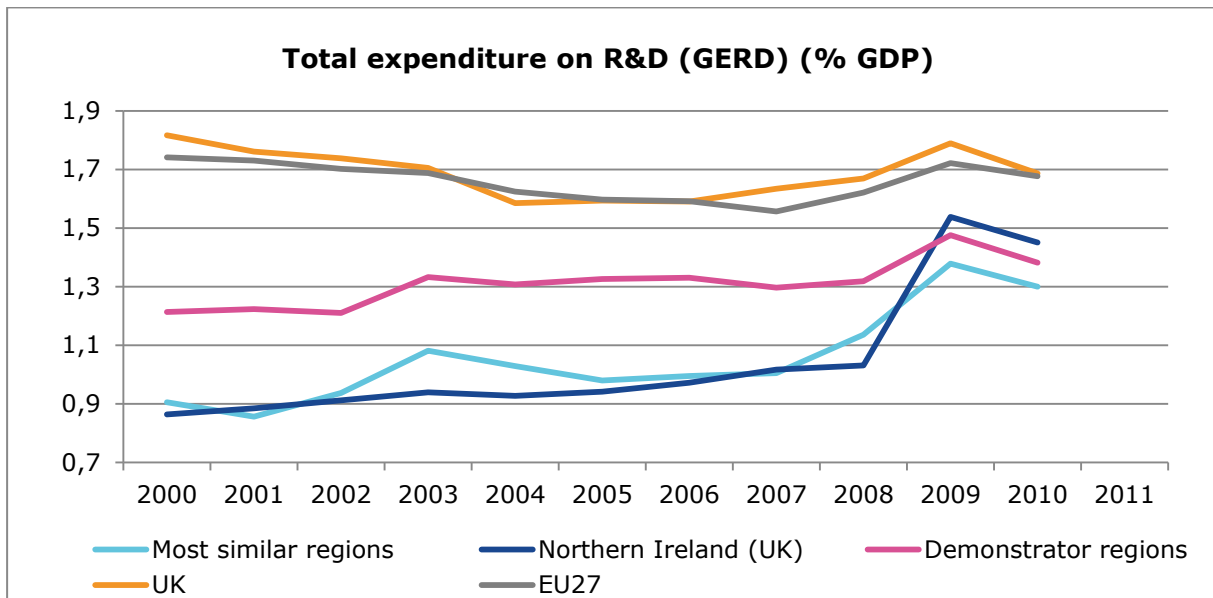
Long-term unemployment followed a reverse trend to that of per capita GDP with a decrease up until 2008 and then a sharp increase in 2009 and 2010. Over the years, relative performance has been worse than that of the EU27 and the group of most similar regions.



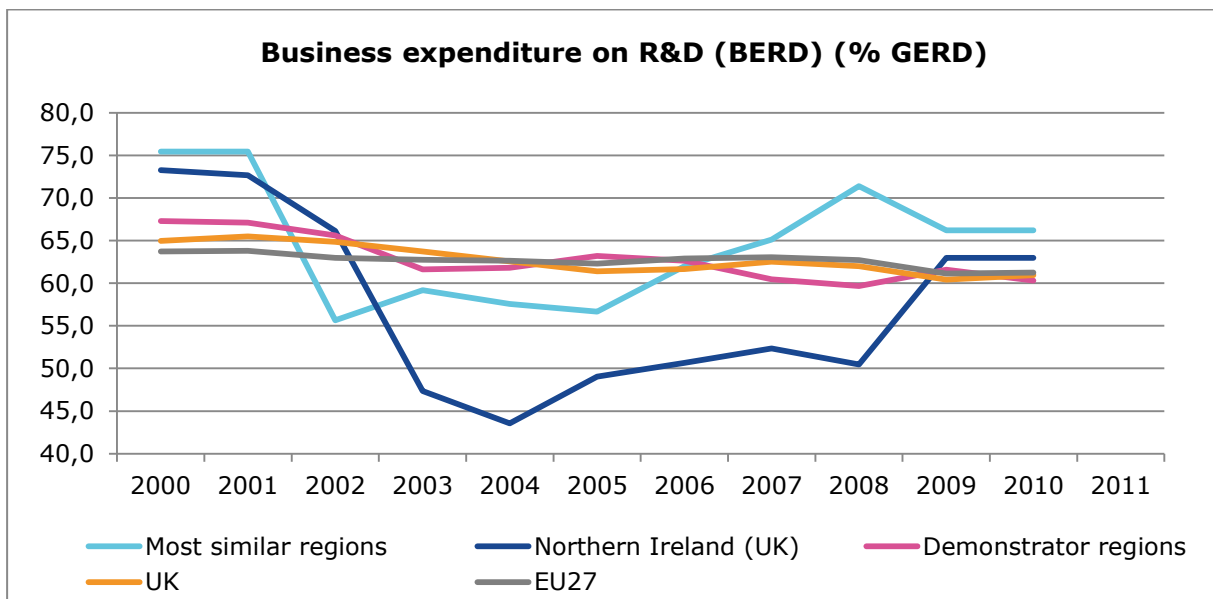
Labour productivity follows a similar development as per capita GDP with an increase until 2006, a decline between 2007 and 2009 and then, an upturn in 2010. However, the changes over time are much smaller, as labour productivity in 2010 was at almost 20% higher than in 2000. It is worrying is that the gap in labour productivity with the other regions has been increasing over time, in particular with the UK and the EU27.



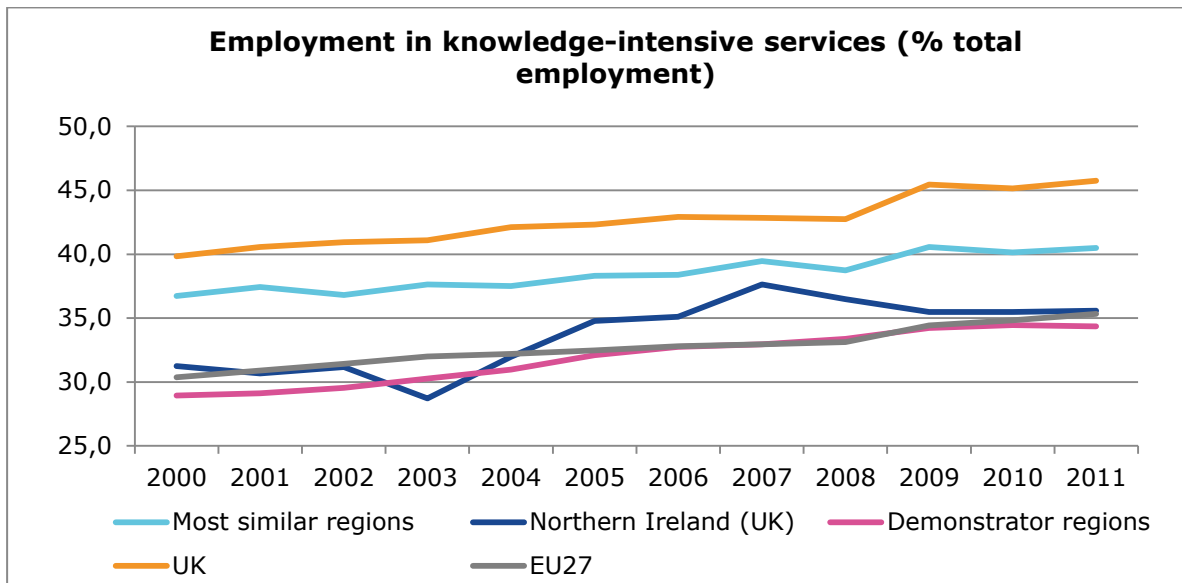
The share of employees with completed tertiary education has been growing continuously for most of the period. Small declines can be observed in 2003, 2009 and 2011. It seems that the general increase up until 2010 may have come to a halt with the decrease in 2011. The share of employees with completed tertiary education has also been continuously above that of the demonstrator regions and the EU27.



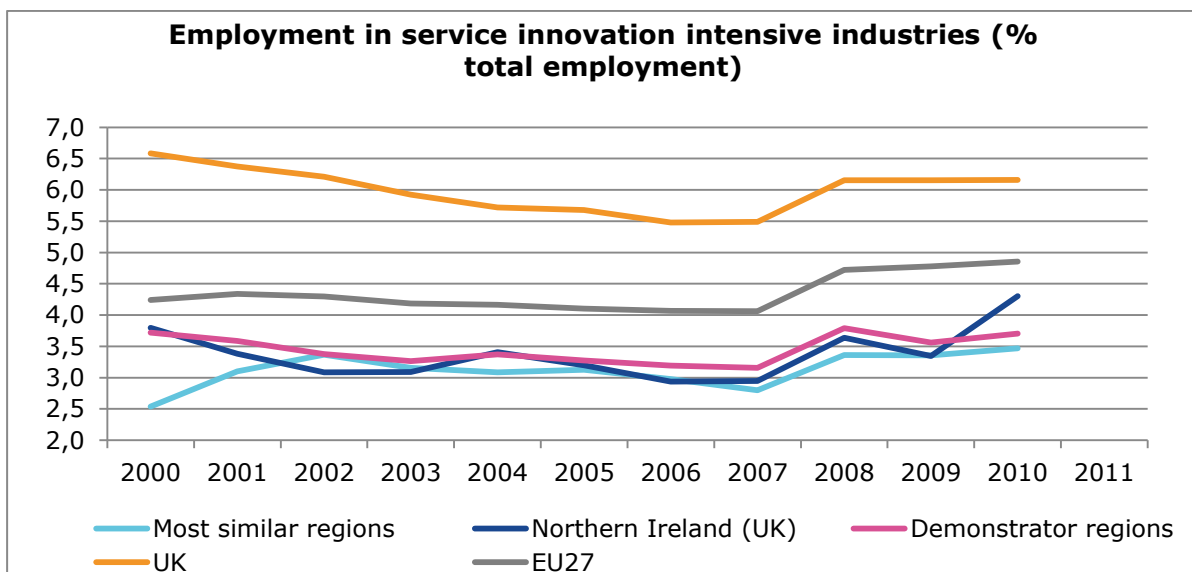
Total expenditures on Research and Development (R&D) gradually increased until 2008 and then boomed in 2009 and 2010. This boom was an 'artificial boom' which is not explained by an increase in the volume of R&D expenditures but rather by a strong decline in the GDP. A similar boom can be observed for the other regions, but not as strong as for Northern Ireland. The gap with most similar regions was closed in 2009, as was the gap with the demonstrator regions in 2010.



The share of total R&D spent by the business sector decreased strongly from almost 75% to less than 45% between 2000 and 2004, as was the case in the most similar regions. The sharp decline before 2004 was caused by a drop of 25% in the volume of business R&D expenditures. However, the share showed an increase from 2004 to more than 60% in 2010.



Employment in knowledge-intensive services increased between 2000 and 2007 with a temporary decline in 2003 and has remained relatively stable since 2008. All other regions show a consistent upward trend over the time period in question. Northern Ireland has been lagging behind the UK and most similar regions and, in recent years, the EU27 and the demonstrator regions have been catching up with Northern Ireland.



Employment in service innovation intensive industries has remained more or less stable over the years, with a decrease between 2000 and 2007 being offset by an increase between 2007 and 2010. A strong upturn in employment in service innovation intensive industries since 2007 can also be observed in the other regions.

Note:

Demonstrator regions: AT31 Oberösterreich (Upper Austria), ES7 Canarias (Canary Islands), ITD5 Emilia-Romagna, LU Luxembourg, NL42 Limburg, UKN Northern Ireland

Most similar regions: BE33 Prov. Liège, DE41 Brandenburg – Nordost, DK02 Sjælland, NL12 Friesland, NL13 Drenthe, UKC1 Tees Valley and Durham, UKC2 Northumberland and Tyne and Wear, UKL1 West Wales and The Valleys, UKL2 East Wales

Appendix D - Institutional fabric relevant for service innovation

Service innovation actors at regional level				
Name of organisation	Type of organisation	Principal activity related to SI	Annual budget (in euro)	Web-link for organisation
DETI	Government Department (GD)	Responsible for R&D and innovation and economic development, and the 2013 Innovation Strategy	2% of total state budget 2010/2011	http://www.detini.gov.uk
DEL	GD	Responsible for promoting learning and skills, the 2012 Higher Education Strategy and the 2011 Skills strategy	8% of total state budget 2010/2011	http://www.delni.gov.uk
DHSSPS	GD	The Department that houses the R&D Office responsible for the Strategic Action Plan 2007-2012	41% of total state budget 2010/2011	http://www.dhsspsni.gov.uk
DCAL	GD	Responsible for the 2008 Strategic Plan for Creative Industries.	1% of total state budget 2010/2011	http://www.dcalni.gov.uk
DARD	GD	Responsible for the Agri-Food sector, a strategic action plan "Going for	2% of total state budget 2010/2011	http://www.dardni.gov.uk

		growth – Investing in Success2.		
INVEST NI	DETI Non-Department Public Body (NDPB)	The main funding agency for industry oriented R&D and innovation	£ 104m (€ 123.76m) – indicative budget for innovation support 2011/2012	http://www.investni.com
InterTradeIreland	DETI NDPB	The only organisation, which has been given responsibility by both Governments to boost North/South economic co-operation. For instance, the INNOVA programme, Halo Northern Ireland	N/A	http://www.intertradeireland.com
NISP	Science park	Channelling different funds (NISPO funds)	N/A	http://www.nisp.co.uk
Queens University Belfast	Public higher education institution	Involved in Collaborative networks, KTPs, Fusions, competence centres, etc.	N/A	http://www.qub.ac.uk
University of Ulster	Public higher education institution	Involved in Collaborative networks, KTPs, Fusions, competence centres, etc.	N/A	http://www.ulster.ac.uk
The Agri-Food Strategy Board	NDPB	Develops a strategic plan for the Agri-Food sector. A	N/A	http://www.agrifoodstrategyboard.org.u

(AFSB)		joint initiative of DARD, DETI and INVEST NI.		k
The Public Health Agency (PHA)	NDPB	Multi-disciplinary body, responsible for health and social wellbeing improvement, health protection, public health support to commissioning and policy development, HSC research and development.	N/A	http://www.publichealth.hscni.net
The Arts Council	The funding and development agency for the arts	Responsible for the Creative Industries Innovation Fund	N/A	http://www.artscouncil-ni.org
CHIC (The Connected Health Innovation Centre)	Competence Centre	Seeks to lead transformational research, which aligns care needs with technology providers, researchers and clinical experience. The research target: e-Health, digital health, tele-health, tele-monitoring, disease management, and home based care.	€ 1.19m plus other sources than the Programme	http://www.ni-chic.org
NIACE (The Northern Ireland Advanced Engineering Competence Centre)	Competence Centre	Supports the development of all advanced engineering companies from Aerospace, Automotive, Industrial	€ 1.19m plus other sources than the Programme	http://www.niace-centre.org.uk

		Marine and Renewable.		
CASE (Centre for Advanced Sustainable Energy)	Competence Centre	The development of highly innovative technologies for the sustainable energy sector. Focus on Intelligent Energy Systems.	€ 1.19m plus other sources than the Programme	http://questor.qub.ac.uk/CentreforAdvancedSustainableEnergy/
C-tric (The Clinical Translational Research and Innovation Centre)	Research and Innovation Centre	A unique facility promoting and facilitating translational and clinical research, the primary objective of which is to reduce both the time to market and the costs associated with research and development of innovative health technologies, medical devices and therapeutics	N/A	http://www.c-tric.com
Further Education Institutions	SRC, SWRC, BMC, NRC, SERC, NWRC, CAFRE	Free-standing incorporated bodies, to support regional development. Management responsibility lies with each individual college's governing body.	N/A	http://www.delni.gov.uk/index/further-and-higher-education/further-education/fecolleges.htm
Service innovation actors at national level with an influence on the regional actions				
Technology Strategy Board	The national	Co-funding KTPs	N/A	https://www.innovateuk.org

(TSB)	innovation agency			
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Appendix E - Policy measures for service innovation

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
Entrepreneurial activities			
(E) Logon.ni services	The Department of Enterprise, Trade & Investment	To assist all businesses in Northern Ireland take full advantage of the opportunities that ICT can bring. Logon.ni services include advice and support on the many ICT available to assist businesses towards cutting costs, saving time and expanding your current market.	ICT Advice and support BUDGET: Approximately £900k (€ 1,071k) per annum (3 year programme finish in 2013, may be a follow on in 2014)
(E) Enterprise Northern Ireland		The network representing of Local Agencies in NI. Local Enterprise Agencies (LEAs) are independent, locally based not-for-profit companies set up to support small business development and to undertake economic development activity.	32 member agencies, with coverage across all local council areas in NI. The LEAs provide a range of consultancy type of advice and small grants to smaller companies. BUDGET: £ 1.1m (€ 1.309m) per annum (over 3 years)
(D) The Next Level Industry Development Programme	Northern Ireland Tourism Board	To support local tourism providers capitalise on the opportunities that 2012 and 2013 presents through the Industry Development Programme. Over 3 million visitors come to Northern Ireland each year, generating £530m (€630.7m) for the local economy.	A series of training courses, events, master classes, business insights, road shows and workshops, running throughout the year. BUDGET: N/A
(E) Challenge Programme	InterTrade Ireland	Strategic and Performance Planning.	Free for businesses. Selected businesses receive around £

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
		The Programme shows businesses how to lead people to work more creatively, more commercially and more innovatively, resulting in a much more competitive business. Businesses can learn how to create, market and launch new products and services and win new customers and markets using a method designed to minimise the time, money and risk involved.	20,000/€ 23,000 worth of intensive mentoring support and assistance to help deliver seriously ambitious growth. BUDGET: approximately £ 120k (€ 142.8k) per annum (over 2 years)
(E) Employer Support Programme for further education colleges	DEL	To support employers as key drivers of local and regional economic and workforce development through the further education sector.	A wide range of support for local employers, through sector-wide initiatives and projects, to encourage businesses to engage with, and embrace, innovation and sustainability. BUDGET: for four years (2012-2015): £ 6.9m/€ 8.21m
Knowledge development and transfer			
(A) Innovation Vouchers	INVEST NI	To enable NI SME's to access knowledge and expertise to develop innovative solutions to business issues. Enterprises can engage with one of the 41 universities, colleges and other public funded research organisations throughout NI and the Republic of Ireland.	£4,000/€5,000 for access to specialist knowledge to develop forward-thinking solutions or ideas to expand, improve or create new products, services and processes. BUDGET: Approximately £ 1m (€ 1.19m) per annum
(T) Grants for R&D	INVEST NI	To encourage businesses to invest in R&D to help differentiate themselves from the competition and retain their market share.	INVEST NI offers both advisory support including workshops, one-to-one advice on planning an R&D project and financial support. Financial support covers scoping, defining and planning an R&D project, research or critical investigation aimed at producing new scientific or technical knowledge, product or process development or improvements, exceptional development of leading edge technology, contacted research, linking to a college or university to carry out specific projects.

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
			BUDGET: £ 20m-£ 25m (€ 23.8m-€ 29.75m) per annum
(A) Knowledge Transfer Partnerships (KTP) Programme	INVEST NI Technology Strategy Board	To help businesses deliver innovative projects by matching business leaders with academic specialists and talented graduates.	A high calibre graduate is recruited to work full time on the identified project, jointly supervised by the company and the senior academic. Up to 2/3 of eligible costs BUDGET: Approximately £ 1m (€ 1.19m) per annum
(A) FUSION - Business-Academic-Graduate Partnerships	Intertrade Ireland	A technology transfer programme, FUSION, helps businesses to develop products and processes and accelerate new product development.	Between € 37,000 to € 52,800 is available for different types of projects (product/service/process development). The graduate is employed by a company and is based in the company throughout the project (12 - 18 months) with mentoring from the academic partner and InterTradeIreland FUSION consultant. BUDGET: FUSION III: approx. £ 900k (€ 1,071k) per annum, FUSION IV: approx. £ 1.5m (€ 1.785m) per annum
(A) The Public Health Agency	Department of Health, Social Services and Public Safety (DHSSPS)	The major regional organisation for health protection and health and social wellbeing improvement. HSC (Health and Social Care) R&D supports research that provides high quality evidence to improve care for patients, clients and the general population, and adds to the understanding of health, disease, treatment and care. It works closely with clinical and academic researchers based in HSC Trusts and universities, but also with further and higher education colleges, policy-makers and practitioners.	R&D budget N/A
Innovation and business model generation			
(A) Design Service	INVEST NI	Promotes greater design awareness by demonstrating the strategic importance of design to the NI business	Either 3 or 7 days of consultancy from an experienced design expert offered with companies only charged £250 or

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
		community. Provides detailed advice on the use of design to improve products and services. Develops the long-term design capability of businesses by integrating design and innovation into company management systems and strategies.	£500/€297.5 or €595. BUDGET: approximately £ 1m (€ 1.19m) per annum
(D) The Creative Industries Innovation Fund	The Arts Council of Northern Ireland Funding from DCAL, supported by NI Screen and Digital Service	Stimulating innovation, R&D and creativity in the economy, and encouraging export focused growth, by developing the creative industries.	All sectors within the Creative Industries wishing to deliver projects that will develop commercially viable content, products, services and experiences. Allocation rules: <ul style="list-style-type: none"> • A minimum of 80% of all available funding for awards in CIIF 2 will be allocated to creative businesses, and a maximum of 20% to sectoral development bodies • All awards to businesses will not exceed £ 10,000/€ 11,900. Awards to sectoral development bodies are capped at £ 20,000/€ 23,800. BUDGET: approximately £ 1m (€ 1.19m) per annum
(A) NISP Connect	Northern Ireland Science Park	NISP CONNECT is an independent, non-profit organisation that supports the development of innovative technologies and early stage companies through a series of educational seminars, mentorship programmes, capital competitions, and public policy advocacy. A joint effort between Northern Ireland's academic research base, University of Ulster, Queen's University Belfast, Agri-Food and Biosciences Institute and Northern Ireland's private sector.	Supported through membership fees, course fees, and corporate underwriting for specific programmes and contributions from economic development agencies. High-quality programmes to entrepreneurs and early stage companies, whilst simultaneously providing opportunities for early stage access to capital providers and the service industry. BUDGET: N/A
(E) E3 Innovation Centre	DEL		BUDGET: £ 18m/€ 21.42m

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
Based at Belfast Metropolitan College.	International Fund for Ireland	Enhancing the employability skills of its students, stimulate enterprise through business incubation and the delivery of innovative development programmes, and foster enhanced approaches to economic development.	
(T) The Northern Ireland Technology Centre (NITC)	Queens' University Belfast	Specialised in design, knowledge engineering and manufacturing, it bridges the gap between academic research and commercial production to meet industries needs and offer advanced solutions for customers in various sectors, such as aerospace, industrial equipment, energy, consumer products, manufacturing and packaging. As a leading commercial service provider and one of Queen's University Belfast's primary links with industry, working with companies has led the NITC to build a strong international reputation, helping raise the local sector's value proposition and competitiveness.	Knowledge transfer, industrial R&D, technical assistance, product design, advanced machining, aerospace engineering, digital manufacturing, innovation programme management BUDGET: approximately £ 1.5m (€ 1.785m) per annum
(E) Greenshoots Incubation Centre	Southern Regional College	A supportive environment for pre-start and start-up and for existing businesses to reside and grow.	Business incubation, training and work-force development BUDGET: N/A
(A) The InnoTech Centre	South West College	Aims to nurture and grow innovation and technology, the top UK College for Employer Engagement.	Innovation and technology services for industry: solutions for environmental and renewable technologies, design skills for any industry including concept design and development, rapid prototyping and reverse engineering, and innovation in electronics, software and ICT. BUDGET: N/A
(A) The Food Business Incubation Centre	College of Agriculture, Food and Rural Enterprise –	To facilitate entrepreneurs wishing to establish new innovative food businesses and established food businesses wishing to develop, test and commercialise new concepts	Incubation and advisory services BUDGET: N/A

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
	CAFRE		
(A) Intellectual Property	INVEST NI	INVEST NI provides specialist advisors to help with: a) international patents, including patent searches, b) trademarks, c) including trademark searches designs and copyright, d) carrying out an Intellectual Asset Management. Audit to establish what elements of the business may need intellectual property protection, and advice on how to get the appropriate protection. The support is provided to businesses that can make the biggest contribution to the economy and eligibility criteria include sales outside NI and salaries above average.	Financial assistance to help pay for the costs involved in protecting patents, trademarks, design registration and licensing agreements. BUDGET: Is part of the Technical Advice group below (approx. £ 200k=€ 238k per annum)
(A) Technical Advice	Invest NI	Guidance on: a) engineering and manufacturing, b) production line, c) technical information, d) health and safety, e) CE Marking, f) quality management systems, g) building commercial, h) technical and R&D partnerships across Europe, i) R&D funding opportunities in the UK and European Union, j) environment (regulation, compliance and resource efficiency processes).	Financial assistance for projects relating to any of the specified areas. BUDGET: approximately £ 1m (€ 1.19m) per annum including IP
Financing innovation and growth			
(A) Business Angel Network: Halo Northern Ireland	Invest NI Intertrade Ireland	This is a joint initiative of Invest NI and InterTradeIreland and is delivered by the Northern Ireland Science Park. Its role is to match companies that have growth potential and are seeking investment with high net worth individuals or the angels, who may want to invest in them. There are currently over 100 investors involved with the network.	Halo investor meetings that take place approximately 5-6 times each year enable 6-7 companies to pitch to an audience of 50 business angels. Although run from within the NI Science Park, Halo is open to all NI companies except those operating in property or straight retail. Halo will look at all stages from start-up to establishment and both technical and non-technical companies. Since 2009, over £ 5m (€ 5.95) of investment

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
			from angels has been contributed to NI companies. The network is run by Alan Watts, Halo Director and Paul Clancy, Halo Manager.
(A) Access to Finance: NISPO Funds, Co-Fund NI, Growth Loan Fund, Ni Small Business Loan Fund, The Development Funds ⁵¹	INVEST NI	'Access to Finance' includes six funds in total. The funds are either debt or equity based, and are designed to support businesses of different sizes, or those at different stages of growth or development. In some cases, Invest NI is the sole provider of investment to the fund, whilst in others, it is one of several investors.	Over £ 100m (€ 119m) of available finance (financing period N/A)
(A) NISPO Funds	INVEST NI	The Northern Ireland Spin Out (NISPO) initiatives support start-up and early stage businesses in Northern Ireland.	The support includes a £ 7m/€ 8.33m venture capital fund, the Invest Growth Fund, which is provided by Invest Northern Ireland and focuses on seed and early stage businesses with high growth potential. NISPO also includes a £5m/€5.95m proof of concept fund, the Invest Growth Proof of Concept Fund, which is funded by Invest Northern Ireland to provide funding to very early, non-university projects. The Queen's University Belfast Innovation Fund (QUBIF) and the Ulster Innovation Fund (UIF) are £ 1m/€1 .19m venture capital funds, set-up to invest in post Proof of Concept, pre-commercialisation, spin-out companies. BUDGET (equity and grant): £ 17m (€ 20.23m)
(E) Loan Fund	Enterprise Northern Ireland	To support any businesses based in Northern Ireland that can demonstrate a viable business plan.	£ 1,000 - £ 25,000/€ 1,190 - € 29,750 BUDGET: £ 5m over 5 years (see also link below) http://www.investni.com/access_to_finance_small_business

⁵¹ <http://www.boostingbusinessni.com/jobs/access-to-finance/>

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
			_loan_fund.pdf
(D) SBRI – Driving Innovation Through Procurement	Technology Strategy Board	Opportunities for innovative companies to engage with the public sector to solve specific problems.	100% of funding through a contract and not a grant BUDGET: approximately £ 2.5m (€ 2.975m) per annum
(E) Propel Programme	INVEST NI	Aimed at high-calibre entrepreneurs who have the passion and energy to succeed on an international stage with businesses that have significant growth potential, particularly in international markets.	Up to £ 20,000/€ 23,800 in financial support, a series of 12 high quality training workshops, individual mentoring support from experienced international entrepreneurs, help with drafting an investor-ready business plan, shared work space and support to make overseas market visits BUDGET: annual N/A
Collaboration and networking			
(S) Collaborative Networks Programme	INVEST NI	Encouraging a cross-sectoral approach, which bridges the boundaries between traditional sectors and exposes companies to new markets, technologies & research opportunities. All projects are industry-led, focused on MATRIX identified priorities.	Support to collaborative networks in a number of ways from collaborative R&D, trade division services, design development, support for a feasibility study and full facilitation support. Minimum of four NI companies, project focused and private sector/company led. BUDGET: £ 1.75m (€ 2.0825m) per annum
(T) Competence Centres	INVEST NI	To support major proposals for the establishment of R&D Centres that will enhance the market-driven technological capability within Northern Ireland industry and universities to further stimulate the restructuring of the economy and, in particular, grasp the opportunities offered by new technologies.	Maximum amount of funding per project dependent on the quality of the proposal. Typical support up to 35% of eligible costs for industry and up to 50% for universities. BUDGET: £ 4m per annum

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
(S) INNOVA	Intertrade Ireland	<p>Support for strategic North/South collaborative innovation partnerships to develop new products, processes or service developments or to build on existing ones. Companies benefit from pooling their expertise and resources to bring their innovations to market faster than if working alone.</p> <p>Partners can work in the same sector or come from different but complimentary disciplines such as an environmental company working with an ICT organisation.</p>	<p>Up to £ 250k/€ 300k funding available per project.</p> <p>In 2013, projects in the following areas were sought: life and health sciences including polymers and plastics, agri-food, advanced engineering, advanced materials, telecoms, environment and ICT</p> <p>BUDGET: £ 1.4m (€ 1.666m) per annum</p>
(T) Collaborative R&D	Technology Strategy Board	<p>It encourages businesses and researchers to work together on innovative projects in strategically important areas of science, engineering and technology from which successful new products, processes and services can emerge, contributing to business and economic growth. Each £1 invested in collaborative R&D typically returns around £7 in GVA (Gross Value Added).</p>	<p>Co-funds partnerships between businesses, and business and academia.</p> <p>BUDGET: £ 2m (€ 2.38m) per annum</p>
(S) DEL Connected Fund	Department of Employment and Learning	<p>To encourage, ease and increase potential knowledge-exchange links between academia and industry, particularly SMEs. The pilot programme 2007-2010 was delivered by Queen's University Belfast and the University of Ulster, in partnership with the Association of Northern Ireland Colleges. The new programme - Connected 2 will be further enhanced through the addition of strategic links to the Agri-Food and Bioscience Institute (AFBI) and the College of Agriculture, Food and Rural Enterprise (CAFRE) that are designed to strengthen the offering to the agri-food sector.</p>	<p>Through the Connected Fund, businesses have coordinated access to the full portfolio of expertise represented by the six Regional Colleges and the two Universities, in terms of research, product development, knowledge transfer, innovation and training. This has assisted them to boost their competitiveness, develop new products and increase market opportunities.</p> <p>BUDGET: Employers support programme £ 2m (€ 2.38m) per annum (3 years); Connected - £ 1.2m (€ 1.428m) per annum over 4 years.</p>

Title (Service Innovation Approach: T, E, A, D, S)	Organisation	Objective	Type of support/Budget if available
(S) The Connected Health ECO System (NICH ECO)	DHSSPF INVEST NI	The ecosystem is a forum, which brings together stakeholders from the HSC, academia and business to discuss and take forward connected health solutions within Northern Ireland. The development of the Ecosystem was a priority set out in the Connected Health and Prosperity Memorandum of Understanding.	Work-shops BUDGET: N/A
(A) CAST Awards	DEL	Awards co-funded by DEL and industry in specific approved project areas. Project titles, as they become available, are advertised in appropriate local and national media. Full awards are available only to applicants who are normally resident in the UK.	The average maintenance allowance for eligible students in receipt of CAST awards is not less than £ 15,000/€ 17,850 per annum. BUDGET: N/A