

**Strategic Evaluation on Innovation and the Knowledge
Based Economy in Relation to the Structural and Cohesion
Funds, for the programming period 2007-2013**

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Executive Summary

Ireland has been a major recipient of European Union (EU) regional funding since 1973 when it first joined. Back then, its GDP per capita was just 64% of the EU average. In 2004, the figure was almost 130%. Throughout those 30 consecutive years, the Cohesion Funds and Structural Funds both contributed to growth of the ‘Celtic Tiger’, as Ireland used to be known.

Until 1999, EU intervention was mainly concentrated in three areas: human capital development, infrastructures, and investment to support productive sectors. In 2000, the Border, Midland and Western region and Southern and Eastern region were established to exploit the EU funds and attempt to bridge economic disparities between different areas of Ireland and the National Development Plan 2000-2006 included new operational programmes for the two regions.

In terms of innovation and knowledge, the Structural Funds 2000-2006 interventions have focussed on empowering the research capabilities of the third-level education system and of indigenous enterprises. The first objective was to transform Ireland into a world-class knowledge base location for research and innovation through massive investment by the National Development Plan (NDP) into universities and institutes of technology. The second objective was to boost innovation activities in Irish enterprises, particularly SMEs, in order to counterbalance the dominance of multinational enterprises in Irish business R&D. In addition, the establishment of the two regions has promoted these objectives at regional level.

In the period 2000-2006, the amount of funds allocated to research, technological development and innovation accounted for almost 9% of the total allocation for Ireland. The result has been to promote research activities in universities and institutes of technology and enhance the level of networking among universities and between universities and enterprises. At regional level, the two programmes have supported the creation and growth of SMEs through loans and training and incubation centres to strengthen their relationships with the third-level education system.

Despite the good results, the Irish innovation system needs reinforcement in order to be competitive in the global arena. The next intervention should boost the Irish research environment, but also strongly support other parts of the innovation process such as the availability of finance for entrepreneurs, the reinforcement of the higher-education system, particularly in the Border, Midland and Western region, and the promotion of process innovation and innovation for low-tech sectors. Also, the involvement of SMEs in the Structural Funds should be encouraged by lowering regulatory barriers, which have sometimes discouraged participation. Finally, various stakeholders have suggested that the next intervention should focus around a small number of big projects in which SMEs should be the main participant, contributor, and beneficiary.

This report is organised in five sections. The first section will provide a comparative overview of innovation capacity in Ireland at national and regional levels. The second section will analyse the institutional context of Irish innovation governance,

discussing the main bodies and policies for the promotion of innovation and knowledge policies in the Republic of Ireland. The third section will describe the Structural Funds intervention in Ireland in the period 2000-2006, focussing on measures to support innovation, their performance and their effects at national and regional levels. The fourth section will highlight the factors enabling innovation in the two Irish regions. The last section will summarise the Structural Funds orientations for the next term, as suggested by stakeholders from the central government agencies and bodies, and from the regional authorities.

1 Introduction

In March 2000, the EU Heads of State and government launched an ambitious political initiative to become “the most competitive, dynamic, knowledge-based economy by year 2010”. The agenda, which has become known as the ‘Lisbon Strategy’, has included a broad range of policies and regulatory measures to achieve this goal.

The 2005 Spring Council of European Union Heads of State and government concluded that all appropriate national and Community resources, including those of the Cohesion Policy, should be mobilised in order to renew the basis of Europe’s competitiveness, increase its growth potential and its productivity and strengthen social cohesion. The Council placed the main emphasis on knowledge, innovation and the optimisation of human capital. In short, the Council recognised that while progress had been made since 2000 towards the goals enshrined in the Lisbon Strategy, there remained a need for “a new partnership for growth and jobs”¹

To launch discussion on the priorities for a new generation of Cohesion Policy programmes, the Commission published draft Community Strategic Guidelines on 6 July 2005 entitled “Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013”. One specific guideline is to improve knowledge and innovation for growth. More specific areas of interventions proposed by the Commission, include improve and increase investment in RTD; facilitate innovation and promote entrepreneurship; promote the information society for all; and improve access to finance.²

Innovation is an important factor in releasing the potential of the Lisbon agenda. The knowledge captured in new technologies and processes can drive growth and competitiveness and create new jobs. But knowledge must be treated as part of a wider framework in which businesses grow and operate. Developing a knowledge-based economy requires adequate levels of investment in R&D, education and ICT as well as creation of a favourable environment for innovation.

Less developed areas of the Union are also confronted with this new competitiveness challenge. Increasing cohesion leads to improvements in living standards and the reduction of economic and social disparities, which depend to an important extent on increases in productivity. Increasing competitiveness implies economic change through the introduction of new technologies and new methods of production, as well as the development of new skills. Innovation is at the heart of this process. Technological and organisational change, and new demands generated by rising income levels, are factors that create new economic opportunities and therefore, contribute to the growth potential of these countries.

¹ Communication to the Spring European Council (2005) “Working together for growth and jobs: A new start for the Lisbon Strategy”, COM(2005) 141. Available at: http://www.europa.eu.int/growthandjobs/key/index_en.htm.

² Communication from the Commission (2005) “Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013”, COM(2005) 0299. Available at: http://www.europa.eu.int/comm/regional_policy/sources/docoffic/2007/osc/index_en.htm.

Structural Funds are the main Community instruments for the promotion of economic and social cohesion. In both past and current programmes, they have contributed to the enhancement of research potential and innovation in businesses and the development of the information society, particularly in the less developed areas. Cohesion Policy has also promoted the development of regional innovation strategies and other similar initiatives in the field of the information society.

The overall objective of the strategic evaluation study, as set out in the terms of reference, is that it should provide conclusions and recommendations for the future of Structural Fund and Cohesion Policy. In particular, the Strategic Evaluation will be used to prepare the negotiations with the Member States for 2007-13, to prepare the next operational programmes and to provide input into the 4th Economic and Social Cohesion Report.

In line with the tender specifications, this country report provides the following

- An analysis of the current situation in the field of innovation and the knowledge-based economy at national and regional level. For the national level, performance is compared to the average performance for the EU25 Member States plus Romania and Bulgaria; and at regional level, where possible given available statistics, compared to a typology of EU regions
- Lessons from experience of implementing innovation and knowledge economy measures in the Structural Funds, in terms of priorities and strategic approaches and operational implementation
- Main needs and potential for innovation in the eligible regions drawing on available studies, strategy development and future and foresight studies
- Recommendations on main investment priorities for Structural Funds over the programming period 2007-2013 and their implications for regional development.

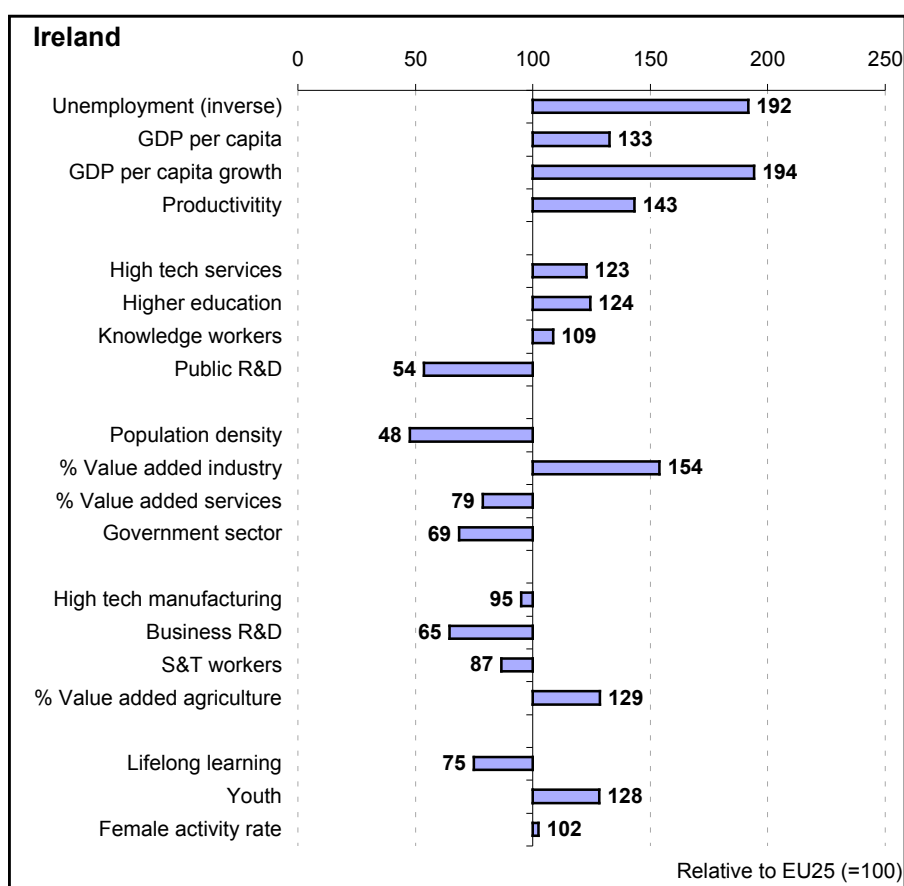
2 Investing in innovation and knowledge: a comparative overview of regional performance

This section provides a synthetic overview of the relative performance of the country, and where relevant main regions, with respect to the EU25 average for a number of structural indicators of innovation and knowledge. The analysis aims to identify the main disparities and needs at national, and wherever possible, regional levels in order to define priorities for future Structural Funds interventions (see sections 5 and 6 of this report).

2.1 Country overview: innovation and the knowledge economy

Exhibit 1 provides a snapshot picture of the relative position of Ireland compared to the EU-25 average for a series of key knowledge economy indicators.

Exhibit 1: Relative country performance for key knowledge economy indicators



Source: calculations of MERIT based on available Eurostat and national data from 2002-2003 depending on indicator. Detailed definitions and data for each indicator are provided in Appendix B.

Exhibit 1 shows the strong status of the Irish economy in terms of GDP per capita and productivity. Regarding research and development expenditure, however, Ireland is still behind the EU average for public and private R&D. This section will discuss further these aspects of the Irish system of innovation.

During 1994-1999, Ireland experienced an average real GDP growth rate of 8% per year with low inflation at 2.1%. However, at the beginning of 2000, inflation picked up to over 5% due to a weak Euro and rising oil prices. This reversed the positive trend of the Irish economy with a notable downturn in Irish international trade. However, by 2003, Ireland had the second highest GDP per capita, expressed in terms of purchasing power standards within the EU. In terms of GNP, Ireland fell back to the ninth place at 11% above the EU average. Nonetheless, Ireland remains one of the most preferred EU destinations for foreign direct investment with direct inward investment representing 17% of GDP. The EU average is just 1.7%.

Ireland's employment rate rose from 54% in 1995 to 65.5% in 2004. The female employment rate increased by over 14% in that period, the male rate by around 9%. Productivity in 2003, defined as GDP per person employed, was the third highest in the EU. A rise in unemployment rate from 3.6% in 2001 to 4.4% in 2004 can be attributed to the combination of two factors; an increase of 12.3% in population, over 4 million persons, in the period 1995-2004 and the halting of economic growth around 2000. In order to reduce unemployment, Irish government has stressed the necessity to improve the quality of the workforce and promote the involvement of younger people in high-skilled jobs. However, education presents a challenge, given the high proportion of early school leavers, representing 12.9% of the 18-24 age group in 2004. The unemployment rate for this group was 21.8% in 2004, almost three times that of all persons aged 18-24³.

The positive economic trend between 1994 and 2004 coexisted with improved performance in the Irish innovation system. At 1.4%, gross expenditure on R&D as a percentage of GDP is below the EU average of 1.9%. However, the level of government investment in R&D has grown from 0.5 bln EUR in 1994-1999 to 2.5 bln EUR over the period of the National Development Plan, 2000-2006. Business R&D grew at annual average rate of 15% over the period 1993-1999, starting from a very low base. In 2001, business R&D (BERD) was around 917 MEUR, two-thirds of which was performed by foreign affiliates and one-third by indigenous enterprises. In the case of foreign affiliates, almost 50% perform R&D in the electronic equipment sector, 20% in information and communication technologies (ICT), and 11% in biotechnologies. In the case of the indigenous firms, almost 40% perform R&D in ICT, more than 15% in electronics, more than 10% in the services sector, and more than 10% in food and tobacco⁴. However, business R&D performance is still below the OECD average. In 2004, BERD intensity as a percentage of GDP was 0.77% in Ireland, compared to OECD BERD intensity of 1.51% and EU BERD intensity of 1.17%⁵.

In terms of future R&D activities in Ireland, BERD is expected to increase from 917 MEUR in 2001 (0.9% GNP) to 2.5 bln EUR in 2010 (1.7% GNP). The number of indigenous companies with minimum-scale R&D activity (in excess of EUR 100,000) should double, from 525 in 2001 to 1,050 in 2010. The number of indigenous

³ Central Statistics Office Ireland. 2004. Measuring Ireland's Progress. http://www.cso.ie/releasespublications/documents/other_releases/2004/progress/measuringirelandsprogress.pdf

⁴ Forfás. 2004. Building Ireland's Knowledge Economy. Report to the Inter Departmental Committee on Science, Technology, and Innovation.

⁵ Forfás. 2005. Research and Development in Ireland, at a glance. www.forfas.ie

enterprises performing significant R&D (in excess of 2 MEUR) should increase from 26 in 2003 to 100 by 2010. Future plans also aim to increase the presence of foreign R&D confirming Ireland as an attractive country for foreign direct investment. The aim is that the number of foreign affiliate companies with minimum-scale R&D activity (in excess of EUR 100,000) should double, from 239 in 2001 to 520 in 2010. Finally, the number of foreign affiliates performing significant levels of R&D (in excess of 2 MEUR) should increase from 47 in 2001 to 150 by 2010.

Exhibit 1 shows that public R&D expenditure is below the EU average. The reason is apparent from the history of the public sector research environment. During the 1980s and 1990s there was little scope for high quality research in universities due to a lack of infrastructure, researchers and sources of funding. The only substantial finance available was the Framework Programme. Since 1998, significant actions have been taken in order to fill the gap and transform Irish third-level education into a world-class research environment. For example, the Programme for Research in Third Level Institutions (PRTL) has been crucial in enabling universities and institutes of technology to develop research infrastructures and long-term research programmes. In addition, the NDP 2000-2006 has increased financial support to R&D by committing 2.48 MEUR. It also invested 648 MEUR for the creation of Science Foundation Ireland (SFI), a foundation for research excellence. Together the PRTL and the SFI have strengthened the Irish research base, establishing several new research centres and long-term project fields such as human genomics and computational physics. However, R&D expenditure in higher education and public research institutes still lags the EU average. In 2002, higher education research expenditure reached 422 MEUR. The bulk of this investment comes from the government, which invested 88% of its total funding for R&D in the public research sector and third-level education. Foreign affiliates contribute to third-level research with 4% and indigenous businesses with just 5%, reflecting a low level of interaction between industry and the research base. In 2001, 17% of indigenous enterprises active in R&D collaborated with universities; in the case of foreign affiliates the percentage was 27%. In total 19% of the companies based in Ireland had forms of collaboration with third-level institutions. The percentage fell to 9% when foreign universities and research institutes were considered⁶.

In terms of future plans for public R&D, the objective is that R&D performance in higher education and the public sector should increase from 422 MEUR in 2001 (0.4% GNP) to 1.1 bln EUR in 2010 (0.8% GNP).

The various initiatives to improve the performance of the Irish innovation system have been beneficial in terms of availability of human resources for R&D. In 2004, Ireland had the equivalent of 5.7 researchers per 1,000 of total employment, compared to the OECD average of 6.6 with peaks of 17.7 in Finland and 10.6 in Sweden. However, the Irish education system is increasing its capacity to produce more science and engineering graduates. In 2001/2002, 29% of total graduates were in science and engineering. Ireland ranked fourth just behind Sweden (32%), France (30%), and Finland (30%)⁷. This effort needs to be encouraged and reinforced. In fact, expectations are that Ireland will require an additional 8,000 researchers over the period 2005 - 2010. It has been estimated that half of these can be produced in Ireland

⁶ Forfás. 2004. Building Ireland's Knowledge Economy. Report to the Inter Departmental Committee on Science, Technology, and Innovation.

⁷ Forfás. 2005. Research and Development in Ireland, at a glance. www.forfas.ie

and the rest must come from a combination of further increases in domestic supply and attraction of researchers from abroad. Consequently, the number of researchers should reach 9.3 per 1,000 of total employment by 2010, from approximately 5.1 per 1,000 in 2001.

In 2003 the output of the Irish innovation system ranked 11th above the EU average in terms of the number of scientific publications per million population. However, Ireland still lags small countries such as Finland, Denmark, Belgium, and Austria. Using patents granted as a science and technology output indicator, in 2002 USPTO granted Ireland 32 patents per million population, compared to Sweden with 187 patents, Finland 159, and Belgium 60. A similar pattern is observable from the EPO database⁷.

In terms of entrepreneurship, Ireland is performing well. Its early stage venture capital rate is close to the EU average, as revealed by its rating on the European Innovation Scoreboard. The Global Entrepreneurship Monitor (GEM) 2004 report confirms this trend, defining Ireland as one of the most entrepreneurial countries in Europe, raking it second after Poland among the EU countries and seventh among the OECD countries. In 2004, 2000 new businesses were established and GEM has estimated that 100,000 new jobs were created as result of entrepreneurial activity.

2.2 Regional disparities and recent trends

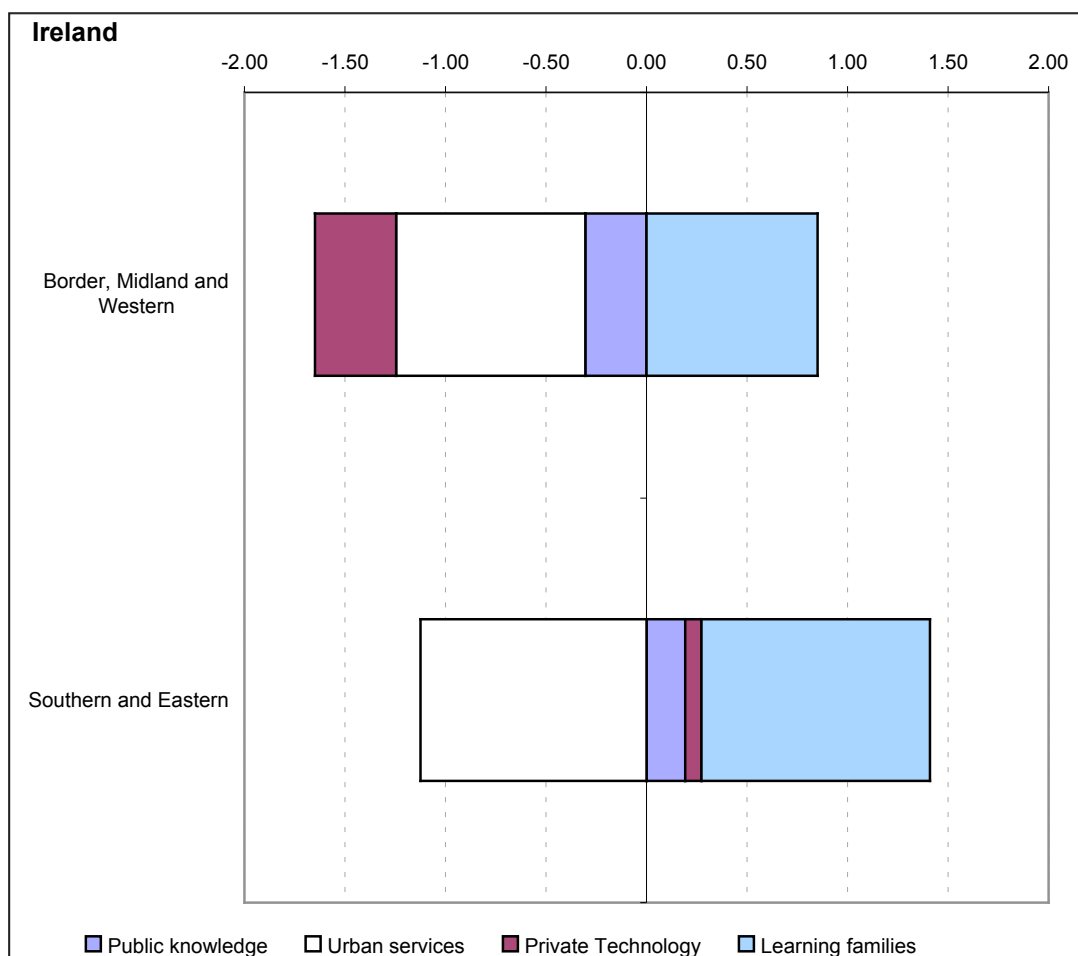
In order to analyse and describe the knowledge economies at a regional level in the EU, the approach adopted was to reduce and condense all relevant statistical information available for a majority of regions. The approach involved firstly reducing the information from a list of selected variables into a small number of factors by means of factor analysis. These factors are

- Public Knowledge (F1): human resources in science and technology combined with public R&D expenditures and employment in knowledge intensive services. Regions with large universities will rank high on this factor.
- Urban Services (F2): The most important variables for this factor are value-added share of services, employment in government administrations and population density. A key observation is that academic centres do not necessarily co-locate with administration centres.
- Private Technology (F3) This factor is most strongly influenced by business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries.
- Learning Families (F4). The most important variable in this factor is the share of the population below the age of 10. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation-friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

The recent growth of the Irish economy has favoured some areas over others and increased disparities across the country. To address this, in 1999 Ireland was divided into two regions: Border, Midland and Western region and Southern and Eastern region. Applying the taxonomy described in Appendix A, they can be classified as Learning Regions. The Learning Regions are firstly characterised by a high score on the factor ‘Learning Families’, and the three main components of this factor, life long learning, youth and female activity rate. On the other factors, the regions are close to the regional average. Unemployment is on average the lowest compared to other EU regions; employment in the government sector is limited; GDP per capita is rather high. The regions are located in Austria, Ireland, the Netherlands, Sweden and the UK. There are many similarities between the Irish regions and Nordic high-tech Learning Regions, but the business sector in the Nordic version invests more in R&D.

Even if the two Irish regions has been classified as same type of region, Ireland is experiencing economic growth at two speeds, as illustrated in exhibit 2. On the one side, the richer Southern and Eastern (S&E) region, principally areas in and around Dublin and Cork; on the other side the Border, Midland and Western (BMW) region.

Exhibit 2: Regional factor scores per region



Source: MERIT. The bars are stapled factor-scores showing the deviation (1=standard deviation) per factor from the average of 215 EU regions (0.00). The longer the bar, the bigger is deviation. Detailed regional scorecards for all regions can be found in Appendix B.

Most of Ireland's recent growth can be attributed to the Southern and Eastern region. In 2002 Gross Value Added (GVA) per capita in the BMW region was 69% of the state average, while in the S&E it was 111% of the state average with a peak of 131% in the South West and a minimum of 82% in the Mid West. It is important to recall that this unbalanced growth occurred during a period of extreme positive national economic growth. The distribution of GVA per sector does not show sharp differences between the two regions. In term of percentage share of GVA, in 2002, agriculture accounts for 5.7% in the BMW region and 2.0% in S&E region, the service sector for 57.9% in the BMW region and 55.4% in the S&E region, and manufacturing for 36.4% in the BMW region and 42.5% in S&E region. In the case of the manufacturing sector, high-tech industries are mainly located in the S&E region and owned by foreign affiliates. In addition, the service sector in the S&E region is dominated by software industries⁸. In 2003, 9% of the large ICT companies were located in the Border, Midland, and Western region and 91% of them in the other region. In the case of the pharmaceutical sector, 88.9% of large firms were located in the Southern and Eastern region⁹.

Considering disposable income per person, the Southern and Eastern region scored 3% above the national average with a peak in the Dublin area, which was itself 13.4% above the national average. In the case of Border, Midland, and Western region, disposable income per person was 8.2% below the national average and the Border region alone was 10.2% below the state average.

Regarding the workforce, between 2000 and 2005 total employment in the BMW region increased nearly 22% compared to 13% in the S&E region. In 2005, the unemployment rate in the BMW region was 4.3% and 4.2% in the S&E region. However, these data are derived from home address whereas significant commuting occurs across regional boundaries. For example, statistics reveals that many workers prefer living in the Midland counties and working in Dublin¹⁰.

All these figures suggest the existence of disparities between the BMW region and S&E region, and between areas of the S&E region. The Audit of Innovation in the BMW region has highlighted different patterns of growth between the two regions arguing that the decline of the traditional industries, primarily manufacturing, has been acute in the BMW region¹¹. Given incapacity to attract higher technology replacement industries, the result is an economy based mainly on traditional sectors, but also seeing a process of brain migration towards the S&E region. The Central Statistic Office (CSO) of Ireland indicates that the country's population will increase from 3.92 million in 2002 to 5.07 million in 2021. However, it projects that 45% of that increase will be concentrated in the Greater Dublin Area, due to a lack of attractiveness and opportunities in the BMW region.

The reasons for this are several. As already mentioned, Ireland is one of the favourite destinations for foreign direct investment. Over the years, these investments have been mainly concentrated in the S&E region, which has exploited foreign research and development activities and the innovative attitude brought by multinational

⁸ Central Statistics Office, Ireland.

⁹ BMW Regional Assembly. 2004. Audit of Innovation in the BMW Region. Final Report

¹⁰ Fitzpatrick Associates. 2005. Community Support Framework 2000-2006. Update Evaluation

¹¹ Border, Midland and Western Regional Assembly. The Regional Divide. Briefing Paper.

enterprises. The S&E region has also been the main beneficiary of public expenditure in R&D. In 2002, government R&D expenditure was 15 MEUR in the BMW region and 110.2 MEUR in S&E; higher education R&D expenditure was 33.8 in the BMW region and 288.5 in the S&E region. This sharp disparity is also due to capacity constraints of the system of innovation in Border, Midland and Western. The ‘knowledge production system’ of universities and institutes of technology is sharply differentiated between the two regions. In 2000, the only university in the BMW region was NUI Galway with 8,655 full-time students and 1,126 part-time students. In addition, there were six institutes of technology and further education with a total of 15,050 full-time students and 2,346 part-time students. In contrast the S&E region had seven universities with 58,259 full-time students and 10,179 part-time students and ten institutes of technology with 31,374 full-time students and 14,158 part-time students¹².

Analysis of regional innovation performance in Ireland reveals two types of Learning Region. The Southern and Eastern region has a high-concentration of innovation activities promoted by a great flow of foreign direct investment, a strong network of universities and institutes of technology, and widespread utilisation of public R&D expenditure. In contrast, Border, Midland, and Western can be defined as a “catching-up learning region”. Low R&D resources, a weak knowledge production system, and brain migration decelerate growth and slow down convergence towards the S&E region. Exhibit 3 confirms these differences between the two regions and their performance in relation to the EU average.

It is also important to emphasise that innovation performance is not equally distributed in the Southern and Eastern region. The Greater Dublin Area and the South West represent the knowledge core of the region and Ireland. Other parts of the region are suffering the same delays experienced by the Border, Midland and Western region.

Exhibit 3: recent trends per region in key indicators

	Unemployment	Per capita GDP	Industry share	Agriculture share	Population density	Tertiary education	R&D intensity
	1996-2003	1996-2002	1996-2002	1996-2002	1996-2002	1999-2002	1996-2002
	%-pnt ch.	% growth	%-pnt ch.	%-pnt ch.	% growth	%-pnt ch.	%-pnt ch.
EU25	--	--	--	--	--	--	--
Ireland	-6.90	9.25	3.94	-3.93	7.95	5.40	-0.15
Border, Midland and Western IE01	-7.00	7.24	-0.80	-6.72	7.59	5.34	--
Southern and Eastern IE02	-6.90	9.73	4.99	-3.12	8.21	5.45	--

Source: MERIT based on Eurostat data for period indicated

¹² Roper, S. Hewitt-Dundas, N., Savage, M. 2002. Benchmarking Innovation Performance in Ireland’s Three NUTS 2 Region. Innovation Lab.

2.3 Conclusions: innovation and knowledge performance

This chapter has discussed the growth potential of the Irish innovation system, but also, its unbalanced nature with both rich and catching-up areas. Exhibit 4 summarises these disparities and suggests key requirements to reduce the innovation gap.

Exhibit 4: summary of key disparities and needs per region

Region / group of regions	Key factors explaining disparity of performance (weaknesses)	Key needs in terms of innovation and the knowledge economy
Border, Midland, and Western Region	<ul style="list-style-type: none"> - Lack of research and development infrastructures. - Lack of R&D funds - Low capacity of absorption by the third-level education system. - Incapacity to attract foreign investments. - Difficulties in developing new productive sectors. 	<ul style="list-style-type: none"> - Research funding should be devoted to institutes of technology to reinforce their research capabilities. - Improve interaction between educational, research institutions and enterprise. - Enhance R&D expenditure also in low-tech sectors. - Balanced regional development as core priority of government policy. - Major involvement of local authorities in strategic planning in favour of innovation and knowledge. - Introduce a system of regional targets in order to ensure balanced and coherent regional actions. Enhancing the use of regional indicators.
Southern and Eastern Region	<ul style="list-style-type: none"> - The regional innovation system is mainly localized in Greater Dublin Area, Cork, and Limerick. The remaining part is experiencing similar problems to those of the Border, Midland, and Western region. 	<ul style="list-style-type: none"> - Balanced regional and local development should be a core priority for government and regional policy. Re-think interventions to close divide. - Introduce a system of regional targets in order to ensure balanced and coherent regional actions. Enhance the use of regional indicators. - Enhance the international prestige of universities through policies for international engagement and students/researchers exchange.

3 Innovation and knowledge: institutional context and policy mix at national and regional levels

Structural Fund support for innovation and knowledge is contingent on and seeks to strengthen the existing national (and/or regional) innovation system¹³ in each Member State. Institutional, legal and financial factors in the innovation system can limit the potential for certain types of intervention. Moreover, within the framework of the EU Lisbon objectives, Structural Fund interventions are expected to complement and provide added value to national (or regional) policy frameworks. In some Member States, Structural Fund interventions to support innovation and knowledge are marginal with respect to the national investment and policy effort; in others Structural Funds are the main source of funding for such interventions. In both cases, there is a need to identify relevant national and EU policies that can have an impact on funding priorities.

3.1 Institutional and legal framework for innovation and the knowledge economy

This section of the report appraises two broad factors that condition the potential for coordinated intervention of EU and national (regional) policies in favour of innovation and knowledge

- The first concerns the organisational structures of public and semi-public bodies responsible for the design, implementation and monitoring of innovation and knowledge economy policies. In particular, the analysis considers the responsibilities for funding or managing specific types of measures liable to be considered for support under the Structural Funds
- The second concerns the institutional, legal and financial frameworks that condition the linkage of national (regional) financing with EU financing.

The national innovation decision-making system is divided between different governmental departments and agencies. Exhibit 5 shows the involvement of these bodies in various innovation policy areas. It is possible to identify three main levels of bodies in the Irish innovation governance. The first level is the policy making level. The Department of Enterprise, Trade and Employment (DETE), and specifically the Office of Science and Technology, is the main body at this level. The DETE operative hand is Forfás, which covers the promotion of research and innovation in Ireland. The Department of Education and Science (DES) is responsible for education, lifelong training, and third-level education. Two committees complete the policy making level: the Cabinet Subcommittee on Science, Technology and Innovation and the Inter-Departmental Committee for Science, Technology and Innovation. The former is composed of senior ministers. The latter is in charge of the inter-departmental coordination of the DETE.

¹³ The network of organisations, individuals and institutions, located within or active within national or regional boundaries, that determine and shape the generation, diffusion and use of technology and other knowledge, which, in turn, explain the pattern, pace and rate of innovation and the economic success of innovation.

The second level is made up of advisory bodies. The Chief Science Adviser reports to the Sub-committee, the Advisory Council for Science, Technology, and Innovation to the Government, the Expert Group on Future Skills Needs to DETE and DES, and the National Competitiveness Council to the Deputy Prime Minister.

The implementation level is made up of several agencies such as Forfás, Enterprise Ireland, IDA Ireland, Science Foundation Ireland, and the Higher Education Authority. Other departments and agencies, such as the Department of Communications, Marine, and Natural Resources, and Department of Agriculture and Food, have room for manoeuvre within Irish innovation governance for specific research purposes.

The complexity of Irish innovation governance tends to fragment and segment the policy-making process. For example, tension between the DES and the DETE over control of the RTDI budget has created contrasts in the implementation of the national innovation strategy. However, the introduction of inter-departmental bodies such as the Inter-Departmental Committee for Science, Technology, and Innovation and the Chief Science Adviser should re-equilibrate divergences at national level. The effect is already detectable in the administration and management of the Structural Funds interventions to support innovation and knowledge. The PRTLTI (Programme for Research in Third Level Education), for example, which was developed by the DES, is partly funded by EU and now managed by the DETE. This centralised governance system, however, is experiencing some new problems with the introduction of the two regions. Regional assemblies claim that the involvement of local authorities in the planning of Structural Funds intervention has been insubstantial, particularly in the case of actions to support innovation and knowledge. Constructive integration between regional governments and central government is an important and new issue for the Irish innovation governance system.

The existence of several bodies with competencies in innovation policy, as discussed previously, has been emphasised as the major legislative and operational problem by several reports such as the Enterprise Strategy Group report. The argument is that some bodies are finding difficult to pursue a balanced range of innovation policies, as their staff expertises and organization are better suited to other areas. In addition, many bodies have other responsibilities, which do not regard innovation policy. As discussed previously, this problem has been faced reducing the number of bodies and creating inter-bodies organization. However, this process requires continuous assessment and renewal in order to ensure that the system is adequately tuned to an adequate range of innovation policy.

Finally, legislative actions are necessary in areas, which affect innovation performance. For instance, the intellectual property rights legislation is still based on the Tax Relief – Patent Royalty Exemption, delivered in the 1983, whereby royalties received from use of patent are exempt from income and corporate tax. However, the patenting process has received little attention by the government. The Commercialisation Fund, established in 2001 and reinforced in 2003, tries to encourage patent registration. However, considering the challenges introduced to the IP system in general by new technologies and the uncertain nature of commercialisation of scientific research, the Irish intellectual property rights system deserve a legislative re-thinking to positively affect innovation.

Regarding financial issues, the Enterprise Strategy Group report claims that the existing favourable corporate tax climate in Ireland should be encouraged in order to maintain Ireland's international competitiveness.

Exhibit 5: main organisations per policy area.

	Type of organisation	
Policy objectives	National (&/or regional) public authorities and agencies	Key private or non-profit organisations
Improving governance of innovation and knowledge policies	<ul style="list-style-type: none"> - Cabinet Sub-Committee on Science, Technology, and Innovation - Inter-Departmental Committee (IDC) for Science, Technology, and Innovation. - Office of Science and Technology (OST) Department of Enterprise, Trade and Employment (DETE). - Southern and Eastern Regional Assembly. - Border, Midland, and Western Regional Assembly. - Department of Education and Science (DES). - Forfás - Advisory Council for Science, Technology, and Innovation. - National Competitiveness Council - Expert Group on Future Skills Needs - Chief Science Adviser 	<ul style="list-style-type: none"> - Irish Research and Development Group - Irish Universities Association
Innovation friendly environment	<ul style="list-style-type: none"> - OST – DETE. - Regional Assemblies - Higher Education Authority (HEA). - DES - Training and Employment Authority (FAS). - Department of Public Enterprise. - Forfás. - Enterprise Ireland 	<ul style="list-style-type: none"> - Irish Business Employers Confederation (IBEC) - Small Firms Association - Enterprise Boards
Knowledge transfer and technology diffusion to enterprises	<ul style="list-style-type: none"> - OST – DETE. - DES. - Patent Office. - Regional Assemblies - Forfás - Enterprise Ireland 	<ul style="list-style-type: none"> - Irish Research Development Group (IRDG). - Irish Universities Association - Enterprise Boards

Innovation poles and clusters	<ul style="list-style-type: none"> - OST – DETE - IDA Ireland - Regional Assemblies - Forfás - Enterprise Ireland 	<ul style="list-style-type: none"> - Small Firms Association - Enterprise Boards
Support to creation and growth of innovative enterprises	<ul style="list-style-type: none"> - DETE - Regional Assemblies - IDA Ireland - Forfás - Enterprise Ireland 	<ul style="list-style-type: none"> - Irish Business Employers Confederation (IBEC) - Small Firms Association - Enterprise Boards
Boosting applied research and product development	<ul style="list-style-type: none"> - OST –DETE - DES - TEGASC - Department of Communications, Marine, and Natural Resources. - Research Councils - Science Foundation Ireland - Higher Education Authority - Regional Assemblies - Forfás 	<ul style="list-style-type: none"> - Irish Research and Development Group (IRDG) - Irish Universities Associations

Source: study team based on national/regional policy documents, TrendChart reports, OECD reports, etc. See appendix C for a detailed definition of the policy categories.

3.2 Policy mix assessment

This section provides analysis of the national and regional policy mix in support of innovation and knowledge within which the Structural Fund interventions take place. Analysis is conducted with respect to seven broad categories of objectives of innovation and knowledge policies (see Appendix C for an explanation of each category).

Measures identified per category of the policy objectives are then further sub-divided in terms of the direct beneficiaries of funding (or legislative) action. To simplify, the report adopts three broad types of organisation as targets of policy intervention:

- Policies supporting academic and non-profit knowledge creating institutions
- Policies supporting intermediary/bridging organisations involved in innovation support, technology transfer, innovation finance, and so on
- Policies supporting direct innovation activities in the private sector.

The matrix below summarises the current policy mix at national level. A simplified coding system is used with intensity of support (financial or political priority) for different policy areas and targets indicated by a colour coding system. The coding has uses financial data from the National Development Plan (NDP). The NDP invests almost 17% of the total commitment in the Productive Sector operational programme. Almost 48% of this investment finances the Research, Technological, Development and Innovation priority, which aims to strengthen the research capacity of Ireland

through the involvement of the third-level education system and private enterprises. At regional level, the National Development Plan invests almost 12% of the regional commitment in supporting creation of enterprises and incubation centres. The data suggests that the NDP has given high priority to the promotion of knowledge and technological transfer, training, and financial support for public and private actors. It also emphasises the development of R&D capability with particular emphasis on third level education.

Exhibit 6: Policy mix for innovation and knowledge

Policy objectives	Target of policy action		
	Academic /non-profit knowledge institutions	Intermediaries/bridging organisations	Private enterprises
Improving governance of innovation and knowledge policies	<ul style="list-style-type: none"> National Development Plan (2000-2006) National Foresight such as “Building Ireland’ Knowledge Economy” Regional Foresight 	<ul style="list-style-type: none"> National Development Plan (2000-2006) National Foresight such as “Building Ireland’ Knowledge Economy” Regional Foresight 	<ul style="list-style-type: none"> National Development Plan (2000-2006) National Foresight such as “Building Ireland’ Knowledge Economy” Regional Foresight
Innovation friendly environment	<ul style="list-style-type: none"> Initiatives, which aim to improve innovative performance of the private sector by improving its employee’s capabilities Marketing initiatives Commercialisation Fund 		<ul style="list-style-type: none"> Tax reduction for companies Intellectual Property – Tax Relief’s Various forms of business supports Courses on technology and R&D management Marketing initiatives
Knowledge transfer and technology diffusion to enterprises	<ul style="list-style-type: none"> Regional Innovative Actions FUSION programme: knowledge transfer between industry and academia Innovation Partnership Scheme supports the undertaking of collaborative research between industry and academia Advance Technologies Research Programme stimulates R&D in the Third level sector Campus Companies Programme supports spin-offs formation in the universities and Institutes of Technology INNOVA 	<ul style="list-style-type: none"> Regional Innovative Actions 	<ul style="list-style-type: none"> Regional Innovative Actions Regional Innovative Actions FUSION programme: knowledge transfer between industry and academia Innovation Partnership Scheme supports the undertaking of collaborative research between industry and academia Simulating R&D in companies by tax incentives INNOVA

Innovation poles and clusters	<ul style="list-style-type: none"> Promotion of regional clusters in food and eco-tourism. Promotion of national and international clusters in bioengineering and medical devices 	<ul style="list-style-type: none"> Promotion of regional clusters in food and eco-tourism (Regional parks). Promotion of national and international clusters in bioengineering and medical devices (Science parks). 	<ul style="list-style-type: none"> Promotion of regional clusters in food and eco-tourism. Promotion of national and international clusters in bioengineering and medical devices.
Support to creation and growth of innovative enterprises	<ul style="list-style-type: none"> Creation of R&D space for SMEs in the Institutes of Technology 	<ul style="list-style-type: none"> Creation of Regional Business Incubation Centres. 	<ul style="list-style-type: none"> Encouraging availability of seed capital and venture capital Business Expansion Scheme for companies financial support Creation of R&D space for SMEs in the Institutes of Technology
Boosting applied research and product development	<ul style="list-style-type: none"> Stimulating R&D in third level sector. 		<ul style="list-style-type: none"> Stimulating R&D in companies. Research Technology and Innovation Competitive Grant.
Legend			
Top policy priority			
Secondary priority			
Low priority			

Source: calculations of study team based on national/regional policy documents, TrendChart reports, OECD reports, etc.

From the 1970s to the 1990s, Ireland has focussed on employment growth through attracting multi-national enterprises and developing export-led indigenous industry. In 2000, the focus switched towards innovation to attract MNCs with R&D facilities to establish local R&D capabilities. This switch occurred simultaneously with the establishment of coordination bodies such as the Chief Science Advisor, the Cabinet Subcommittee on Science, Technology and Innovation, and the Inter-Departmental Committee for Science, Technology, and Innovation. The new Irish philosophy towards innovation has produced several documents and measures that move the financial and political efforts towards the promotion of Irish R&D. These are focussed on indigenous SMEs, enhancement of research quality in third-level education, and the development of innovation networks between the private sector, universities and research institutes.

The re-organisation of the innovation governance system and the creation of the two regions in 2000 have raised awareness of the need to improve governance capacities at national and regional level. The National Development Plan and the Community Support Framework have fostered the use of studies, evaluations, indicators, and targets. For example, the report 'Building Ireland's Knowledge Economy' proposes R&D targets in relation to the Lisbon goals. At the regional level, the Border,

Midland and Western regional assembly has undertaken regional foresight, audit, and evaluations.

Establishing a friendly environment conducive to innovation is undoubtedly one of the priorities. Several measures have been implemented to support innovative activities in the private sector and universities; tax reduction for companies engaged in incremental R&D and exploitation of intellectual property rights; professional training in R&D management and collaborative R&D between universities and firms; marketing initiatives for the promotion of Irish R&D; and the creation of a business angels database. At university level, the Commercialisation Fund tries to promote spin-off culture in order to exploit universities' knowledge. At the regional level, the County Enterprise Boards provide grants, loans, and assistance to micro enterprises.

The policy area 'knowledge transfer and technology diffusion to enterprises' pays particular attention to regional initiatives in support of innovation. The Regional Innovation Action Programme has been implemented in both regions and partly funded by the EU under its Innovative Actions Programme. The principal aim is to transfer knowledge from the higher education system to rural SMEs. At national level, the FUSION programme and the Innovation Partnership promote the development of collaborative research networks between industry and third level colleges. Other schemes, such as the Advanced Technologies Research Programme and Campus Companies Programme, aim to stimulate R&D in the third-level sector and, in the case of Campus Companies Programme, to commercialise R&D. Finally, INNOVA promotes collaborative R&D between firms with support of public research organisations as required.

The National Development Plan includes measures for regional and national networks and technology parks. The aim is to boost the development of regional innovation poles and clusters in ICT, food industry, and eco-tourism. At national level, the objective is to reinforce the pharmaceuticals and bioengineering sectors through the creation of clusters of national and international firms.

Enterprise Ireland is the main implementation body of initiatives in the policy area 'support to creation and growth of innovative enterprises'. National measures, such as the Business Expansion Scheme (BES), support start-ups and encourage the availability of seed and venture capital. However, the main focus of Enterprise Ireland is on companies with more international potential. This implies that the support delivered to micro-enterprises is weak. The other point of attention of this policy area is the creation of incubation centres, particularly at regional level. This is the case of Regional Business Incubation and R&D Space in Institutes of Technology, which are partly funded by EU intervention.

The policy area 'boosting applied research and product development' strongly emphasises the necessity for R&D activities in the private sector and in the third-level sector. For example, the Research Technology and Innovation Competitive Grant scheme supports lead-projects in product and process development and is a key action in the National Development Plan 2000-2006.

In terms of overall resources, the National Development Plan 2000-2006 has invested massively in research and development. Almost 850 MEUR has been used to

undertake basic research and more than 500 MEUR has been committed to the PRTLII programme to boost research in universities. Science Foundation Ireland and the Higher Education Authority manage these funds respectively. In addition, almost 1,300 MEUR has been used by Enterprise Ireland and IDA Ireland to push innovation and R&D in the private sector. In conclusion, almost 70% of all the NDP investment is directed to public research institutes, universities and institutes of technology. The remaining 30% is devoted to the private sector.

The vision of Ireland as a world-class research country depends on policies that stimulate businesses to do more R&D, promote a culture of entrepreneurship among researchers, and foster linkages and innovation networks between universities and firms. The policy mix illustrated above is working in these directions and strongly emphasises the role of the private sector and universities. However, this strong approach can weaken other parts of the innovation system. For example, not enough attention is paid to intermediary actor. The implementation of venture capital and entrepreneurial scheme focussed on high-tech sectors can limit the effort to support micro-enterprises in medium and low-tech sectors. This is particularly relevant for the less developed areas of Ireland. Finally, major coordination between implementation and policy level bodies, particularly at regional level, is also necessary to properly channel schemes and initiatives.

3.3 Conclusions: the national innovation system and policy mix

Exhibit 7: Key opportunities and constraints for investment by the Structural Funds

Policy objectives	Opportunities for Community funding (national priorities)	Constraints or bottlenecks (factors limiting Community funding)
Improving governance of innovation and knowledge policies	<ul style="list-style-type: none"> - Improvement of institutional condition, particularly at regional level, by using foresight, audit, and evaluation exercises. - Rationalising R&D planning targeting more catching-up areas. 	<ul style="list-style-type: none"> - Coordination between implementing bodies and policy-making bodies.
Innovation friendly environment	<ul style="list-style-type: none"> - Reinforcement of financial engineering schemes for SMEs and micro-enterprises. - Improvement of management skills 	<ul style="list-style-type: none"> - Lack of emphasis on intermediary actor such as services to SMEs and new businesses.
Knowledge transfer and technology diffusion to enterprises	<ul style="list-style-type: none"> - Reinforcement of regional innovative actions. - Emphasising the culture of innovation networks among SMEs - Involvement of SMEs in international collaborative framework such as FP7, Craft 	<ul style="list-style-type: none"> - The density of the universities/Institutes of Technology/ private sector is low in some areas. - Lack of emphasis on intermediary actor such as services to SMEs and new businesses.
Innovation poles and clusters	<ul style="list-style-type: none"> - Clusters in ICT and biotechnologies are an efficient gateway to enhance the international prestige of Irish industry. - Regional/local clusters on low and medium-tech sectors can reinforce local SMEs competitiveness and promote entrepreneurial culture. 	<ul style="list-style-type: none"> - Lack of emphasis on development of poles and clusters. - Intermediary actors are necessary to boost the creation of poles and clusters.
Support to creation and growth of innovative enterprises	<ul style="list-style-type: none"> - Reinforcement of entrepreneurship training at private level, but also at the university level to encourage spin-off culture. - Improving the role of institutes of technology in supporting new firms creation. 	<ul style="list-style-type: none"> - Start-ups assistance is too focus on SMEs with an international potential. The attention on micro-enterprises is weak.
Boosting applied research and product development	<ul style="list-style-type: none"> - Enhancing cooperation between firms and universities in new and incremental product development. - Promoting the involvement in FP7 and Coop-Craft. 	<ul style="list-style-type: none"> - The level of total R&D expenditure is the main problem.

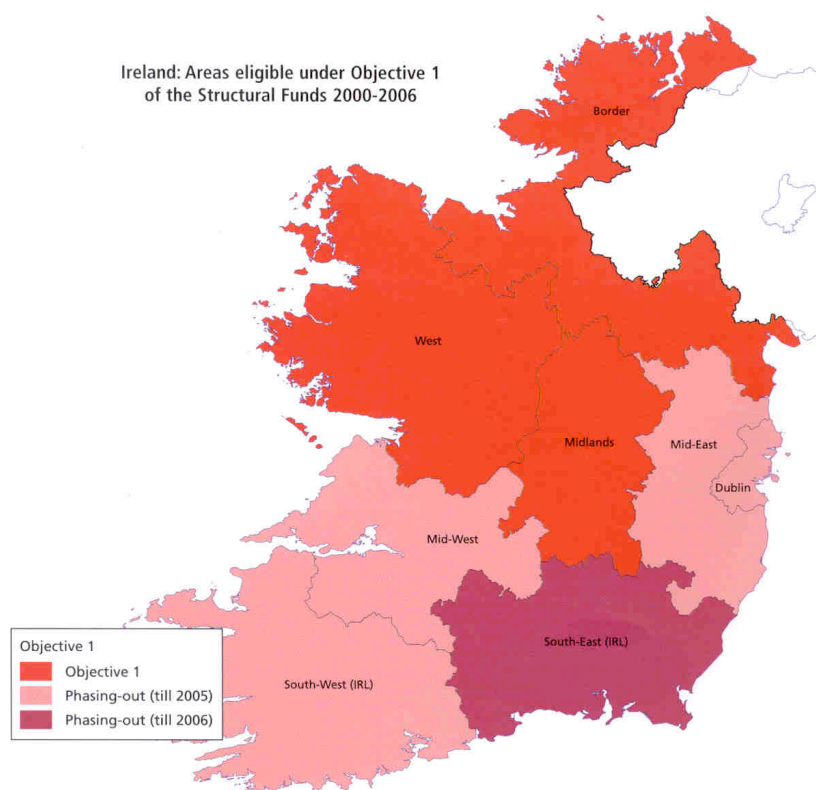
4 Structural Funds interventions to boost innovation and create a knowledge economy: 2000-2006

This section provides analysis of Structural Fund expenditures in the fields of innovation and knowledge-based economy during the current programming period (2000-2006 for EU-15, or 2004-2006 for the new Member States). It examines spending patterns from both a strategic point of view (the policy mix pursued by the Structural Funds programmes) and at an operational level (consumption of funds, management of innovation measures, indications of relative effectiveness of measures, case studies of ‘good’ practice).

4.1 Strategic framework for Structural Fund support to innovation and knowledge

4.1.1 Strategic approach to innovation and knowledge in Structural Fund programmes

The territory of Ireland has been divided into two areas of Cohesion Policy intervention: the Border, Midland and Western Objective 1 region and the Southern and Eastern Objective 1 in transition region. (See map)



1. This figure includes the CSF's 1989-1993 and 1994-1999, Community Initiatives and Cohesion Funds.

The Structural Funds intervention in Ireland is included in the National Development Plan (NDP). The NDP is the government's investment programme for the period 2000-2006. It is based on four strategic objectives: continuing sustainable national economic and employment growth; consolidating and improving Ireland's international competitiveness; fostering balanced regional development, and promoting social inclusion. The Community Support Framework (CSF) is the subset of measures within the NDP that is co-funded by the EU Structural Funds. The CSF co-finances 112 measures and sub-measures in all across seven NDP Operational Programmes (OPs): Economic and Social Infrastructure; Employment and Human Resources Development; Productive Sector: the two Regional Operational Programmes; the PEACE II programme and the Technical Assistance Operational Programme. In addition to the Structural Funds, Ireland has also received Cohesion Funds until the end of 2003, mainly for environmental infrastructure and transport projects.

Measures and projects in support of innovation and knowledge are included in four operational programmes: the Productive Sector Operational Programme (PSOP); the Border, Midland and Western Regional Operational Programme; the Southern and Eastern Regional OP, and the PEACE II programme.

The main aim of the PSOP, the principal programme in favour of innovation and knowledge, is to raise productivity levels in all sectors in an environmentally sustainable way. The Irish business system is based on the attraction of foreign direct investment and Irish-owned small and medium enterprises. The Operational Programme aims to sustain the development of the Irish SMEs through the promotion of research and development, inter-firms collaboration, linkages between universities and firms, promotion of spin-offs and start-ups, and the improvement of research capability in third-level education.

The two regional Operational Programmes are organised in four priorities, including measures in support of innovation and knowledge. The Local Enterprise Development priority includes the measure, Regional Innovation Strategies, which aims to balance the paucity of RTDI infrastructures in the two regions, and the Micro-Enterprise measure, which provides financial support and assistance for SMEs.

Finally, the Peace II Operation programme, which involves the Northern Ireland and the Border areas of Ireland, includes measures to support formation and growth of SMEs.

The following is an analysis of the allocation of Structural Funds in support of innovation and knowledge for the different operational programmes.

The calculations presented in the two exhibits below are based on the allocation of Structural Fund budgets based on the intervention code classification. For practical purposes, the calculation of financial resources allocated to innovation and knowledge has been limited to the following RTDI codes:

- 181 Research projects based in universities and research institutes
- 182 Innovation and technology transfers, establishment of networks and partnerships between businesses and/or research institutes
- 183 RTDI infrastructure
- 184 Training for researchers

Additional calculations based on broader definitions of innovation are presented in Appendix D.

Exhibit 8: Overall allocation of resources at an Objective 1 and 2 level (planned figures in EUR)

Objective	Total cost	SF			NF	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	710,546,795.00	245,021,322.00	245,021,322.00	0.00	197,224,563.00	268,300,910.00
TOTAL COHESION POLICY						
Objective 1	6,019,723,729.00	3,057,569,375.00	1,812,313,000.00	1,016,487,000.00	2,253,582,752.00	708,571,602.00

Source: programming documents and financial data provided by DG REGIO

Exhibit 8 shows the distribution of funds for innovation and knowledge in relation to the entire Structural Funds intervention. Total co-financed investment under the CSF is almost 6.1 bln EUR. This includes 3.0 bln of EU funding and the remaining part from public and private bodies. Of the Structural Funds component, 61% is for ERDF interventions. 245 MEUR of this intervention is devoted to innovation and knowledge measures, or almost 9% of the total allocation, or almost EUR 63 per capita. In relation to the public expenditure for R&D in 2004, the SF intervention in favour of research and innovation counts for almost 14% of the GERD¹⁴.

¹⁴ Data from Forfas. 2005. Research and Development in Ireland – at a glance.

Exhibit 9: Regional allocation of resources (Euro)

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
PO obj. 1 Border Midland and Western	-	-	-	402,369,340.00	261,918,000.00	37,063,000.00
PO obj. 1 Southern and Eastern Ireland	5,135,000.00	5,135,000.00	-	570,188,636.00	399,590,601.00	87,337,000.00
Total Regional OPs	5,135,000.00	5,135,000.00	0.00	972,557,976.00	661,508,601.00	124,400,000.00
PO obj. 1 Employment/HR D Ireland	-	-	-	892,087,000.00		892,087,000.00
PO obj. 1 Economic and Social	-	-	-	905,621,077.00	905,621,077.00	
PO obj. 1 Productive Sector	239,886,322.00	239,886,322.00	-	282,403,322.00	240,283,322.00	
PO obj. 1 Technical Assistance	-	-	-	4,900,000.00	4,900,000.00	
Total Multiregional OPs	239,886,322.00	239,886,322.00	0.00	2,085,011,399.00	1,150,804,399.00	892,087,000.00

Source: programming documents and financial data provided by DG REGIO

Exhibit 9 breaks down the allocation of funds by Operational Programmes. The majority of funds in support of innovation and knowledge are allocated for the Productive Sector Operational Programme. At regional level, the Productive Sector programme behaves differently. The expenditure for the programme in the BMW region is around 27% compared to almost 73% in the S&E region¹⁵. This trend is confirmed by the expenditure provided to innovation from the two regional programmes. Exhibit 9 shows that S&E invests more than 1% of the Structural Funds allocated for the S&E Operational Programme, whereas the BMW operation programme invests 0%. However, if business services and ICT initiatives are counted, the BMW region invests 15.9% of all the Structural Funds and the S&E region invests 12.8%. In the two regions, intervention in support of innovation has also been fostered by the implementation of Regional Programme of Innovative Actions, which has received, in the period between 2000-2004, 2.5 MEUR in the BMW region and 2.6 MEUR in the S&E region.

4.1.2 Specific measures in support of innovation and knowledge.

The Community Support Framework 2000-2006 includes 14 measures and sub-measures in support of innovation and knowledge. Four are part of the Productive Sector Operational Programme, six are part of the two regional operational programmes, and four are part of the PEACE II programme. Exhibit 10 breaks down these measures and sub-measures by policy area. It is important to notice that some of these are covered by more than one policy area.

¹⁵ Fitzpatrick Associates. 2005. Community Support Framework 2000-2006. Update Evaluation. Final Report.

Exhibit 10: Key innovation and knowledge measures

Policy area	Number of identified measures (all programmes)	Approximate share of total funding for innovation & knowledge measures	Types of measures funded (possibly indicating importance)
Improving governance of innovation and knowledge policies	0		Audit initiatives have been part of Innovative Actions 2002-2004 in the Border, Midland and Western Region
Innovation friendly environment	2	49%	Projects in higher education involving post-doctoral and post-graduate courses.
Knowledge transfer and technology diffusion to enterprises	6	23%	Promotion of research collaboration between firms and universities. Development of incubation centres
Innovation poles and clusters	0		
Support to creation and growth of innovative enterprises	6	29%	Financial assistance to SMEs. Promotion of entrepreneurial culture
Boosting applied research and product development	4	64%	Development of industrial research projects. Investments in research infrastructures for universities.

Nb: This table is a summary of the table in Appendix D. The total of the percentage share per policy area may sum to more than 100 since certain measures fall into several categories.

Structural Funds investment in support of innovation has contributed to develop key areas of the Irish system of innovation, particularly the third-level institutions system. Just over 30% of the NDP funds devolved to research and technological innovation are from Structural Funds. It can be said that Structural Funds intervention in Ireland is an important complementary source of funds, which have been used in areas recognized crucial by Irish innovation governance system. This paragraph will illustrate the characteristics and features of these interventions in the period 2000-2006.

Education Strategic Research and Industry are the two measures, financed by Structural Funds, within the RTDI priority of the Productive Sector Operational Programme. The Education Strategic Research measure is divided in two sub-measures: Programme for Research in Third Level Institutions and North-South Collaboration. The Education Strategic Research measure aims to reinforce the research capability in third-level state research institutes and meet the RTDI needs of the economy. The sub-measures emphasise the creation of research collaboration between universities inside Ireland and between those in Ireland and Northern Ireland through the North-South Collaboration sub-measure. However, the measure also puts a gives attention to the creation of a world-class research environment to support Irish

SMEs in developing research and development capabilities. Insufficient resources devoted to R&D are the main reason for the failure for Irish SMEs. The Industry measure also addresses this challenge and consists of two sub-measures: Competitive RTDI and National Collaboration. Competitive RTDI encourages the development of high quality research projects that would otherwise be out of SMEs' reach due to lack of funds and resources. The sub-measure supports in-house research activities, but also encourages SMEs to collaborate with other national and international research performers through participation in collaborative programmes. The importance of networking for SMEs is stressed by the National Collaboration sub-measure, which promotes the development of innovation networks between SMEs and universities and institutes of technology.

The RTDI priority of the Productive Sector Operational Programme is complementary to the two regional operational programmes. The regional programmes channel their resources to support the creation of new firms, SME growth, and the development of RTDI infrastructure for private and public sectors. Two measures are devoted to these aims: Micro-Enterprise and Regional Innovation Strategies. The Micro-Enterprise measure encompasses two sub-measures: Selective Financial Intervention and Entrepreneurial and Capability Development. The Selective Financial Intervention sub-measure consists of grants for the establishment and development of micro-enterprises in areas and sectors of great need or potential. The Entrepreneurial and Capability Development sub-measure encourages the development of an entrepreneurial climate by addressing individuals' managerial capability and by promoting adoption and use of ICT for e-business applications. In order to be competitive, SMEs need to operate in an innovation friendly environment, where networks, high-class research, and RTDI infrastructure are strong and effective. As discussed previously, The Productive Sector Operational Programme works towards the development of a networked, world-class research arena in Ireland.

In the area of RTDI infrastructure, the Regional Innovation Strategies measure aims to provide research and business centres at the regional level. The main aim is to assist with the provision of incubation space and enhance the role of the institutes of technology and universities. In the case of the Southern and Eastern region, the aim is to improve R&D infrastructures in regions distant from the three important university areas: universities in Dublin, University College Cork and University of Limerick. In the case of Border, Midland, and Western, the measure, as with all Structural Funds intervention, tries to bridge the gap with other Irish regions. As stressed in the previous chapter, the BMW region has only one university, NUI Galway, and so the institutes of technology are crucial for technology and business development. In addition to the operational programmes, the two regions were approved for ERDF funding, as already mentioned in the previous section, for their Regional Innovative Action Programmes. The S&E Regional innovative Action Programme focuses on knowledge transfer towards rural small and medium enterprises and diffusion of information and communication technologies in rural communities. The BMW Regional Innovative Action is focussed on innovation audit and regional foresight actions.

The PEACE II programme is designed to promote cooperation between Northern Ireland and the Border Counties of the Republic. The interventions are part of the Priority 1 Economic Renewal. It is divide in two main streams. The first, called

Business Competitiveness and Development, assists SMEs through loans, training, and marketing. The second stream, called Technology Support for the Knowledge-based Economy, promotes networking among SMEs, universities, and research institutes and encourages SMEs to adopt ICT. The PEACE II programme is also interrelated with the crosscutting theme, North-South Co-operation.

4.2 Learning from experience: the Structural Funds and innovation since 2000

4.2.1 Management and coordination of innovation and knowledge measures

This section reviews the overall management of Structural Fund interventions in support of innovation and knowledge during the current period. It examines the role of key organisations and partnerships in implementing Structural Funds measures, the linkages between Structural Fund interventions and other Community policies (such as the RTD Framework Programme) and the financial absorption and additionally of the funds allocated to innovation and knowledge.

The managing authority for the NDP/CSF is the Department of Finance, which drafted the NDP and negotiated the CSF with the European Commission. It examines the progress of intervention through the NDP/CSF Monitoring Committee. Each operational programme has its own managing authority. The managing authority for the Productive Sector Operational Programme is the Department of Enterprise, Trade and Employment. The Border, Midlands and Western Regional Assembly and the Southern & Eastern Regional Assembly are the managing authorities for their respective operational programmes. The presence of the regional programmes in the NDP is due to the division of the Republic of Ireland into two NUTS 2-level regions in 2000. This was prompted by the desire to maximise Structural Funds intervention, but also to use EU funds to balance the uneven distribution of economic and social development between the western and southeastern regions of Ireland. The managing authority for the PEACE II Programme is the Special EU Programmes Body, which includes representatives of Northern-Irish authority and the Department of Finance of the Republic of Ireland. Finally, each operational programme has an Operational Programme Monitoring Committee.

Mid-term evaluations show that the Structural Fund management system works well at all levels. However, there is a common belief that the system needs improvements to increase value for money and accelerate the delivery of capital. Specifically for the interventions in support of innovation, prioritisation of the activities should be emphasised in order to increase expenditure in RTDI activities. RTDI resources should be channelled more towards research that displays public good characteristics and towards areas prioritised in the government's spatial strategy. The creation of specific groups to control the progress of measures for specific issues could be a new way of managing RTDI interventions. At regional level, the regional mid-term evaluations suggest the need for more substantial involvement of NUTS-3 level area in order to better focus interventions. Finally, more transparency in terms of the

decision process and accuracy in the adoption and use of indicators are two common issues throughout the operational programmes.

In terms of capacity of spending of the operational programmes, exhibit 11 shows that 60.8% of Structural Funds allocated to support innovation and knowledge has been spent.

Exhibit 11: absorption capacity of innovation & knowledge measures

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	245,021,322.00	148,867,148.37	60.8%

Source: Provided by ISMERI.

Data from the updates of mid-term evaluations show generally good performance from all the operational programmes.

In case of the Productive Sector Operational Programme, RTDI sub-measures spending reached 111% of the revised target in Education and Strategic Research, 71% in Industry–National Collaboration and 51% in Industry–Competitive RTDI. With regards to regional outcomes, the Border, Midland and Western region had reached the 42% of the target under Education and Strategic Research, 32% of the target under Industry–National Collaboration, and 33% of the target under Industry–Competitive RTDI. In the case of Southern and Eastern region, spending capacity is different. The Education and Strategic Research reached 138% of the target, the National Collaboration 90%, and Competitive Industry 60%¹⁶. The reason for this sharp difference between the two regions is poor absorptive capacity at third-level institutions and firms in the Border, Midland and Western region.

In the case of regional programmes, the two managing authorities have experienced delays to spending for the Regional Innovation Strategies measure under the Local Enterprise Development priority. The main aim of this sub-measure is to create incubation centres within institute of technologies. Project management blockages have delayed the proper implementation of this measure. For example, in the case of Broader, Midland and Western region, the Regional Innovation Strategies sub-measure has reached 50% of the target with almost 3 MEUR spent in 2004. At the end of 2004, total spending was almost 3.2 MEUR. In contrast, the BMW operational programme has shown a good capacity of spending in the case of the Micro-Enterprise sub-measures, reaching 211% of the revised target. This Southern and Eastern regional operational programme has not achieved the same level of expenditure in the Micro-Enterprises sub-measures. The Regional Innovation Strategies measure has suffered from an initial delay due to a number of factors including a delay in securing State Aids approval from the European Commission.

Finally, the managing authority of the PEACE II programme shows that 49% of the resources for the Border Region had been spent. Regarding innovation and knowledge, the Economic Renewal priority has spent 54.2% of the resources allocated.

¹⁶ Fitzpatrick Associates. 2005. Community Support Framework 2000-2006. Update Evaluation. Final Report.

Regarding an overall analysis of the intervention, the capacity of spending of the different measures and sub-measures varies across all the operational programmes, but is nonetheless positive and promising for the conclusion of the intervention. In 2004, the majority of the measures were above 70% of their expenditure targets. Mid-term evaluations claim that delays are due to difficulties in the early stage of the programme, overestimation of the capital delivery system, and by a poor capacity to readjust quickly when something is not working. In addition, the lack of absorptive capacity in some areas has weakened the success in terms of expenditure and targets. This is the case in the BMW region where poor absorptive capacity of funds by the third-level educational system has slowed use of structural funds in support of research, innovation, and product development. However, the use of Structural Funds has influenced the prioritisation of policy themes such as research and regional innovation. It is worth recalling that the regional approach of the Structural Funds has been the main force behind the creation of the two Irish regions, recognised in, the CSF mid-term evaluation as the main programming innovation in the period 2000-2006.

Looking at the end of the planning period, mid-term evaluations suggest that the intervention will succeed in spending money and meeting targets. However, an initial failure in meeting expenditure targets could influence the final output. This has three causes: initial over-provision in the sense that likely demand was over-estimated in the first place; difficulties administrative in the supply side, and lower than expected demand for grants from the private sector. Regarding the future of the different measures in support of innovation, the RTDI sub-measures are all evidently crucial for the Irish research environment and public benefits and so they will be part of the next term strategy. Regarding the use of Structural Funds in the regions, as described in the report, particular problems have arisen in relation to absorption of the co-financed schemes in the BMW region. The view is that these need to be addressed via other approaches such as increasing linkages between universities, within universities and institutes of technology in the region, and with those outside through a more general collegiate approach.

4.2.2 Effects and added value of Structural Fund support for innovation and knowledge

This section of the report analyses the effects and added value of the Structural Fund interventions in support of innovation and knowledge during the current programming period. The analysis is based on two main sources, namely: available evaluation reports and studies concerning Structural Fund interventions; b) interviews and additional research carried out for this study. Accordingly, this section does not pretend to provide an exhaustive overview of the effects or added value¹⁷ of Structural Fund interventions, but rather is based on a limited number of cases of good practice. These cases may concern the influence of the Structural Funds on innovation and knowledge economy policies (introduction of new approaches, influence on policy development, and so on), integration of Structural Funds with

¹⁷ A good definition is “The economic and non-economic benefit derived from conducting interventions at the Community level rather than at the regional and/or national level”. See Evaluation of the Added Value and Costs of the European Structural Funds in the UK. December 2003. (Available at: www.dti.gov.uk/europe/structural.html)

national policy priorities, promotion of innovative approaches to delivery (partnerships), or measures which have had a particularly important impact in terms of boosting innovation potential, jobs and growth.

The Structural Funds intervention has successfully promoted innovation in the country, particularly in attracting major political and financial support for research and development activities at institutional and firms level. The Programme for Research in Third Level Education sub-measure has had a particular impact in strengthening the institutional research capacity of Ireland, contributing to the creation of almost 35 specialist third-level research centres. This has helped the international competitiveness of the research institutes and universities through consolidating inter-institutional research collaboration and attracting and retaining world-class researchers. At the end of 2004, this sub-measure had involved 860 post-graduate researchers and 754 post-doctoral researchers in research projects. However, given the successful results, the sub-measure requires further enhancement. The National Collaboration sub-measure has promoted networking and inspired 927 collaborations at the end of 2004. However, this effort needs to be increased through major involvement of SMEs and improvement of technology hubs. The Industry RTDI competitive sub-measure has facilitated more commercially orientated research with good results. At the end of 2004, the sub-measure had created 353 new R&D performers. In conclusion, the Productive Sector operational programme has had significant impact on the knowledge production system of the Ireland. It has also raised awareness of the importance of R&D among indigenous SMEs.

The two regional operational programmes have also supported the creation and growth of SMEs. The Micro Enterprise measure has been very successful in both regions. At the end of 2004 the BMW region achieved 211% of its target with 51,688 participants in training activities. The success is less emphatic in the S&E region with 32,072 participants in training activities¹⁸.

In contrast, the impact of the Regional Innovation Strategies sub-measure is difficult to quantify due to delays in implementation and the long-term nature of return on investment in incubation centres. However, several incubators have been built in both regions. In BMW, obsolete infrastructures have been transformed into advanced locations for education, research and networking. Both regions are pleased with progress regarding this measure, as they have been able to reinforce the role of the institutes of technology, particularly in those areas remote from the universities centres. In these areas, the institutes of technology are crucial for the promotion of research and innovative activities in local SMEs. In addition, the Innovative Actions programmes, implemented in both regions, have enhanced awareness of innovation among local actors through initiatives of knowledge transfer and extensive activities around innovation policy auditing and evaluation. For example, the Audit of Innovation in the Border, Midland, and Western region provides deep analysis of the regional innovation system and is an efficient base from which to understand future interventions.

In conclusion, measures to support innovation in the Irish regions have acted as a catalyst to push local stakeholders, particularly SMEs, universities and institutes of

¹⁸ Fitzpatrick Associates. 2005. Community Support Framework 2000-2006. Update Evaluation

technology, to engage. Structural Funds intervention has improved conditions in the national system of innovation particularly in the promotion of research and development in the third-level education system. The RTDI priority of the Productive Sector Operational Programme has accelerated research collaboration between universities and firms. The Regional Innovation Strategies sub-measure has consolidated the status of RTDI infrastructures in the Southern and Eastern region, and created a stronger RTDI infrastructures backbone in the Border, Midland, and Western region.

The following text-box discusses the Programme for Research in Third Level Institutions (PRTLTI) as a successful example of a measure to support research in the Irish third-level education system.

Ireland – The Programme for Research in Third Level Institutions (PRTLTI)

The Programme for Research in Third Level Institutions (PRTLTI) was established in 1998 and in 2000 was co-funded using Structural Funds. The Programme is an investment vehicle designed to bring about a permanent transformation in the research environment and culture in Ireland. It can be classified under policy areas for ‘boosting applied research and product development’ and ‘innovation friendly environment’. A programme impact assessment, undertaken in 2003, showed that the programme has strengthened international competitiveness of the research and third-level education systems, increased inter-disciplinary and inter-institutional research collaboration, helped attract and retain high-calibre research professionals, and introduced a new culture of research management and organisation in the beneficiary institutions. This has been achieved through the development of 29 specialist third-level research centres involving universities and institutes of technologies, through the provision of large grants to several research institutes, and delivery of 65 new courses with the involvement of 2,174 students, researchers, and professors. The output is impressive: the centres are working on 62 research programmes and have published over 2000 peer reviews over a period of 2.5 years and applied for 60 patents. The programme, which is administered by the Higher Education Authority, represents a milestone in the State’s investment in higher education institutions to address the deficit in the Irish research base.

4.3 Conclusions: Structural Funds interventions in support of innovation and knowledge

The Productive Sector Operational Programme has successfully strengthened the research base in universities and firms. The two regional operational programmes have performed less successfully, however, particularly the Regional Innovation Strategies measure. Exhibit 13 illustrates the capability and outputs of all the measures that support innovation. Capability is measured in terms of financial and other targets. More data is available in the mid-term evaluations, which are listed in the further reading section.

Exhibit 12: main outcomes of innovation and knowledge measures

Programme or measure	Capability	Added value
Productive Sector Operational Programme – RTDI Priority – Education – Strategic Research sub-measure	Significant absorption capacity. The spending has reached the 111% of the revised forecast. The sub-measure has also reached almost the 130% of the targets.	Enhancing the capacity of the research base. 860 post-graduate researchers and 754 post-doctoral researchers involved in research projects.
Productive Sector Operational Programme – RTDI Priority – Industry National Collaboration sub-measure	Good absorption capacity. The spending has reached the 71% of the revised forecast. The sub-measure has also reached almost 85% of the targets.	Enhancing collaboration between firms and universities. 927 collaborations established with 146 non R&D performing firms involved. Due to indicators adopted by the mid-term evaluations is difficult to quantify or capture the impact of these collaborations.
Productive Sector Operational Programme – RTDI Priority – Industry Competitive RTDI sub-measure	Good absorption capacity. The spending has reached the 51% of the revised forecast. The sub-measure has also reached almost the 70% of the targets.	Facilitating more commercially oriented research and increasing research intensity within firms.
BMW Regional Operational Programme – Local Enterprise Development Priority	Good absorption capacity. The spending of the Micro-Enterprises measure has reached the 211% of the revised forecast. The spending of Regional Innovation Strategies measure is significantly lower, around the 50%	Improving SMEs supports and promoting the creation of innovation incubators.
S&E Regional Operational Programme – Local Enterprise Development Priority	Medium level of absorption capacity. The spending of all the priority has reached 51% of the revised forecast.	Improving SMEs support. Creation of innovation incubators.
PEACE II Operational Programme – Economic Renewal Priority	Medium level of absorption capacity. The spending of all the priority has reached almost 55% of the revised forecast.	Improving SMEs assistance and fostering entrepreneurial spirit. 12754 individuals were trained and 997 SMEs assisted. 163 jobs were created reaching 27% of the target.

Effectiveness → significant results achieved; good absorption and management performance, etc.

Added value of measures → reinforcement of national priorities, innovative approaches and solutions, institution building, etc.

5 Regional potential for innovation: a prospective analysis

This section summarises and draws conclusions from the analysis of the preceding sections, available studies and interviews and focus groups carried out for this study. The aim is to provide a framework for orientations in terms of future Structural Fund investments in innovation and knowledge.

5.1 Factors influencing regional innovation potential

The industrial environment in Ireland is currently adversely affected by three main factors. The first concerns the role of multinational enterprises (MNEs) and their relations with Irish enterprises. During the 1908s and 1990s, the growth of foreign direct investment in Ireland spawned an increasing number of new Irish start-ups, which tended to develop their activities around MNEs as suppliers. Subsequently, MNEs improved their supply chain management, aiming to reduce their suppliers network on the basis of lowest price. The effect was for MNE activities to shift to low-cost locations. The second factor regards the crisis of ICT sector and the dotcom collapse. ICT industries in Ireland have been instrumental in accelerating development of small indigenous firms. The crisis in the sector has had a highly adverse impact on these firms. The third factor is increasing competition from the emerging economies. These three factors continue to cause problems for the Irish regional systems of innovation. Strategies to absorb and respond to these threats depend on the features of the two regions.

Regionally, two main factors guide innovation performance: the research and knowledge transfer capacity of the third-level institutions system and the attitude to innovation of indigenous SMEs. Ireland's ability to compete in the global market depends on its capacity to strengthen these two factors. Stakeholders argue that third-level institutions and SMEs are not mutually exclusive, but interrelated elements of an effective regional innovation strategy. According to this view, third-level institutions can become strong economic actors if commercialisation of R&D and knowledge transfer towards indigenous SMEs is adequately supported. In addition, indigenous SMEs must be able to export and should be aware of the importance of innovation, research, and new product development. Universities and institutes of technologies can play a crucial role building relationships with SMEs and working on market-driven research. On the other hand, intense effort on monitoring, training and advice, is required to improve attitudes to innovation among indigenous SMEs. This emphasis should not be limited to high-tech SMEs, but also to firms whose activities are in low-tech sectors.

Looking closely at the two regions, S&E contains a strong university system within a promising innovation climate made up of research institutes, private research centres, multi-national enterprises, and dynamic SMEs. However, this favourable atmosphere is limited to the Dublin, Cork, and Limerick areas. In the BMW region, the situation is more problematic. Institutes of technology and the NUI in Galway can be

considered the main potential sources of innovation if adequately supported. Levels of foreign direct investment are lower than in the S&E region, but can represent an important source of activity for indigenous SMEs. This also depends on the ability to promote product and process development in areas such as food industry, eco-tourism, and organic foods.

Given the impracticality of allocating funding solely according to need, choices must be made. R&D funding should be focussed on high-class research centres and universities, avoiding those institutions unable to absorb it. However, special effort should be made to address knowledge transfer and networks between universities and SMEs in both the region and across sectors.

The following exhibit summarises the main factors that may influence the innovation performance of the two regions. For a more exhaustive analysis of these groups, based on scoreboard indicators as well as on other relevant sources, the reader should refer to that section of this report.

Exhibit 13: factors influencing innovation potential by type of region

Region / type of region	Main factors influencing future innovation potential
Border, Midland, and Western	<ul style="list-style-type: none"> - The third-level institutions, institutes of technology and NUI Galway, should improve their research and teaching capacity and enhance their centrality in the regional system of innovation by expanding their networks and promoting entrepreneurial culture. - Indigenous SMEs can grow and be innovative if linkages with academia are reinforced and innovation attitude becomes part of SMEs strategy and governance. - Presence of multi-national enterprises can promote forms of outsourcing towards indigenous - Low-tech sectors such as food industry, textile, eco-tourism, and organic foods have room to improve and develop.
Southern and Eastern	<ul style="list-style-type: none"> - High concentration of inward investment and multinational corporations. - Existence of poles of excellence of either strong agglomerations of innovative firms or highly productive research nodes (universities, public/private research centres) - Presence of an innovation climate particularly in Dublin area, Cork, and Limerick.

5.2 A prospective SWOT appraisal of regional innovation potential

The previous section illustrated the main features of the two regions. This section will discuss further the regional innovation systems in BMW and S&E regions. In this analysis, it has to be taken into account the fact that the concept of region is relatively new in Ireland. However, the CSF mid-term evaluation report argues that the establishment of the two regions has been one of the most innovating aspects of the NPD 2000-2006. It also claims that thinking regionally has raised awareness about regional and local policy. This has also emphasised differences that there are between the two regions and the report has already discussed.

Regarding the BMW region, the 2004 Audit of Innovation argued that potential for growth existed primarily in highly populated areas within the region such as Galway, Lough, and Donegal. The only university of the BMW region is in Galway, as are some small clusters of indigenous SMEs and multi-national enterprises in medical devices and multimedia technology. The other areas suffer the missing link with a strong base third-level institution. The institutes of technology, located in different areas of the region, can cover a crucial role in closing the communication gap between firms and third-level systems in the region. The creation of incubation centres within the institutes of technology can enhance market-driven research, networking, cluster development, and attitudes to innovation among SMEs. It is also important to strengthen the connection between the institutes of technology, NUI Galway and with the entire university system in Ireland. These networks cover different sectors including agro-food, seafood processing, textiles and tourism, which all present the possibility of growth in the region. Additional business support is required as are forms of venture capital to promote entrepreneurship particularly among students and graduates.

Looking at the S&E region, the system of innovation has some features that distinguish it from that of the BMW region. The third-level education and research system is well developed and networked with seven universities and 11 institutes of technology. This system also has a high degree of absorptive capacity. For example, in the case of the PRTLTI programme, the main source of funding for research in Ireland, the majority of the resources allocated were used in the universities and research institutes located in the S&E region. In addition, the strong presence of multi-national enterprises has guaranteed development of high-tech clusters, which in turn have been crucial for the creation of innovative indigenous SMEs. Electronics, software engineering, pharmaceuticals, and medical devices are the most active sectors. However, this climate of innovation is concentrated in just three areas: Greater Dublin, Limerick, and Cork. Other parts of the region are lagging behind. Exhibit 14 shows the SWOT analysis for the two regions, summarising the main points from discussion with regional stakeholders.

Exhibit 14: Innovation and Knowledge SWOT

Border, Midland, and Western	Opportunities	Threats
Strengths	<ul style="list-style-type: none"> High potential. Region shows a good base for enterprise development, particularly in low-medium tech sectors. This business system needs to be nurtured. 	<ul style="list-style-type: none"> Good potential but knife-edge path. A flexible and adaptable work force, which is generally well trained and skilled, can form the base for entrepreneurship in the region, but more support services for start-ups are necessary.
Weaknesses	<ul style="list-style-type: none"> Good potential with structural change. SMEs can be innovative and grow if research collaboration between SMEs and universities becomes a common and accepted practice. 	<ul style="list-style-type: none"> Low potential. The low R&D expenditure in the regions and the small share of third-level research and education infrastructures are the main weaknesses of the innovation system.

Southern and Eastern	Opportunities	Threats
Strengths	<ul style="list-style-type: none"> High potential. Extensive educational facilities, in particular a strong network of third-level institutions represent an efficient base to make the region a world-class research environment. 	<ul style="list-style-type: none"> Good potential but knife-edge path. Very good destination for foreign direct investment, particularly in ICT and biotechnologies, but it is necessary to strengthen the indigenous knowledge infrastructure in order to avoid technological dependency on MNEs.
Weaknesses	<ul style="list-style-type: none"> Good potential with structural change. A good base of indigenous SMEs in manufacturing and ICT services. However, in order to be internationally competitive, they must focus on product and process innovation. 	<ul style="list-style-type: none"> Low potential. Unbalanced regional development

5.3 Conclusions: regional innovation potential

This section summarises the main findings regarding innovation potential in the Irish regions. Four prominent policy implications have been identified and are discussed below.

Policy headline 1: Potential for developing SMEs capabilities.

- During the 1990s, Ireland has been the production base for foreign multinationals. Large flows of investment in high tech industries have transformed the country into a popular location for multinational enterprises. Microsoft, IBM, Oracle, Novell, Lotus, Corel, AT&T, Ericsson are just some of the major names with European offices in Ireland. At the same time, many indigenous companies are operating on the supply side for the MNEs. However, emerging economies and the crisis in ICT has revealed the vulnerability of indigenous SMEs that are too closely linked to MNEs. Irish SMEs should enhance their own innovative and research capacities in order to be competitive. Grants alone will be insufficient. It is essential to create the right environment in terms of researchers, centres of technological excellence, innovation networks, and business support.
 - o Border, Midland, and Western region. The development of innovation networks between SMEs, universities, Institutes of Technology, and MNEs is particularly relevant to empower SMEs' capabilities to develop new products and services. The incubation centres established in the Institutes of Technology can be the adequate locus to promote new product development. This strategy needs to be reinforced including also MNEs' participation.
 - o Southern and Eastern region. A favourable innovation environment in which indigenous SMEs have flourished in sectors such as electronics, ICT, and pharmaceuticals characterizes the region. This climate needs to be nourished. The number of collaborative research projects between SMEs and universities, Irish and non Irish, needs to be intensified. The formation of innovative new firms needs also to be encouraged promoting strongly entrepreneurial spirit and venture capital availability.

Policy headline 2: Potential for reinforcing the role of third level education system.

- The third-level education system has two main objectives. The first is to develop a world-class research system as strong base for the Irish innovation system. This requires investment in basic and applied research, improving international engagement of universities and research institutes, promoting innovation networks with national and international firms, encouraging the exchange of students, researchers, and professors. The second objective is to reinforce the economic impact of universities and institutes of technology, not only by improving the entrepreneurial culture within research labs, but also through their role as promoters of regional and local innovation.
 - o Border, Midland, and Western region. The third-level education system in the region needs to be reinforced in order to be able to meet the second objective. The role of the Institutes of Technology

and the NUI Galway is crucial to network SMEs to knowledge and research resources.

- Southern and Eastern region. The third-level education system in the region is adequately equipped to meet the first challenge. Intensifying international engagement of Irish universities in research and promoting commercialisation of research and spin-offs culture are two areas of intervention, which needs to be considered.

Policy headline 3: Potential for revitalising low-tech sectors.

- Policy makers should avoid underestimating the importance of innovation in low-tech sectors. These represent an important part of the economy in both regions, particularly in the areas outside Dublin, Cork, and Limerick and in the Border, Midland, and Western region. It is necessary to promote both commercial and applied research and development in low-tech SMEs through collaboration with universities, promotion of clusters in food industry, textile, and tourism, and, finally, business support.
 - Border, Midland, and Western region. Food industry, eco-tourism, organic food industry, and textile represent an opportunity of economic growth for many areas of the region such as Leitrim, Fermanagh, north Sligo, south Donegal, and north Roscommon. The collaboration with universities to promote new product development and the definition of forms of business support to enhance SMEs market and management capabilities are crucial to revitalise low-tech sectors.
 - Southern and Eastern region. The areas outside Greater Dublin, Limerick and Cork have potential for economic growth in food industry, eco-tourism, organic food industry, and textile. Collaboration with academia and business support are essential to exploit this potential.

Policy headline 4: Potential for empowering Irish competitiveness in high-tech sectors.

- The location of many high-tech MNEs has made the Irish innovation system high competitive in sectors such as electronics, information and communication technologies, and biotechnologies. In order to remain competitive in high-tech sectors, the promotion and development of clusters should be addressed with more emphasis. The Programme for Research in Third Level Institutions (PRTLII) has been able to develop several research centres in cutting-edge technologies. The idea can be to encourage companies to be more involved in these centres.
 - Border, Midland, and Western region. The region does not have cluster features in high-tech sectors such as a critical mass of businesses and third level research and development capacity. However, the Audit of Innovation in the BMW region argues that there is potential to create an international cluster in medical devices in the Galway-Mayo-Sligo area.
 - Southern and Eastern region. Greater Dublin, Limerick and Cork are the areas of the transformation of the Irish innovation system from a less developed system to the “Celtic tiger”. There is a large room of manoeuvre to develop world high-class cluster in electronics, ICT, and biotechnologies.

6 Future priorities for Structural Fund support for innovation and knowledge: options for intervention

This section summarises the future priorities for Structural Funds as indicated by national and regional stakeholders. Interviewees identify two main areas for action. The first is to increase awareness among SMEs of the value of research and development as crucial for international competitiveness. This type of intervention is valid and necessary in both Irish regions. The second concerns the third-level education system. Stakeholders agree on the need for more entrepreneurial spirit in universities and institutes of technology, not only regarding the commercialisation of research and development, but also in giving third-level institutions a role to promote innovation locally. However, this intervention has different implications in different areas of Ireland. The Greater Dublin area, Cork, and Limerick have a mature and efficient research base made of several universities, public and private research centres, and Institutes of Technology. Other areas of the S&E region and the BMW region have a weak third level education system made mainly of Institutes of Technology. This disparity requires a differentiated approach.

Better communication and collaboration are essential to both interventions suggested above. Intermediaries have an important role in connecting SMEs with third-level education systems. ‘Innovation architects’, as stakeholders have defined them, can become the SMEs’ gateway to the Irish research base.

Regarding the management and administrative aspect of Structural Funds intervention, stakeholders agree that the amount of regulation is a burden, particularly for SMEs. They request a reduction of recommendations and regulations, and more clarity. They also agree that SMEs do not have time to fulfil all the administrative requirements for the use of funds. This can be solved through the involvement of management bodies that act as administrative offices.

Stakeholders also agree on the value of aligning Structural Funds intervention with the National Development Plan. This ensures clarity and avoids overlap. However, they claim that more coordination between actors is required. Regional and local authorities should also take a more proactive role in all the phases of the planning and intervention. Finally, stakeholders agree that the next intervention should be focussed on few projects, but with large investments. Running several small projects means dispersing effort and undermining the effectiveness of the intervention.

The next section synthesizes the future priorities suggested by stakeholders. The first section is focussed on strategic orientations. The second section describes suggestions for management and administrative guidelines.

6.1 Strategic orientations for Structural Fund investments in innovation and knowledge

Key conclusion 1: The Border, Midland and Western innovation system appears scarcely networked

The regional innovation system in the Border, Midland and Western region is made up of SMEs, University of Galway, and several institutes of technology. The Structural Funds intervention 2000-2006 has tried to reinforce these institutions through financial and training support, advanced R&D infrastructures, and incubation centres. However, these three sets of actors are scarcely networked. In addition, the entire regional system has difficulties in connecting itself with the Southern and Eastern region.

Recommendation 1: Structural funds intervention should promote the creation of innovation networks in less developed areas

The Regional Innovation Strategies measure has tried to put together local SMEs and universities through the establishment of incubation centres within the universities. However, networking processes should involve other actors such as business and technological intermediaries. The creation of networks should be not only regionally based, but also inter-regional, for example favouring links between Border, Midland, and Western institutes of technology and Southern and Eastern universities. One good example has been the Atlantic Corridor, which has encouraged collaborative projects between University of Limerick and NUI Galway.

The next Structural Funds intervention should address networking among the different actors in the BMW innovation system. It should also reinforce mechanisms of knowledge and technology transfer from universities and institutes of technology towards indigenous SMEs.

Key conclusion 2: The Irish third-level education system is divided between the world-class, research-oriented Southern and Eastern system and the weak Border, Midland, and Western system

The most evident disparity between the BMW region and S&E region is the structure of the third-level education system. The BMW system is made of one university and several institutes of technology. The S&E system is made of several institutes of technology and seven universities with a good private research base.

Recommendation 2: Structural Funds interventions should promote high-class research in the Southern and Eastern region and reinforce the third-level education system in the Border, Midland and Western region

Universities, research institutes in the Dublin area, Cork, and Limerick can enhance their international prestige and transform Ireland into a high-class research country. Structural Funds should promote collaborative research between Irish universities, indigenous companies and MNEs in cutting-edge areas such as biotechnologies, nanotechnologies and emerging information technologies. At the same time, Structural Funds intervention should promote national and regional networking between universities and Irish SMEs.

In the case of the Border, Midland and Western region, the third-level education system needs to be reinforced. The role of the institutes of technology is crucial in

providing research and development to local enterprises, but also they can act as innovation champions to generate enthusiasm. In contrast, NUI Galway can be the core of a research network between the institutes of technology and the university itself. In this context, NUI Galway can be the gateway to a high-class and international research base. The Programme for Research in Third Level Institutions (PRTLII) is an exemplar case of promotion of collaboration and partnership between Irish universities. This model could be used to establish the research network discussed previously.

Key conclusion 3: There is a risk of too much attention on technological innovation and less on process innovation and low-tech products innovation

Research and development in high-tech and advanced sectors has been central to innovation policies in Ireland, particularly in areas such as pharmaceuticals, electronics, and ICT, partly influenced by foreign investments in these sectors. However, some indigenous enterprises are active in declining manufacturing sectors and traditional sectors such as agri-food, textile, construction, tobacco, and tourism industries. Insufficient attention has been paid to innovation in these sectors to ensure the competitiveness of Irish enterprises, particularly SMEs.

Recommendation 3: Low-tech innovation should receive more emphasis through the development of clusters and poles in relevant sectors of the Irish economy such as agri-food industry and eco-tourism.

Developing innovative clusters in high-tech technologies is important to reinforce existing sectors such as pharmaceuticals and ICT. However, cluster policy should also be used to enhance the competitiveness of low-tech sectors. Structural Funds intervention should encourage and promote process innovation and product innovation in low-tech sectors. Universities and Institutes of Technology have also to participate in low-tech innovation collaborating with SMEs, but also commercialising research in these sectors. The promotion of low-tech innovation is relevant for both regions. The integration of local companies into supplier's chain of big companies can allow them to access markets and new management capabilities. This integration can also be reached using funds to cluster SMEs, big companies, and universities in collaborative research projects with clear market-driven objectives.

Key conclusion 4: Ireland has a good critical mass of SMEs, but these risk failure in the international market unless they adopt a more proactive attitude to innovation.

The Global Entrepreneurship Monitor report argues that in 2004 Ireland was the second-most entrepreneurial country in Europe. Ireland has a good critical mass of SMEs in comparison with the size of its population. However, SMEs are not well equipped for international competition. SMEs should understand that process and product innovation are crucial in order to sustain international trade. Research and development should therefore be a bigger part of companies' activities.

Recommendation 4: Large investments are necessary to raise the awareness of the value of R&D for SMEs.

Structural Fund interventions should be focussed on large projects with a fundamental objective: to raise the awareness of the value of R&D among SMEs. The lack of time available for research, of expertise, and of financial resources slows down new product development activities of SMEs in both Irish regions. In order to perform

research and make research a priority of their activities, SMEs should strongly interact with academia and government research agency. The triple helix model could bring SMEs close to the knowledge production systems of Ireland. In this network there is a role for intermediaries or “innovation architects”, as defined by stakeholders, which can build and manage connections with universities and research institutes. Thus, the innovation architect acts as the SME R&D department, which participate in research networks with other companies, also MNEs, and universities, promote the mobility of researchers from RTDI centres to the company, facilitate students placement, improve interactions between with users, promote the culture of research within the company. All this can happen if the government designs appropriate research schemes to nourish the actors of this model: SMEs, business and technology support companies, and universities, public research institutes, and Institutes of Technology.

The intensification of SMEs R&D activities is extremely important in both regions and the model, suggested previously, can be applied in the BMW and S&E.

6.2 Operational guidelines to maximising effectiveness of Structural Fund interventions for innovation and knowledge

Key conclusion 5: Excessive regulation seems to be a serious burden especially for SMEs.

The main barrier to involvement in projects financed by Structural Funds is the excessive bureaucracy required. The administration is perceived as time consuming, particularly for SMEs, which are usually entirely devoted to their production operations.

Recommendation 5: Clarity and flexibility in regulation, and rapid administrative response can help SMEs to participate in Structural Funds intervention.

Administrative and delivery rules need to be clearer, more flexible and easier to follow than in the past. Reducing regulative burdens is crucial for the involvement of SMEs. Stakeholders also have suggested that management bodies can be created to help SMEs in participating to projects. These management bodies can act as SMEs’ administrative offices

Key conclusion 6: Investments in several small projects can disperse the intervention and render it ineffective.

Experiences from the previous intervention show that small projects are time consuming and not effective for beneficiaries.

Recommendation 6: The next Structural Funds intervention should be strategically focussed on a small number of large projects.

Stakeholders agree that only a small number of large projects can be effective in having an impact on regional innovation systems. The suggestion is to design large projects and also allow easy integration with other programmes such as the Framework Programme.

Exhibit 13: Summary of recommendations on investment priorities

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources
<p>Border, Midland and Easter region (Learning Region)</p>	<p>Knowledge transfer and technology diffusion to enterprises. Support to creation and growth of innovative enterprises. Boosting applied research and product development.</p>	<p>Enhancing the research and educational capacity of the Institutes of Technology. Institutes of Technology should be the regional innovation champions. Empowering networking between firms and universities through collaborative research and incubation centres. Financial and training support to SMEs. Promoting product and process innovation in low-tech sectors</p>	<p>RTDI + Business Support expenditure in 2000-2006: 4.6% [Note that this refers to the Regional Operational Programme. We should take into account that the multiregional Productive Sector Operational Programme counts for almost 14% of SF allocated nationally.]</p> <p>RTDI + Business Support indicative allocation in 2007-2013: Between 20% and 30% of all the Structural Funds allocated for the Regional Programme.</p>
<p>Southern and Eastern region (Learning Region)</p>	<p>Knowledge transfer and technology diffusion to enterprises. Support to creation and growth of innovative capacities. Boosting applied research and product development. Innovation friendly environment.</p>	<p>Enhancing the research capacity of the Institutes of Technology in areas outside Dublin, Cork, and Limerick. Promoting commercialisation of third level education R&D. Networking between universities and indigenous SMEs and between multinational enterprises and local SMEs Promoting international trade and research relations for indigenous SMEs. Promoting product and process innovation in low-tech sectors.</p>	<p>RTDI + Business Support expenditure in 2000-2006: 5.2% [Note that this refers to the Regional Operational Programme. We should take into account that the multiregional Productive Sector Operational Programme counts for almost 14% of SF allocated nationally.]</p> <p>RTDI + Business Support indicative allocation in 2007-2013: Between 20% and 30% of all the Structural Funds allocated for the Regional Programme.</p>

Appendix A Methodological annex

A.1 Quantitative analysis of key knowledge economy indicators

A 1.1 Factor analysis

In order to analyse and describe the knowledge economies at regional level in the EU, the approach adopted was to reduce and condense all relevant statistical information available for a majority of regions. The approach involved firstly reducing the information from a list of selected variables (Table 1) into a small number of factors by means of factor analysis.

Table 1. Reduction of the dataset (215 EU-27 regions) into four factors by means of factor analysis

	The 4 factors			
	F1 'Public Knowledge'	F2 'Urban Services'	F3 'Private Technology'	F4 'Learning Families'
Higher education (HRSTE), 2003	.839	.151	.190	.184
Knowledge workers (HRSTC, core), 2003	.831	.164	.267	.327
High-tech services employment, 2003	.575	.367	.428	.323
Public R&D expenditures (HERD+GOVERD), 2002	.543	.431	.275	-.195
Value-added share services, 2002	.323	.869	.002	.121
Value-added share industry, 2002	-.265	-.814	.386	-.061
Employment government administration, 2003	-.217	.745	.124	-.175
Population density, 2002	.380	.402	.043	.038
High and Medium/high-tech manufacturing employment, 2003	-.073	-.331	.873	-.089
Value-added share agriculture, 2002	-.222	-.350	-.672	-.198
Business R&D expenditures, 2002	.335	-.050	.664	.267
S&T workers (HRSTO, occupation), 2003	.560	.178	.589	.382
Population share under 10 years of age, 2001	-.237	.060	-.015	.868
Life-long learning, 2003	.472	-.009	.165	.703
Activity rate females, 2003	.418	-.227	.281	.620

Note: Principal Component Analysis. Rotation Method: Equamax with Kaiser Normalization, a Rotation converged in 9 iterations. Main factor loadings are highlighted in bold. Source: MERIT, based on Eurostat data, mostly referring to 2002 or 2003

Based on the variable with the highest factor loadings we can characterise and interpret the four factors and give them a short symbolic name:

Public Knowledge (F1)

Human resources in Science and Technology (education as well as core) combined with public R&D expenditures and employment in knowledge intensive services is the most important or common factor hidden in the dataset. The most important variables in Public Knowledge are the education and human resource variables (HR S&T education and core). Cities with large universities will rank high on this factor.

One interesting conclusion is that public and private knowledge are two different factors (F1 and F3 respectively), which for instance has implications for policy issues regarding Science-Industry linkages. Public R&D and higher education seems especially related to high-tech services, whereas Business R&D especially serves high- and medium-high-tech manufacturing.

Urban Services (F2)

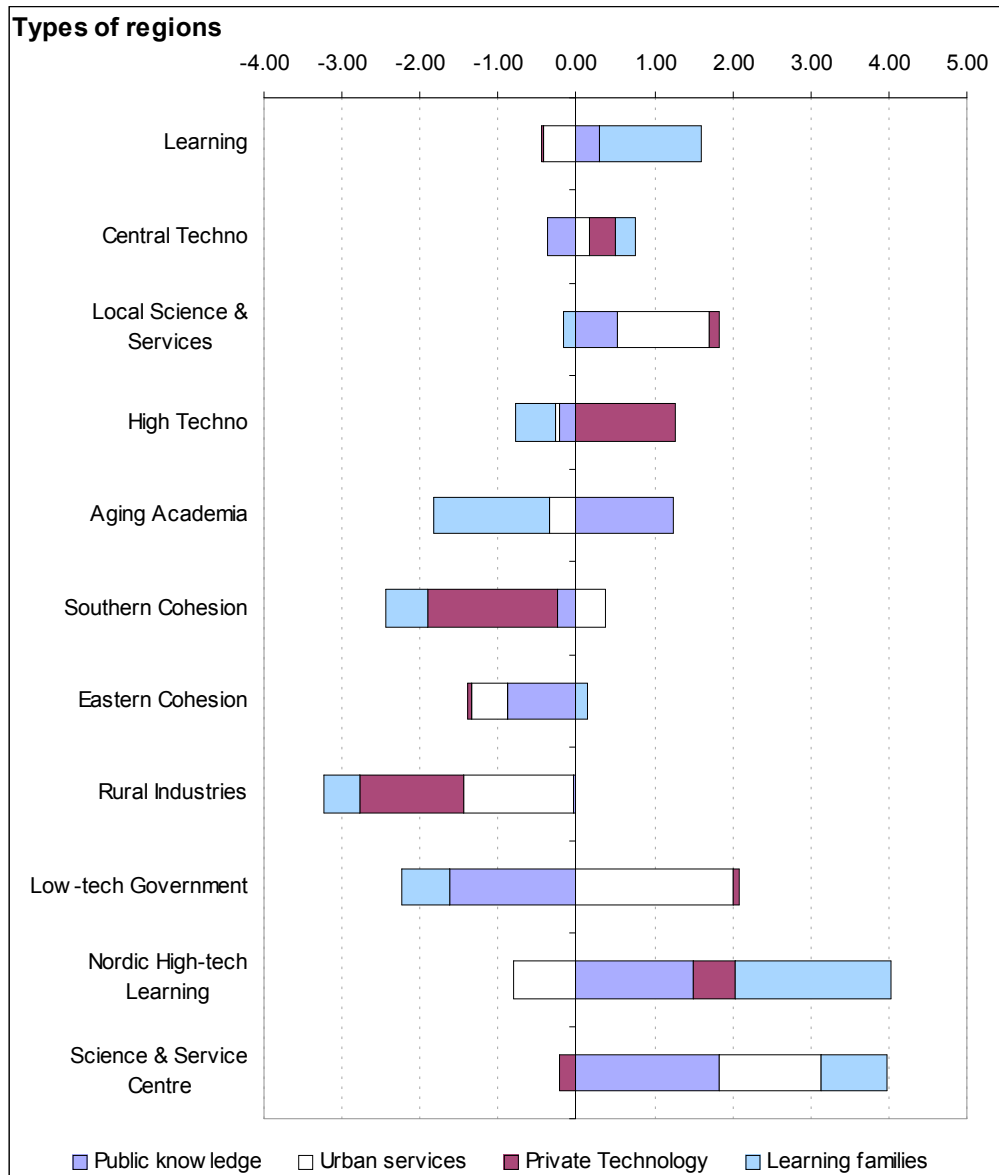
This second factor contains information on the structure of the economy. It is well known that industrial economies are quite different from services based economies. It is not a matter of development per se, because in the European regions the variety of economic structure is very large and for a large part based on endowments and path dependent developments like the extent to which government administration is located in a region or not. This factor takes into account the differences between an industrial area and a service-based area including the public administration services of the government. Another observation is that there are two different 'urban' factors, indicating that academic centres not necessary co-locate with administration centres. What may not be surprising is that the Urban Services factor is not associated with R&D, since R&D is more relevant for innovation in manufacturing than for service industries.

Private Technology (F3)

This factor contains business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries. A countervailing power is the existence of agriculture in the region. One interpretation could be that agricultural land-use goes at the cost of possibilities of production sites. Another interpretation is that agriculture is not an R&D intensive sector.

Learning Families (F4)

The most important variable in this factor is the share of the population below the age of 10. Locations with relatively large shares of children are places that are attractive to start a family. Possibilities for Life Long Learning in a region seems associated with the lively labour participation of the mothers of these youngsters. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation- friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.



1 Learning

The Learning regions are first of all characterised by the high score on the factor 'Learning Families', and the three main components of this factor: life-long-learning, youth and female activity rate. On the other factors the regions are close to the regional average. Unemployment is on average the lowest compared to the other EU regions. Employment in the government sector is limited. GDP per capita is rather high. The regions are located in Austria, Ireland, the Netherlands, Sweden and the UK. There are many similarities with the Nordic High-tech Learning regions, but the business sectors in the Nordic version invest more in R&D.

2 Central Techno

This is a rather large group of regions located mostly in Germany and France with close to average characteristic, but the share of High-tech manufacturing is rather

high. The factor-scores as well as GDP-per head is slightly above the regional average, except for the Public Knowledge factor which is slightly lower.

3 Local Science & Services

This group of regions with diverse nationality consist mainly of capital cities, such as Madrid, Warsaw, Lisbon, Budapest and Athens. These urban areas serve as national centres for business services, government administration, public research institutes and universities. Urban Services and Public knowledge are therefore the strongest factors for this type of region. GDP per capita is on average slightly below the EU25 average, but growing. The low score on life-long-learning is a weakness in most Local Science & Services regions, especially compared to the more wealthy and advanced Science & Service Centres.

4 High Techno

The High Techno regions host many high-tech manufacturing industries. They are mostly located in Germany (e.g. Bayern and Baden-Wurtemberg), some in Italy (e.g. Lombardia and Veneto) and two French regions. This type is very strong in Private Technology and has a high level of GDP per capita. The factors Public Knowledge and especially the Learning Family factor shows a relative weakness, e.g. in life-long-learning. Growth in terms of GDP per capita has been low and unemployment didn't improve much in the previous years.

5 Aging Academia

This group of regions is mostly located in East Germany and Spain and also includes the capital regions of Bulgaria and Romania. The strength in the Public Knowledge factor is mostly based on the high share of people with tertiary education. The low score on the Learning Family factor is due to little life-long-learning and hosting relatively few children. The unemployment situation has improved, but is still very high.

6 Southern Cohesion

Southern cohesion regions are located in Southern Europe, consisting of many Greek, some Spanish and two Portuguese regions. The low score on the Private Technology factor is striking. There is hardly any high-tech manufacturing nor business R&D. Services is the most important sector, but also agriculture is still a rather large sector. The share of manufacturing industry in value added is very limited. Population density is low, but on average it has been increasing.

7 Eastern Cohesion

Manufacturing industries is the dominant sector, whereas services and agriculture are rather small sectors. This type of region is mostly located in Poland, Czech Republic, Hungary and Slovak Republic. Two Portuguese regions are also included. The Public Knowledge factor is the main weakness of this type of regions. However, the score on the Private Technology factor is close to average, which means that it is much stronger in this respect than the Southern Cohesion regions. Unemployment is high, even compared to Rural Industries and Southern Cohesion regions.

8 Rural Industries

Besides a low per capita GDP, Rural Industries regions have in common a low score on both the factors Urban Services and Private Technology. Population density is

very low. The service sector is often very small. Especially agriculture but also manufacturing industries are relatively large sectors. Besides regions in Bulgaria and Romania and Greece, there is also a more Nordic sub-group consisting of Estonia, Lithuania and Itä-Suomi

9 Low-tech Government

This type of region, mostly located in southern Italy is characterised by a very low score on Public Knowledge combined with a high share of employment in the Government sector. Unemployment is severe, on average comparable to Eastern Cohesion regions. GDP per capita is however close to the regional average.

10 Nordic High-tech Learning

The Nordic version of the learning regions are typically strong in the Learning Family factor, but this type also has by far the highest business R&D intensity. In contrast with the popular characterisation of Nordic societies, the size of the government administration is the lowest of all the types. The low score on Urban Services is also due to the low population density. A rather unique feature of this type of regional knowledge economy is the combined strength in both the Public Knowledge and the Private Technology factor.

11 Science & Service Centre

The main characteristics of this urban group of regions are the high scores on the Public Knowledge and Urban Services factors. Population density is very high. This type also has the highest GDP per capita and productivity. The variables that are captured by the factor Learning Families also show a score above the regional average, but disappointing is the relatively low presence of high and medium-high-tech manufacturing and the business R&D intensity.

A.2 Qualitative analysis and preparation of country reports

In summary, the country reports were prepared in the following stages:

A first country document was prepared by the core study team in the form of a **template country report**. It contained overall guidance to the country experts and included a number of pre-filled tables, graphs and analysis sections based on information available at EU level.

Next, the core team members and the national experts who were involved in the pilot phase of the project commented completed elements of the templates. Drafted elements and templates were completed and compiled into **first country briefings (draft pilot reports)** by the national experts involved in the pilot phase of the project. These pilot country reports were prepared by experts for Belgium, Greece, Italy, France, and Poland.

Once the five first country briefings were completed, a **final set of guidelines** was prepared by the core team. These guidelines were agreed with the Commission services responsible for this evaluation. Prior to this, all first country briefings were reviewed during the January 2006 and presented to a first meeting of the scientific committee.

The work during the **country analysis phase** included:

- Undertaking a series of key interviews (KI) with policy decision makers;
- Organising a focus group (FG) with key national or regional RDTI stakeholders;
- Collecting additional information and finalising short case studies; and
- Preparing the synthesis notes of these various activities.

The above-mentioned work served as qualitative data and allowed the national experts to compile the draft **country reports**. All reports were subsequently reviewed, checked and finalised by the core team and the consortium members. Once this first check was completed, the core team organised a final peer reading of the document to verify its overall consistency and to ensure a final English language editing of the document. The core team then completed the final editing and layout of the document with a view to publication.

An overall synthesis report of all has been prepared and will be published by the European Commission providing an overview of the issues addressed in each of the 27 country reports produced by the evaluation team.

Appendix B Statistical tables and regional scorecards

B.1 Overall quantitative analysis per region

	Economic performance		Public knowledge				Urban services			Private technology				Learning families						
	GDP per capita	GDP per capita growth 1996-2002	High tech services	Higher education	Knowledge workers	Public R&D	Population density	Value added industry	% Value added	Government sector	High tech manufacturing	Business R&D	S&T workers	% Value added agriculture	Lifelong learning	Youth	Female activity rate			
EU25	9.2	2.1	170	4.8	3.2	20.7	11.6	0.69	117	27.0	70.9	7.5	6.6	1.24	20.7	2.1	8.7	10.8	48.3	
Regional average	9.4	18882	4.8	3914	2.8	18.9	10.7	0.49	294	28.9	66.6	7.6	6.5	0.80	19.5	4.3	7.1	10.5	47.2	
Ireland	4.8	28089	9.3	6530	3.9	25.8	12.6	0.37	56	41.6	55.7	5.1	6.3	0.80	18.0	2.7	6.5	13.9	49.4	
Relative to EU25	192	133	194	143	123	124	109	54	48	154	79	69	95	65	87	129	75	128	102	
Border, Midland and Southern and Eastern	5.5	19374	7.2	4806	2.7	20.9	10.3	0.20	31	36.4	57.5	4.9	6.1	0.66	15.2	6.1	5.4	13.6	46.5	
IE01	4.5	31232	9.7	7100	4.3	27.4	13.4	0.39	78	42.8	55.3	5.2	6.4	0.35	18.9	1.9	6.9	14.0	50.4	
IE02																				

C.2 Classification of Beneficiaries:

Beneficiaries	Short description
<i>Public sectors</i>	Universities National research institutions and other national and local public bodies (innovation agencies, BIC, Chambers of Commerce, etc.) Public companies
<i>Private sectors</i>	Enterprises Private research centres
<i>Networks</i>	cooperation between research, universities and businesses cooperation between businesses (<i>clusters of SMEs</i>) other forms of cooperation among different actors

C.3 Classification of instruments:

Instruments	Short description
<i>Infrastructures and facilities</i>	Building and equipment for laboratories or facilities for university or research centres, Telecommunication infrastructures, Building and equipment for incubators and parks for innovative enterprises
<i>Aid schemes</i>	Grants and loans for RTDI projects Innovative finance (venture capital, equity finance, special bonds, etc.) for innovative enterprises
<i>Education and training</i>	Graduate and post-graduate University courses Training of researchers

Appendix D Financial and policy measure tables

D.1 Additional financial tables

D 1.1 RTDI plus business (innovation technology) support

Objective	Total cost	SF			NF	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	789,143,896.00	287,767,122.50	287,767,122.50	0.00	233,075,863.50	288,300,910.00
TOTAL COHESION POLICY						
Objective 1	6,019,723,729.00	3,057,569,375.00	1,812,313,000.00	1,016,487,000.00	2,253,582,752.00	708,571,602.00

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
PO obj. 1 Border Midland and Western	18,513,000.00	18,513,000.00	-	402,369,340.00	261,918,000.00	37,063,000.00
PO obj. 1 Southern and Eastern Ireland	29,367,800.50	29,367,800.50	-	570,188,636.00	399,590,601.00	87,337,000.00
Total Regional OPs	47,880,800.50	47,880,800.50		972,557,976.00	661,508,601.00	124,400,000.00
Employment/HRD Ireland	-	-	-	892,087,000.00	-	892,087,000.00
PO obj. 1 Economic and Social Infrastructure	-	-	-	905,621,077.00	905,621,077.00	-
PO obj. 1 Productive Sector	239,886,322.00	239,886,322.00	-	282,403,322.00	240,283,322.00	-
PO obj. 1 Technical Assistance	-	-	-	4,900,000.00	4,900,000.00	-
Total Multiregional OPs	239,886,322.00	239,886,322.00		2,085,011,399.00	1,150,804,399.00	892,087,000.00

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	287,767,122.50	180,489,344.36	62.7%

Categories 181 to 184 plus :

152 Environment-friendly technologies, clean and economical energy technologies
 153 Business organisation advisory service (including internationalisation, exporting and environmental management, purchase of technology)

155 Financial engineering

162 Environment-friendly technologies, clean and economical energy technologies

163 Enterprise advisory service (information, business planning, consultancy services, marketing, management, design, internationalisation, exporting, environmental management, purchase of technology)

164 Shared business services (business estates, incubator units, stimulation, promotional services, networking, conferences, trade fairs)

165 Financial engineering

D 1.2 Broad innovation and knowledge economy funding

Objective	Total cost	SF			NF	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	968,803,896.00	377,597,122.50	377,597,122.50	0.00	322,905,863.50	268,300,910.00
TOTAL COHESION POLICY						
Objective 1	6,019,723,729.00	3,057,569,375.00	1,812,313,000.00	1,016,487,000.00	2,253,582,752.00	708,571,602.00

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
PO obj. 1 Border Midland and Western	64,563,000.00	64,563,000.00	-	402,369,340.00	261,918,000.00	37,063,000.00
PO obj. 1 Southern and Eastern Ireland	73,147,800.50	73,147,800.50	-	570,188,636.00	399,590,601.00	87,337,000.00
Total Regional OPs	137,710,800.50	137,710,800.50		972,557,976.00	661,508,601.00	124,400,000.00
Employment/HRD Ireland	-	-	-	892,087,000.00	-	892,087,000.00
PO obj. 1 Economic and Social Infrastructure	-	-	-	905,621,077.00	905,621,077.00	-
PO obj. 1 Productive Sector	239,886,322.00	239,886,322.00	-	282,403,322.00	240,283,322.00	-
PO obj. 1 Technical Assistance	-	-	-	4,900,000.00	4,900,000.00	-
Total Multiregional OPs	239,886,322.00	239,886,322.00		2,085,011,399.00	1,150,804,399.00	892,087,000.00

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	377,597,122.50	217,789,216.10	57.7%

This third calculation adds RTDI plus business (innovation & technology) support plus information society. As D.1.1 plus:

322 Information and Communication Technology (including security and safe transmission measures)

324 Services and applications for SMEs (electronic commerce and transactions, education and training, networking)

D.2 Summary of key policy measures per programme

Exhibit 14: main measures in favour of innovation and knowledge

Identified RTDI measure or major project		Focus of intervention (Policy areas classification)*	Main Instruments**	Main beneficiaries***
Programme	Number and title of the measure			
Productive Sector OP	Priority 1 - Education Strategic Research sub-measure - Programme for Research in Third Level Institutions strand	Boosting applied research and product development / Innovation friendly environment	Aid Schemes / Infrastructure and facilities / Education and Training	Public sector
	Priority 1 - Education Strategic Research sub-measure - North-South Collaboration strand	Boosting applied research and product development / Innovation friendly environment	Aid Schemes / Infrastructure and facilities	Public sector
	Priority 1 - Industry - Competitive RTDI sub-measure	Boosting applied research and product development	Aid Schemes	Private sector
	Priority 1 - Industry - National Collaboration	Knowledge transfer and technology diffusion to enterprises	Aid Schemes	Public sector / Private sector / Networks
Border, Midland and Western Regional OP	Micro-Enterprise Measure - Entrepreneurial and Capability Development Sub-measure	Support to creation and growth to innovative enterprises	Aid Schemes	Private sector
	Micro-Enterprise Measure - Selective Financial Interventions	Support to creation and growth to innovative enterprises	Aid Schemes	Private sector
	Regional Innovation Strategies	Knowledge transfer and technology diffusion to enterprises	Aid Schemes / Infrastructure and facilities	Private sector / Public sector / Networks
Southern&Eastern OP				

Micro-Enterprise Measure - Entrepreneurial and Capability Development Sub-measure Support to creation and growth to innovative enterprises Aid Schemes Private sector

	Development Sub-measure	enterprises		
	Micro-Enterprise Measure - Selective Financial Interventions	Support to creation and growth to innovative enterprises	Aid Schemes	Private sector
	Regional Innovation Strategies	Knowledge transfer and technology diffusion to enterprises	Aid Schemes / Infrastructure and facilities	Private sector / Public sector / Networks
PEACE II Operational Programme	1.1 Business Competitiveness and Development	Innovation friendly environment / Support to creation and growth of innovative enterprises	Aid schemes	Private sector
	1.4 Promoting Entrepreneurship	Support to creation and growth to innovative enterprises	Aid schemes	Private sector
	1.8a Technology Support for the Knowledge Based Economy (Innovation Technology Networking)	Knowledge transfer and technology diffusion to enterprises / Boosting applied research and product development	Aid schemes / Infrastructures and facilities	Private sector / Networks / Public sector
	1.8b Technology Support for the Knowledge Based Economy (Information Age)	Knowledge transfer and technology diffusion to enterprises	Aid schemes	Private sector

* Classification of RTDI interventions: Improving governance capacities for innovation and knowledge policies; Innovation friendly environment; Knowledge transfer and technology diffusion enterprises; Innovation poles and clusters; Support to creation and growth of innovative enterprises; Boosting applied research and product development (see appendix).

**Classification of instruments: Infrastructures and facilities; Aid schemes; Education and training.

***Classification of Beneficiaries: Public sectors; Private sectors; Networks

Main source: Operational Programme documents and Evaluation Reports

Appendix E

Case studies

Name of Case (related policy measure or action)
<p>Title of measure/project: Programme for Research in Third Level Institutions (PRTLTI)</p> <p>Description: The primary objective of the programme is to support the development of research capabilities within the third-level education and research system in Ireland. This is done through the provision of infrastructural and programmatic support so as to enhance the numbers and quality of graduate output and to empower high quality inter-disciplinary and inter-institutional research.</p> <p>Zone: Objective 1 – All Ireland PRTLTI programme is part of the ‘Research’ priority, whose overall aim is to improve research capacity in the third-level education system.</p>
Brief history and main features
<p>Policy Area The Programme for Research in Third-Level Institutions is an investment vehicle to bring about a permanent transformation in the research environment and culture in Ireland. The programme can be included under the policy areas ‘boosting applied research and product development’ and ‘innovation friendly environment’. The main objectives of the programme are: to facilitate strategic development of institutional research capabilities with investment in infrastructure and research programmes; to enhance the numbers and quality of researchers and graduates; support collaborative research among Irish research institutes and universities and internationally.</p> <p>Main instruments The initiative is characterised by involvement of post-graduate students, young researchers and researchers in addressing research in national sectoral priorities. Aid schemes, physical infrastructures, and collaborative projects are the other main instruments.</p> <p>Main beneficiaries The third-level education and research system, universities, research centres, and Institutes of Technology, is the main beneficiary of the programme. In 2004, out of total of 35 eligible institutions, funding was approved for 15. The largest three recipients of funding were University College Cork, University College Dublin, and Trinity College Dublin.</p> <p>Inspiration by previous experience The Programme for Research in Third Level Institutions (PRTLTI) was established in 1998 as the main instrument to create a dynamic, innovative, and well-resourced research base in Ireland. It was not inspired by previous experience, but by the need strengthen the weak research capability of Ireland in the late 1990s.</p> <p>Managing organisation The Higher Education Authority (HEA) administers the initiative. PRTLTI is part of the Productive Sector Operational Programme and the managing authority is the Office of Science and Technology (DETE).</p> <p>Structure of the programme The PRTLTI investment of 605 MEUR has been allocated on a competitive basis to</p>

third-level institutions in three funding cycles. The first cycle was announced in 1999 for the funding period 2000-2003 with a total investment of 206.1 MEUR. 177.5 MEUR has been devoted to buildings and equipment, the remaining part to research programmes and researchers. The second cycle was announced in 2000 for the period 2001-2004 with a total investment of 78.5 MEUR. The third cycle has been announced in 2001 for the period 2002-2006 with a total investment of 320.4 MEUR. 178.0 MEUR has been devolved to buildings and equipment and 142.4 MEUR to research programmes and people.

Degree of novelty and relevance of the initiative

PRTLTI represents a milestone for the public research and development arena in Ireland. In the second half of the 1990s, research in Irish universities received little or no funding from public agencies, instead relying heavily on outside resources. In addition, there was little strategic planning of research and connections among institutions were weak and characterised by an adversarial rather than collaborative attitude. In 1999, the advent of PRTLTI transformed this scenario by providing significant funding to institutions to carry out research, and requiring the institutions to draw up strategic plans and collaborate with each other.

Main results

Financial and physical outcomes

The financial allocation per each cycle is outlined above. However, in 2004, the total allocation was 605 MEUR. Two-thirds of this allocation has been used for buildings, equipment, and infrastructures. The remaining third went to finance research programmes and researchers. Regarding infrastructures, 17 large research buildings have been completed, including centres in biosciences, biotechnology, communications networks, social sciences, humanities, engineering, and advanced materials science. Research programmes and researchers in different fields of science and technology have also been financed: bioscience/biomedicine (EUR 295 MEUR), green technologies (EUR 62 MEUR), chemical and physical science (EUR 60 MEUR), information and communication technologies (EUR 52 MEUR). This data refers to year 2004. By the end of 2003, 850 researchers had been funded through the PRTLTI programme. This represents a three-fold increase in research numbers in the higher education sector since 1998

Evaluation results

The programme has achieved exemplary results according to the last impact assessment published by the Higher Education Authority in 2004. The evaluation looked at three types of results: quality and outputs of research, output of teaching and learning, and organisation and management of the research. Regarding quality and output, the evaluation used two main analyses: peer review and bibliometric analysis. Peer review suggests that the research funded by PRTLTI was of good quality, scoring an overall average of 2.65 out of 3 in science and medicine with an average of 2.8. This assessment is supported by the bibliometric analysis which emphasises the increase in number of publications between the start of the programme in 1999 and 2002. For example, a sample of 73 bioscientists, funded by PRTLTI, published 1,560 articles, or 21 per scientist. In the case of chemical and physical science, 35 scientists published 1,011 articles, or 29 articles per scientist.

If this analysis is extended to books, conference proceedings, and 'grey literature', the total number of publications in the period evaluated is 4,599. In addition to the contribution of the literature, the centres developed by the programme have hosted 239 international conferences. Intellectual property rights are another output indicator, but given their long-term nature, it is too early to expect granted patents. However,

there have been 60 patent applications to the end of 2003.

In terms of teaching and learning output, 65 new courses have been developed: 24 in biosciences, 12 in chemical and physical sciences, and 26 in environmental science. 2,174 people were involved in these courses: 751 personal investigators, 454 post-doctoral fellows, and 969 post-graduate students.

Regarding the organisation and management of the research, the evaluation aimed to understand if the third-level education system was developing a suitable management culture. Site visits at the centres revealed that PRTLTI has been able to change the way that research is organized and conducted. In addition, the capacity of networking among different centres and universities was increasing. The evaluation process selected seven institutions that were involved in PRTLTI, whereas in 1995 there were no collaborations with other institutions. In 2003, all were participants in research networks.

Results expected at the end of the programme

When completed, PRTLTI funding allocations will provide: 33 research centres, including multi-site collaborative centres, 90,000-square meter additional purpose-built research base, and sophisticated equipment and technology. Consequently, it is also expected to attract an increasing number of researchers to projects and partnerships among universities, research centres, and international research actors.

Reasons of success and conditions for repeatability

Main lesson

PRTLTI has been a major driver of the improvements that have occurred in the Irish R&D system. The evaluation, illustrated above, shows that PRTLTI has been a major contributor to improvements in infrastructure, research management, and research activity and quality. The programme represents best practice because “PRTLTI marks the beginning of a major and most beneficial transformation of the research landscape of Ireland that will help to install an innovation-driven economy” (Higher Education Authority – PRTLTI Impact Assessment).

Repeatability of the programme

Given the extraordinary results, the PRTLTI Impact Assessment report has strongly suggested that the programme should be financed for the next few years and additional resources have been allocated until 2008. In terms of transferability, the programme can be a good example for small countries with underdeveloped research systems that need to strengthen entrepreneurial spirit, management, and research output.

Appendix F

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List of useful websites at national or regional level

Border, Midland and Western Regional Assembly. <http://www.bmwassembly.ie/>

Central Statistics Office. Ireland. <http://www.cso.ie/>

Enterprise Ireland. <http://www.enterprise-ireland.com/>

EU Structural Funding in Ireland. <http://www.csfinfo.com/>

Expert Group on Future Skills Needs. <http://egfsn.forfas.ie/>

Forfás. <http://www.forfas.ie/>

Higher Education Authority. <http://www.heai.ie/>

Irish Council for Science, Technology and Innovation.
<http://www.forfas.ie/icsti/index.html>

Irish Regional Office. http://www.iro.ie/about_us.html

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Southern and Eastern Regional Assembly. <http://www.seregassembly.ie/>

Appendix G Stakeholders consulted

Name	Position	Organisation
Bob Keane	Productive Sector Operational Programme Team Member	Office of Science and Technology – DETE
Dolores Keating	Innovative Actions Manager	Southern and Eastern Regional Assembly
Michael Leahy	Corporate Services, Investment Services and Policy Team Member	Enterprise Ireland
Bernard McKeown	Innovation specialist – PEACE II Programme	DETINI
Michael O'Brien	Innovative Actions Manager	Border, Midland and Western Regional Assembly
Ivan Grimes	Assistant Director	Southern and Eastern Regional Assembly