Csil Milano

Policy guidelines for regions falling under the new regional competitiveness and employment objective for the 2007 - 2013 period in the fields of the knowledge economy and the environment, in line with the Lisbon and Gothenburg objectives

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Policy guidelines for regions falling under the new regional competitiveness and employment objective for the 2007 - 2013 period

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The Team takes full responsibility for the data, information and judgments expressed in the present report.

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LIST OF ACRONYMS

CIS	Community Innovation Survey
DG Regio	Directorate General of Regional Policy of the European Commission
ERDF	European Regional Development Fund
EKC	Environmental Kuznets Curve
EPO	European Patent Office
ESPON	European Spatial Planning Observation Network
FA	Factor Analysis
GDP	Gross Domestic Product
ICT	Information and Communication Technology
INRA	International Research Associates (Europe)
NUTS	Nomenclature of Territorial Units for Statistics
PC	Personal Computer
PCA	Principal Components Analysis
PPS	Purchasing Power Standards
R&D	Research & Development
SF	Structural Funds
TLC	Telecommunication

EXECUTIVE SUMMARY

This Report offers an assessment of economic conditions and policy priorities for the regions falling under the new Competitiveness and Employment Objective 2007-2013.

It is structured as follows:

1) the report presents some statistical data on the general economic conditions of the country.
2) a statistical analysis on the three ERDF themes: a) Innovation and the Knowledge economy; b) Accessibility; c) Environment and Risk Prevention.
3) a discussion of the current experience with Structural Funds and some implementation issues.
4) a set of policy priorities as perceived by the team of independent experts. The methodology, sources of data and description of indicators are explained in detail in Vol. I of the Report, that should be duly considered.

Contributors to the Report include: the statistical team, the core team, thematic experts and the country experts. The final version has been prepared under the responsibility of the core team (Milan).

Eligible Regions: Border-Midland-Western; Southern - Eastern.

- *General Economic Conditions*

Border-Midland-Western is the statistical aggregate of three regions. On average it shows low population density in comparison to the benchmark of EU eligible regions to the Competitiveness and Employment Objective. It has a very high share of employment in the primary sectors, and a share of manufacturing only slightly below the benchmark. Southern and Eastern is composed of very different subregions, including Dublin and other four NUTS III areas. It has a relatively higher population density, but still well below the benchmark, and a much lower share of employment in the primary sector employment. In terms of economic performance the overall ranking is high for both regions, but there are differences. In fact, Border-Midland-Western (phasing-in) has lower GDP per capita than the South and Eastern, and well below the average of eligible regions, while the latter is 20% above the benchmark. Growth of GDP, and per employee is higher in South and Eastern, and unemployment lower. Recent trends for the Irish economy are good, but medium and long term forecasts show a much slower GDP growth because of macroeconomic tensions and possible loss of

competitiveness and profitability. Moreover, because of the high share of multinationals in the GDP, national income is significantly lower than domestic product, and this reduces the relative position of Ireland in the EU.

- *Innovation and knowledge economy*

The innovation potential in both regions is in contrast to their good performance. R&D expenditure is around 30% below the benchmark in both regions, number of patents applications is very low, and also very low is the share of firms' turnover due to new products. This contrasts with high employment in hi-tech services and manufacturing, particularly in South and Eastern, and good tertiary education. Thus the overall ranking for innovation is only Intermediate for both regions, probably a reflection of the foreign ownership of many hi-tech plant, where research is developed elsewhere. This is a threat because FDI will decline in future if changes in profit taxation is going to be implemented in 2012.

- *Accessibility*

In both regions multimodal transport accessibility is in the low range, while connectivity to transport terminals by car is in the low-intermediate . Trends of passenger and freight traffic in Ireland in past years show a much higher increase than in the EU-15, particularly for cars and coaches. Railway has a declining role. The TEN-T priority projects include the railway Cork-Straraer (North-South and ferry connection with Scotland), the UK-Ireland-Benelux road link, and the Western Europe motorway.

ICT/TLC indicators are relatively low in BMW and intermediate in Southern and Eastern. In the latter all indicators are close to the benchmark, while in the former they are slightly lower. ICT investment is below EU average. In recent years however there were improvements in this area.

- *Environment and risk prevention*

Electricity efficiency is high in both regions, self-sufficiency near to the benchmark, but renewable resources are relatively underdeveloped. The environmental impact of transport seems to be intermediate, basically because of vehicle density and traffic intensity below the benchmark, but there is very limited non-fuel transport. For the indicators of natural/rural assets the situation is intermediate, particularly in the BMW region, with around 12% of the territory protected, while unsatisfactory in the South and Estern. Natural risk is low on most indicators, and there is no indication of widespread technological risk, but this may conceal

specific local situations, above all in the South and Eastern. Emissions are however high, and there are some concerns for flooding in some Atlantic coast zones. Water and waste management is felt as problematic in both regions.

- *Implementation of Structural Funds in the current programming period*

Under the current programmes, both regions were eligible to Objective 1. Ireland invested EU funds in four national programmes (transport & energy; social infrastructures; employment; productive sector, including RTDI and SMEs support) and in two regional programmes. There were four priorities for the latter: local infrastructures, enterprise development, rural development, and social integration. Trasport was give one third of the funds, human resources one quarter, while RTDI and SMEs together were given one fifth (the remaining was distributed in a high number of sectors). While the overall perception of the Structural Funds is one of an ongoing success story, there is room for improvement in project selection and management.

- *Policy priorities for discussion*

Accessibility is perhaps still the highest priority for both regions, and we suggest that around one half of the ERDF funds have to be allocated in this area, also because Ireland is no more eligible to the Cohesion Fund. Transport accessibility is definitely a much greater concern in BMW than in South and Eastern as compared with ICT, while the reverse is true in the S&E perspective. While the former needs greater accessibility to trade in agricolture and manufacturing products, the latter should support its innovation strategy and knowledge economy efforts with a robust ICT network.

As for the Innovation priority, the key issue for both regions is the need to develop the domestic, endogenous potential. This suggests to assign the second highest priority in funds allocation to measures in this area, but with a different content. BMW, given its economic structure, should give the highest priority to SMEs support and less to other programmes, while S&E should focus on enhancing RTDI capacities. In fact, it seems that there is no need to dilute research potential, while there is a good rationale for concentration of R&D support in Dublin and to a certain extent in Cork.

Some of these issues should be addressed by national funds, within an integrated environmental approach.

1 Scope and methodology

1.1 Aim of the report

The aim of this Country Report is to offer the European Commission an overview of the strengths, weaknesses, opportunities and threats faced by the regions eligible for the new Competitiveness objective 2007-2013. It focuses on the three ERDF themes listed in the draft regulation, and it has been prepared as a background document, with a view to supporting the Commission in its own policy priorities analysis and negotiation with the Member States.

As a part of a comprehensive study on 19 countries including 167 regions, the present Country Report is designed as a summary assessment of some key issues. It is a preliminary assessment that should be completed by a much more detailed structural and policy analysis needed at a later stage for the preparation of the Operative Programmes. Moreover, as explained in detail in Vol. I (Statistical Analysis), and as requested by the Terms of Reference, the present report is based mainly on standardised regional statistics and a common cross-country approach. This has obvious advantages in terms of comparisons and benchmarking, but is not designed to fully capture specific features based on local data, and this fact should be duly considered when using it as a reference.

1.2 Methodology for context analysis

The analysis at regional level presents the following sections: general economic structure, innovation and the knowledge economy, accessibility, environmental and risk prevention. For each section a brief description is given according to a short list of indicators with the following characteristics:

- they are consistent and available at NUT2 level;
- they are relevant for the ERDF thematic approach;
- they are, as far as possible, policy-oriented.

The choice of this set of indicators comes from the need to provide guiding principles for policy priorities, rather than to develop comprehensive regional statistical data. For this reason it should be clear that they give some highlights of the major trends in the regions and do not offer a complete picture of all the needs and weaknesses experienced by the regions.

The rationale of the data processing is the following:

- for each aspect (economic structure plus three themes) a linear composite indicator is created and the region is ranked in comparison with all the other eligible regions;
- for each theme (except Environmental risks) the degree of correlation with the economic performance is investigated, by means of a correlation analysis.

The basic idea is to discuss the main thematic trends in the regions, with respect to the ERDF eligible interventions, in the light of the economic structure and trends and the relative position of the regions as compared to a given benchmark (the EU eligible regions average). This reading of the data helps to discover combinations of, for example, High Innovation and Low Economic Performance, that may suggest the existence of unexploited potential, hence an opportunity to invest more on transfer and adaptation than on R&D or tertiary education per se. This analysis is included in Sections 2 to 5.

This set of information is then discussed from a more qualitative point of view on the basis of inputs coming from an assessment of the current SF programming period and lessons learnt in the field analysis carried out by the national expert.

1.3 Structure of the report

Section 2 briefly summarises the general economic conditions for the eligible regions, using the following average annual data (2000-2002): regional population and its national share, population density, employment share of manufacturing, a 'rural/urban' and a 'presence of manufacturing' classification; and 1995-2002 averages for GDP per capita, rate of unemployment, growth of GDP, labour productivity growth per employee, and economic performance ranking. The latter ranking is crucial in the analysis. It is based on a linear combination of two factors ('levels' and 'growth') arising from a factor analysis (see Vol. I for details). Each data set is presented in comparison with a benchmark given by the average of the EU 168 regions eligible for the objective. Often some additional macroeconomic information is also included.

The following section is on Innovation and Knowledge Economy. It presents regional average annual data (mostly 1995-2002) on R&D expenditure as a share of GDP, EPO applications per million inhabitants, percentage of employment in high-tech services, share of population with tertiary education, share of firms' turnover due to new products (CIS data), and an overall

classification based on a factor analysis. Regions are classified High, Intermediate or Low performing in innovation with a combination of these data.

Section 4 is about Accessibility. It presents data on TLC and ICT (share of firms with Internet access and websites and share of households with a PC and access to the Internet) and data on transport indicators (the ESPON multimodal accessibility potential and connectivity to terminals by car). The analysis is supplemented by recent and forecasted trends in travel demand by mode (DG TREN data and scenario at 2020 (Tremove). A multi-index analysis is given in the Annex.

Section 5 looks at Environment and Risk prevention. This includes standardised data on energy sustainability (electricity efficiency, self-sufficiency, renewable sources and ranking); the environmental impact of transport (vehicle density, non-fuel transport, anthropic degree, urban/rural typology); natural and technological risk (flood hazard potential, burnt areas and polluting sites). The reader should note that these data cannot cover specific sub-regional environmental risks, but consider regional averages.

Section 6 gives a quick overview of the current 2000-2006 programming period, based on a financial breakdown by re-classified priority and some qualitative comments based on the evaluation results.

The last section is about the policy priorities assessment. The first part of it presents the results of a correlation analysis between Economic Performance and Innovation, Access, and Environment summary indicators. A similar cross-reading is given for Economic Performance, Accessibility and Environment, while the presence of high Natural or Technological Risks is considered as a critical issue per se.

After this combined reading of performance and structural data, the following section is more qualitative, and based on other sources of evidence, including interviews with stakeholders, official documents, evaluation reports, academic research, and the personal assessment by the country expert. This leads to the suggestion of some indicative regional policy priorities, based on the available evidence, to be checked at a later stage when the national frameworks and regional programmes are available.

The report ends with a brief discussion of some implementation issues.

2. General economic conditions

As a whole, Ireland has a low density of population, less than half of the reference average (see table 1). The Southern and Eastern region accounts for almost three quarters of the population eligible for the competitiveness objective, but still maintains some rural characteristics (as evident from the relevant share of employment in primary activities). Southern and Eastern, due to its higher density of population, is classified as intermediate in the urban/rural dimension, while Border, Midland and Western (which is a phasing-in region) results to be rural, having a share of primary employment four times higher than the reference average. At the same time, both regions display an intermediate presence of manufacturing which, thanks to the recent process of industrialisation, has remarkably increased over time.

Tab. 1 Structural indicators

	Population (thousands)	Share of national population	Population density	Share of primary sectors on total employment	Share of manufacturing on total employment	Rural/urban classification	Presence of manufacturing
Border. Midland and Western	1016	26.40	31	12.42	18.12	Rural	Intermediate
Southern and Eastern	2831	73.57	77	5.78	16.28	Intermediate	Intermediate
National figures	3848	100.00	55	7.43	16.74		
EU eligible regions	313711		129	3.34	20.18		

Source: Eurostat - see vol I

For both regions the economic performance ranking is high, and this outcome is equally attributable to the indicators of economic level and growth.

Tab. 2 Economic performance indicators

	GDP per capita	Rate of unemployment	Growth of GDP	Growth of GDP per employed person	Economic Performance Ranking
Border, Midland and Western	19692	5.40	7.94	3.51	High
Southern and Eastern	29010	3.89	8.44	3.85	High
National average	26548	4.27	8.34	3.79	
Average of EU eligible regions	24162	6.42	2.34	0.99	

Sources: Eurostat and DG Regio – see vol. I

Concerning the former indicators, the unemployment rate is quite low despite the relatively early stage of Irish industrialisation. As for the latter indicators, with respect to the reference average Ireland presents amazing rates of growth for both GDP and labour productivity. Its should also be noted that, despite the gap still existing between the levels of their GDP per capita, the two regions exhibit quite similar paths of economic development, pointing towards a model of economic growth optimising the traditional trade-off between employment-rich and productivity-based growth.

Tab. 3 Economic performance indicators (comparison with the national and European eligible regions)

	GDP per capita		Rate of unemployment		Growth of GDP		Growth of GDP per employed person	
	Ireland (100)	EU eligible regions (100)	Ireland (100)	EU eligible regions (100)	Ireland (100)	EU eligible regions (100)	Ireland (100)	EU eligible regions (100)
Border, Midland and Western	74	81	126	84	95	339	93	353
Southern and Eastern	109	120	91	61	101	360	102	387

Sources: Eurostat and DG Regio – see vol. I

While the performance of the Irish economy has been very good recently with respect to real GDP growth, given the unique and significant amount of inward investment Ireland receives, real GNP growth is significantly lower over 1995-2004 due to the remittance of profits. Direct inward investment flows in 2003 represented 17 per cent of GDP whereas the EU 12 average was only 1.7 per cent. According to this specific feature, one may think that there is a clear argument that real GNP/GNI should be used to evaluate Irish economic performance. In 2003 Ireland had the second highest GDP per capita in purchasing power standards but only joint ninth highest GNI per capita. When EU GNI as a ratio of GDP for 2003 is compared for the EU 25 Ireland has the lowest value at 83.8 per cent with Luxembourg being the only other country with a value below 90.0. The Ireland value is more than 10 per cent below the EU 25 average and the next five lowest countries (with values between 93.7 to 98.3) are all new member states.

Tab. 4 Real GDP and GNI growth (%), 1995-2004

Ireland, (%)	1995-2004	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
GDP constant market prices	7.7	8.3	11.7	8.5	10.7	9.2	6.2	6.1	4.4	4.5
GNI constant market prices	6.6	8.8	9.8	7.2	8.3	9.2	3.8	3.2	4.9	4.1

One of the most significant signs of the strong growth from the 1990s onwards has been the considerable rise in employment.

- Employment growth has slowed over the past two years while unemployment has remained relatively stable. The male employment rate fell from 76.1 per cent in 2001 to 74.7 per cent in 2003 while the female employment rate increased over the same period. In 2004 Ireland had the 9th highest employment rate and was above the EU 25 average.
- Productivity in Ireland (using GDP in purchasing power standards) was 27.2 per cent higher than the EU average in 2003 and was the third highest in the EU 25.
- Unemployment has fallen from 7.8 per cent in 1998 to 3.6 per cent in 2001 but has risen since then. In 2004 the unemployment rate was the second lowest in the EU 25 and was less than half of the EU average. Long term unemployment has also declined every year over 1994 to 2001. The long term unemployment rate was 1.5 per cent in 2003, the 8th

lowest in the EU 25 compared to the EU average of 4.0 per cent. It is expected however that as economic growth picks up then unemployment will slowly decline again.

- Net inward migration has been increasing since 1996 and the population change over 1995-2004 was 12.3 per cent, the second highest in the EU 25. There has also been a strong rise in the natural change in the population as the rate has increased from 4.6 per cent per 1,000 in 1995 to 8.2 per cent per 1,000 in 2003 compared to the EU 25 rate of 0.4 per cent per 1,000 in 2003.

The regional labour market depicts a similar picture with relatively high participation rates and low unemployment rates in Dublin and the Mid East. Performance in the South West is also relatively good. However the Border, Mid West and South East sub-regions have relatively poorer performance. Table 6 presents the regional labour market data for 1998 to 2005.

Tab. 5 Participation rate and unemployment rate, (%), 1998-2005

ILO Second quarter data	1998		2002		2003		2004		2005	
(%)	Part.	Unemp.	Part.	Unemp.	Part.	Unemp.	Part.	Unemp.	Part.	Unemp.
Ireland	56.5	7.8	59.6	4.2	59.6	4.4	60.0	4.4	61.5	4.2
South East										
Dublin	60.4	7.2	62.4	3.6	62.1	3.8	62.0	4.3	63.7	4.2
Mid East	60.3	7.1	63.5	3.3	63.6	2.9	62.8	3.2	64.2	2.7
Mid West	55.9	6.8	58.5	3.6	59.1	4.2	60.5	5.0	61.7	4.7
South East	54.5	9.7	58.7	4.7	59.2	5.7	58.9	5.2	59.9	5.6
South West	54.5	7.8	56.8	4.0	56.8	4.4	58.0	4.2	59.6	4.2
Border, Midland and West										
Border	52.2	10.3	55.5	6.7	55.5	6.4	57.2	5.2	58.3	4.9
Midlands	53.6	7.9	58.1	3.9	59.8	5.2	59.2	4.6	61.0	4.0
West	53.0	6.4	58.6	4.8	57.8	3.9	58.4	3.7	60.1	3.7

GVA by region is presented in Table 5 and it is clear that Dublin accounts for nearly 40 per cent of activity. Within Border, Midlands and West the lowest activity occurs in Midlands. The lowest performer in South East region is Mid West. This demonstrates that within the two regions of Ireland there are areas of relatively poorer economic performance and that the

whole country does not enjoy the substantial levels of activity seen in Dublin and the South West.

In 2002 average income was 3 per cent higher in the South East region (compared to Ireland) while in Border Midland and West it was 8.2 per cent below the Irish average. The Border sub-region was 10.2 per cent below the average in 2002 and was the lowest of the eight sub-regions. In 2002 there were three counties[1] where household disposable income was between 83.5 and 89.4, compared to Ireland = 100. Fourteen counties[2] have a value of 89.5 to 95.4. This large swath of rural Ireland (running north west to south east) plus Kerry and Clare are clearly priorities for economic development.

Tab. 6 GVA by region (%), 1995-2001

(%)	1995	1996	1997	1998	1999	2000	2001
Ireland	47.322	52.463	60.200	69.337	80.003	91.299	103.245
South East	37.816	41.705	48.294	55.813	64.869	73.971	82.838
Dublin	17.999	20.093	23.255	27.343	31.152	35.565	39.133
Mid East	4.062	4.295	5.142	5.213	7.197	7.524	9.202
Mid West	3.877	4.335	4.676	5.429	6.268	7.339	7.595
South East	4.378	4.959	5.279	5.954	6.887	7.811	9.461
South West	7.500	8.024	9.940	11.874	13.364	15.731	17.447
Border, Midland and West	9.506	10.757	11.906	13.525	15.135	17.327	20.407
Border	4.171	4.675	5.272	6.015	6.623	7.297	8.408
Midlands	1.941	2.202	2.439	2.638	3.073	3.561	4.138
West	3.394	3.881	4.196	4.872	5.439	6.469	7.861

[1] Kerry, Donegal and Cavan

[2] Mayo, Sligo, Leitrim, Roscommon, Longford, Westmeath, Offaly, Laois, Clare, South Tipperary, Kilkenny, Carlow and Wexford

Looking forward it is probable that Irish growth will slow slightly because of increased inflationary pressures driven by the appreciation of the Euro, rising oil prices and the strong deflationary effect that the Euro Area is experiencing. The external environment for Ireland is now less favourable for economic growth than it was in the recent past. Given the existing problems of the Euro Area it is likely that profitability and competitiveness will suffer. While growth will slow slightly, it is still expected to be above that of most EU countries. Employment growth is also set to slow as the Irish economy matures while ILO unemployment is forecast to decline to just above 4 per cent by the end of this decade. Table 7 presents forecasts for Ireland.

Tab. 7 Forecasts for the Irish economy (%), 2005-2020

Ireland	2005	2006-	2007-	2008-	2009	2010	2000-2005	2005-2010	2010-2015	2015-2020
	%						Annual Average Growth			
GDP	6.1	6.6	5.9	5.9	5.3	5.0	4.8	5.7	3.3	2.9
GNP	4.7	5.7	5.6	5.7	5.1	4.8	3.1	5.4	3.5	2.8
Employment	2.4	2.5	2.7	2.0	2.0	1.7	2.1	2.2	1.1	0.5
ILO Unemployment rate	5.4	5.2	4.7	4.6	4.3	4.3	5.4	4.3	3.1	3.2

Source: ESRI, (2005)

3. Innovation and knowledge economy

The recent industrialisation process of Ireland has been intensive in the technological content but not extensive in the spatial diffusion: in fact, as displayed by table 1, the Irish share of manufacturing employment is still below to the reference average. Moreover, the composition effect between new fast growing high tech-sectors and areas of traditional and rural activities explains why the table 8 exhibit a technological level which is intermediate but less than one may expect looking at the high economic performance of the country.

In particular, while both R&D and EPO indicators score quite satisfactorily (in any case, not too far from that of many UK regions):

- the share of employment in high-tech manufacturing appears even higher, confirming the undergoing process of specialization of Ireland in the "new economy" industries.
- This process has stimulated a complementary surge of high-tech services[3]. In both cases, an important role has been played by a highly favourable fiscal system set up by the Irish government, aimed at attracting foreign direct investments.
- The share of population with tertiary education is satisfactory in Border, Midland and Western and high in the other Irish region.

Tab. 8 Indicators of innovation and knowledge economy

	R&D expend. on GDP	EPO application per million inhabitants	Percent. of employ. in high-tech manufact.	Percent. of employ. in high-tech services	Share of population with tertiary education	Share of turnover due to products new to the firms	Overall ranking
Border, Midland, Western	1.23	38	3.19	2.72	22.53	7.00	Intermediate
Southern and Eastern	1.23	74	3.24	3.50	30.49	13.20	Intermediate
EU eligible Regions	1.70	136	1.49	3.23	24.81	35.21	

Sources: Eurostat and Community Innovation Survey - see vol. I

[3] See again table 4

The current innovation policy in Ireland is to produce global excellence, not just national or European excellence. Any attempts to promote innovation in the Border Midland West region may just simply dilute activity in the core area of Dublin which would be counter productive. This is because the two universities in Dublin enjoy harmonious collaboration and Dublin provides a critical mass for innovation.

Here follow some findings from statistical analysis[4]:

- Ireland had in 2003 gross fixed capital formation (GFCF) of 28.2 per cent of GNI and 23.6 per cent of GDP. The former places Ireland 2nd highest in the EU 25 while the latter is the 9th highest ranking in the EU, compared with the EU 25 average of 19.2 per cent.
- In each of the three years 2001 to 2003 investment in Ireland has been above that of the EU average. In fact, Ireland has not been out with the top three countries over the same period.
- The proportion of mathematics, science and technology PhDs awarded in Ireland was 0.5 per 1,000 in 2002, ranking it 8th highest but close to the EU average.
- Irish spending on R&D as a percentage of GDP however was only 1.12 per cent in 2003. This was considerably below the top performer, Sweden at 4.27 per cent and significantly below the EU 25 of 1.93 per cent. In 1998 this value was 1.25 per cent and it was 1.17 per cent in 1993. As a percentage of GNI it is slightly higher at 1.35 per cent in 2003 but still short of the EU 25 average rate.
- In the period 1994 to 2000 there was a significant rise in the number of applications made to the European Patent Office but a 6 % decrease in the years 2000 to 2002. Ireland is ranked 12th out of the EU 25 and is two places below the EU 25 average for the year 2002.

Some recommendations

We should note that the Irish fiscal system will change in 2012 with the amendments to the profit tax rate likely to be put in place. If this does happen then it is probable that the new

[4] The indicators used to measure innovation are to be interpreted with caution. Both the Irish government and the academic experts would like to see broader measures of innovation being used to assess the strength of innovation in the Irish economy. They also believe that within the two NUTS2 regions there are differing performances in the sub-regions e.g. Dublin is a high performing sub-region therefore it effectively masks the significantly worse performance in the other sub-regions of the south east region.

levels of FDI will decline relative to those seen in the past. In assessing the outlook for innovation in the Irish economy this needs to be considered.

It is more important to shift the emphasis to promoting indigenous innovation as this will benefit GNI in the long-run. External firms have a high capacity for innovation.

Further it is still important to stimulate entrepreneurship and to foster innovation within SMEs. It is more important to concentrate on innovation in SMEs than it is to try to get SMEs to develop internet access and ICT.

Given this situation it is important to highlight the relatively weaker performance of Ireland here. This applies more in the Border Midland Western region than to the South East. It should also be noted that the position is improving (ad hoc and survey evidence) as official statistics have a significant time lag and that by 2006 both investment and scientific output levels will be stronger than the latest data[5].

[5] An example of an initiative aimed to improving this is the Science Foundation Ireland

4. Accessibility

4.1. Access to transport infrastructure

Concerning connectivity (time for reaching by car important nodes of transport), Irish regions score at the lower and intermediate range of the 168 eligible regions distribution**.** Instead, concerning multimodal potential accessibility, both regions share the same low score.

In the case of Ireland, considering also the different degree of proximity of the two regions with UK (which naturally favours Southern and Eastern), a stronger emphasis should be put on the transport infrastructure of the Border, Midland, Western region, to sustain its process of convergence with the other more developed region.

Transport context

Transport demand increased very fast between the years 1990 and 2001[6] and, with the exception of the railway mode for freight transport, all trend data for Ireland are well above the EU 15 values, with peaks for air, for private cars and road haulage. Demand for transport has been very dynamic and mainly addressed toward the road modes, private cars, bus and coaches for passengers and trucks for freight. Railways service, although showing a positive trend in the passengers market probably linked with the main lines recent improvement, is currently covering a minor percentage of passengers and goods transport demand. Motorization, consistently with the passengers demand development, is also growing at a higher rate then the EU one: the gap has been narrowed but still remains significant, 360 cars per 1000 inhabitants in 2001 against 488 of the EU15.

[6] European Commission, Directorate General for Energy and Transport, European Union Energy and Transport Figures, 2003

Tab. 9 Trends in travel demand – pkm 1990 = 100

Years	Cars	Bus and coaches	Railway	Air
1970	*61*	*85*	*62*	
1980	*97*	*117*	*84*	
1990	100	100	100	100
1995	128	133	105	144
2000	184	158	113	261
2001	193	162	124	283
2001 EU 15	*120*	*112*	*115*	*182*

Source: EC -DGTREN

Tab. 10 Trends in travel demand – tkm 1990 = 100

Years	Road haulage	Railway
1970	103	93
1980	128	108
1990	100	100
1995	141	102
2000	168	83
2001	184	88
2001 EU 15	*143*	*95*

Source: EC -DGTREN

Tab. 11 Modal shares by mode of land transport – Passengers - 2001

	Cars	Bus and coaches	Railway	Urban rail	Powered two wheels
Ireland	81.0	14.5	3.5	na	0.9
EU 15	80.4	8.8	6.5	1.0	3.2

Source: EC -DGTREN

Tab. 12 Modal shares by mode of land transport – Freight - 2001

	Road	Rail	Inland waterways	Pipelines
Ireland	93.3	6.7	na	Na
EU 15	75.5	13.1	6.8	4.7

Source: EC -DGTREN

Tab. 13 Motorization – cars per 1000 inhabitants

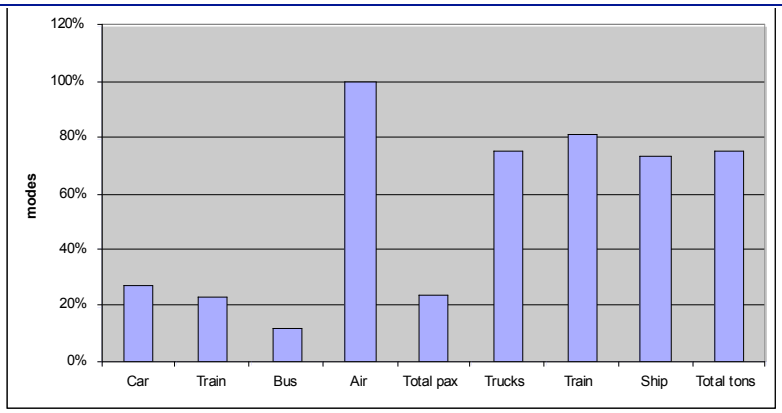
	1970	1980	1990	1995	1996	1997	1998	1999	2000	2001
Ireland	133.37	217.03	227.17	274.9	291.5	309.79	323.08	338.85	346.99	359.34
EU 15	183.64	292.5	392.92	432.97	438.22	446.13	456.88	468.81	478.81	487.75

Trends projections[7]

Baseline trends in transport demand, emissions and vehicle stock are derived from the Tremove study[8] for the period 2005-2020 and are used as background scenario for the regional analysis.

Trends in passengers demand are expected to slow down, but will remain high, particularly for air transport. In the freight sector, train will recover some shares in total demand, but will remain very marginal. Transport emissions are stable or declining, for NO_x PM and VOC even though, at the end of the period, these show a tendency to start growing again.

Fig. 1 Modal share. Percentage change 2005-2020

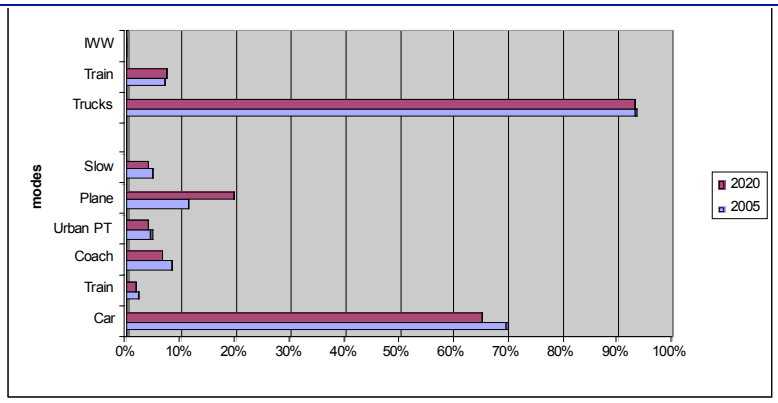


Source: Tremove

[7] Trends have been derived from the Tremove database, data cannot be compared with the past trends presented in the previous section as the transport modes as well as the type of flows considered are different. Nevertheless they represent a likely trend in the absence of specific transport policies.

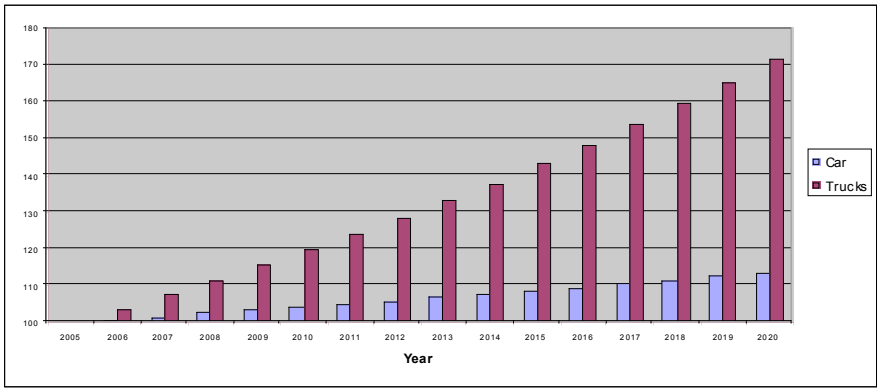
[8] Tremove 2 Model has been developed by K.U Leuven and Transport &Mobility Leuven together with WSP, TRT, TRL, INFRAS and COWI, on behalf of DG ENV (2005)

Fig. 2 Modal shares



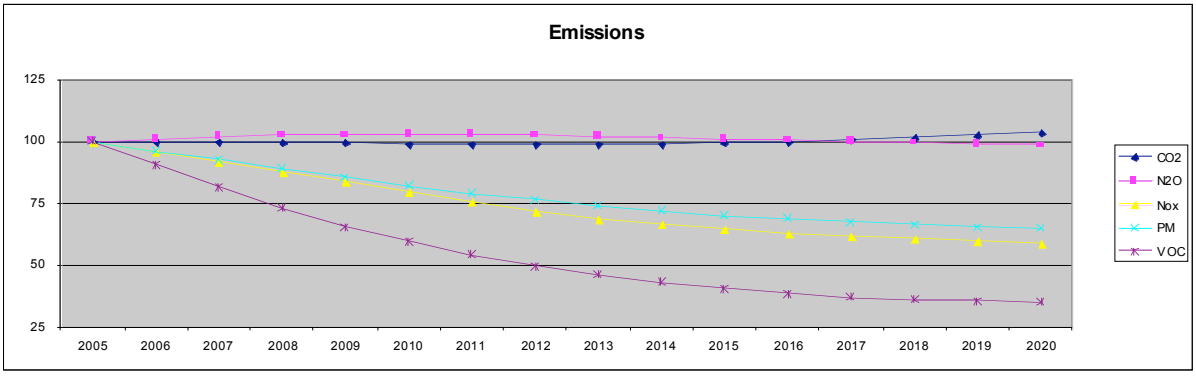
Source: Tremove

Fig. 3 Road vehicles stock



Source: Tremove

Fig. 4 Trends in transport emissions



Source: Tremove

The number of private cars under licence has risen from 939,000 in 1994 to 1,507,100 in 2003, a 60.5 per cent increase. The number of private cars per 1,000 of the population was 349.4 in 1994 and has increased to 479.2 in 2003. In 2002 Ireland was ranked 16th highest out of the EU 25 at 468.6 and was 8 places below the EU 25 average of 555.3. Road transport accounted for 90.2 per cent of all inland freight in 1994 but this has increased to 97.6 per cent in 2003. This is considerably above the EU 25 average of 76.4 per cent. Only Greece, Cyprus, and Malta had shares greater than Ireland (it should be noted that Iceland also has 100 per cent of its freight distributed by road).

Two factors are important here: an island issue exists and a less well developed rail infrastructure on a historical basis.

- The volume of freight transported relative to the volume change in GDP over the period 1995 to 2003 was 141.7. The EU value was 99.7 and it has remained relatively static since 1995. This demonstrates that the growth in Ireland's GDP was accompanied by a considerable increase in freight on Irish roads. The only country with a value higher than this was Estonia (190.0).

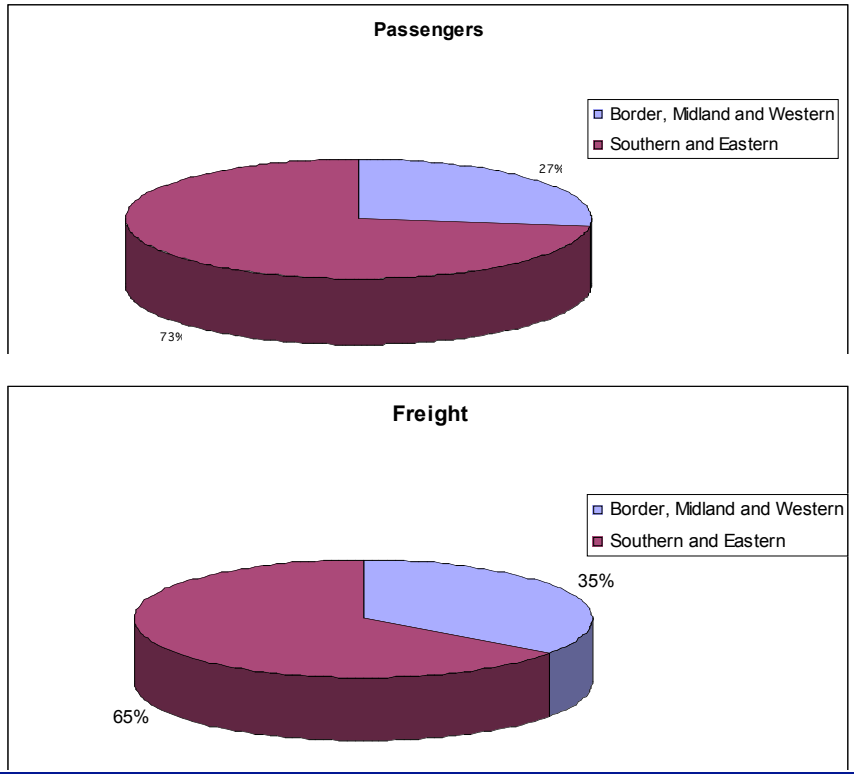
- Rail use in freight transport has one of the lowest shares in Ireland over the period 1991 to 2000 (similar to Greece and In fact rail transport of freight decreased by 64 per cent in Ireland during the 1990s, with only Luxembourg demonstrating a similar decline (53 per cent). Ireland does however have a relatively high share of short sea shipping of freight.

- Air passenger demand has seen strong increases across the EU and in 2003 grew by 4.9 per cent to 590 million. Ireland had 20,010,000 passengers in 2003, growth of 9.7 per cent. Domestic growth was 23.3 per cent while international passengers grew by 9.2 per cent. International passengers accounted for 95.5 per cent of all passengers. Dublin airport was ranked 16th in the top 25 airports in 2003 with 15,916,000 (79.5 per cent of all Ireland's air passengers). In 2004 all air passengers grew by 11 per cent on 2003 levels (14 per cent if measured in revenue passenger kilometres). Air freight growth was 10.1 per cent for 2004 on 2003. There are two main reasons for this: the robust economic expansion and the liberalisation and increased competition. This has led to lower fares and increased route choice as passenger demand remains buoyant. Air passengers and air freight are both forecast to grow by 6 per cent per annum in the period 2004 to 2008 (IATA, 2005).

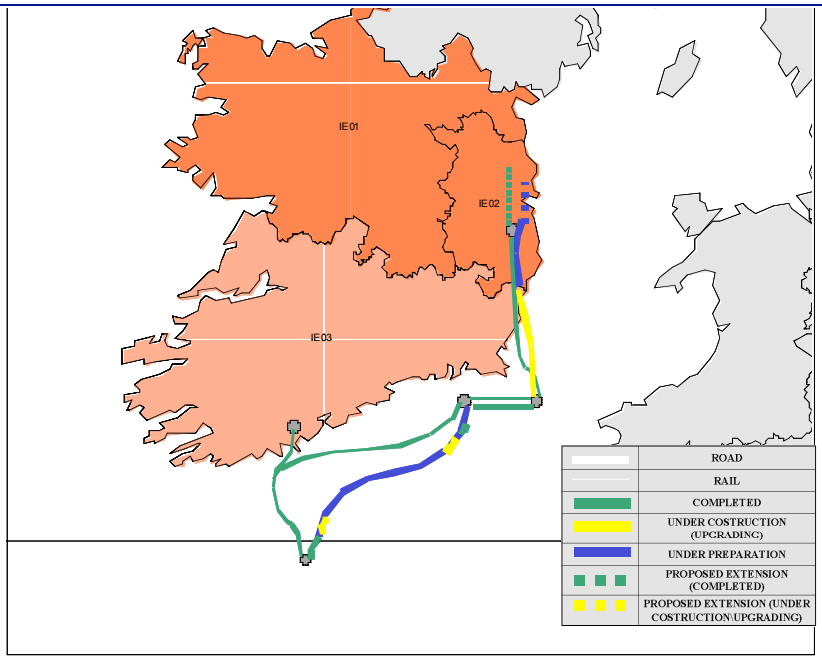
Regional analysis

Ireland is split into two only NUTS2 regions, so the analysis consists essentially in the comparison between the two regions. Generated and attracted passengers traffic flows are distributed according to the population, while for freight transport the Border, Midland and Western region play a more significant role, with 35 % of total freight flows attracted and generated by Ireland, 7% higher then the share of passengers flows.

Fig. 5 Traffic flows % of total traffic attracted/generated by each region



Map. 1 TEN-T priority projects



The TEN-T priority projects running in the Irish territory are:

- The railway line Cork-Dublin-Belfast-Stranraer, an improvement of the major Irish north south railway line and of the connection, via ferry, with the Scottish port of Stranraer. Through an increase of speed and frequency for both passengers and freight it is expected to shift traffic from the roads. A consistent part of the project has already been completed.
- The UK/Ireland/Benelux road link, a 1500 km route which include a mixture of new roads, mainly in the republic of Ireland, upgrading of existing roads to motorway, expressway, dual carriage way and high quality single carriageway depending on traffic density
- The Western Europe motorway of the sea linking the Irish Sea to the North Sea and via the Atlantic Arc to Spain and Portugal.

The M1 running from Dublin to Belfast is the only motorway to be completed within the timescale set out under the National Development Plan (NDP). Structural funds were used to assist with the construction of this important transport corridor.

4.2. Access to telecommunications and information technologies

The level of diffusion of TLC and ICT technologies across Irish firms and households is displayed in table 14. Compared to the reference situation, the two Irish regions score respectively low and intermediate. Firms possess a good level of Internet access, although the rate of presence of Web sites is not as high. Households, instead, show a medium-low presence of PC and Internet access – at least compared for example to that of UK. Finally, broadband deployment is negligible, although more recent figures would probably depict a better situation.

Tab. 14 Access to TLC/ICT

	Share of firms with Internet access	Share of firms with a Web site	Share of households with PCs	Share of households with Internet access	Share of households with broadband Internet access	Overall ranking
Border, Midland, Western	82.7	54.9	43.3	31.2	0.5	Low
Southern and Eastern	87.1	60.5	46.0	33.9	0.0	Intermediate
EU eligible Regions	86.01	56.33	49.29	35.19	5.05	

Sources: ESPON and INRA - see vol. I

Although being to some extent a relevant player on the ICT competitive scene, Ireland does not invest heavily on ICT (4.60% of GDP, well below the European average). But overall, it can rely on an intermediate position across the whole spectrum of ICT industries: at the 4th and 2^{d} level in fixed and mobile telephony; at the 2^{d} and 3^{d} level in PC and internet availability[9].

Irish regions don't offer a strong access to ICT either and, although their economic performance is high, they only belong to the intermediate and low positions in the rankings. Even worse is the position on broadband.

[9] See ANNEX II

Tab. 15 Ranking of the best performing Irish eligible region by variable

	Share of firms with Internet access	Share of firms with a Web site	Share of households with PCs	Share of households with Internet access	Share of households with broadband Internet access
Ranking	13	11	13	12	17

Variability is limited and the country shows a rather homogeneous approach, across firms and households, technology levels and regions.

The limited regional differences that exist show a clear pattern, with Southern and Eastern placed in the higher position across all variables, and Border, Midland and Western in the lower.

Tab. 16 Ranking of regional spread, by variable

	Share of firms with Internet access	Share of firms with a Web site	Share of households with PCs	Share of households with Internet access	Share of households with broadband Internet access
Ranking	10	10	13	13	12

The number of private households with access to the internet increased from 33.5 per cent in 2003 to 38.2 per cent in 2004. Ireland remains slightly below the EU 25 average of 42 per cent and is ranked 10th highest in the EU 25. In 1998 only 5 per cent of households were connected to the Internet. The level has risen from 61,200 to 537,000, an increase of 777 per cent.

While domestic demand for access to internet remains robust it is not seen as a priority for businesses, especially small businesses. The data on firms with a website confirm this although the share of households with broadband access remains low in the 2000 to 2002 period[10]. Caution is needed in the interpretation of the data because of the rapid changes in more recent years and because of qualitative trends not necessarily well captured by available comparative data.

[10] See Table 14

5. Environment and risk prevention

5.1 General analysis

Overall, considering its high level of economic performance, Ireland has managed to maintain a good performance in environment and risk prevention. In fact, its situation appears fairly good across all the concerned areas (see tables 17-20): energy sustainability, transportation impact, natural assets, and degrees of natural and technological risks. As a result, Ireland's situation qualifies as non critical in the realm of environment and risk prevention.

Tab. 17 Indicators of energy sustainability

	Electricity efficiency	Electricity self-sufficiency	Renewable sources of electric energy	Overall ranking
Border, Midland, Western	4.973	0.232	0.117	Intermediate
Southern and Eastern	4.973	0.232	0.117	Intermediate
EU eligible Regions	3.646	0.254	0.202	

Source: EUROSTAT - NEW CRONOS (Regio) - see vol.I

Tab. 18 Indicators of transportation impact

	Vehicles density	Non-fuel transportation	Traffic intensity	Overall ranking
Border, Midland, Western	0.022	0.002	-1.131	Intermediate
Southern and Eastern	0.022	0.002	-1.131	Intermediate
EU eligible Regions	0.218	0.031	0.400	

Source: EUROSTAT - NEW CRONOS (Regio) - see vol.I

Tab. 19 Indicators of natural/rural assets

	Degree of protection	Wilderness degree	Antropic degree	Urban/Rural typology	Overall ranking
Border, Midland, Western	0.117	0.129	0.005	5.000	Intermediate
Southern and Eastern	0.068	0.137	0.017	3.902	Intermediate
EU eligible Regions	0.088	0.310	0.103	2.819	

Source: IRENA Database and ESPON-CORINE Landcover Database – see vol.I

Tab. 20 Indicators of natural and technological risk

	Natural risk			Technological risk	
	Flood hazard potential	Share of burnt areas	Overall ranking	Polluting sites density	Overall ranking
Border, Midland, Western	0.000	0.000	Low	0.147	Low
Southern and Eastern	0.146	0.000	Low	0.284	Intermediate
EU eligible Regions	0.763	1.622		0.447	

Source: ESPON Database and EPER-EEA – see vol.I

5.2 Specific Features

Tab. 21 Energy indicators

IRELAND	EN1 (electricity efficiency)	EN2 (electricity self-sufficiency)	EN3 (renewable sources)	overall ranking
IE	4.973	0.232	0.117	intermediate

Regarding energy sustainability, data at the NUTS2 level are not available, thus only the national average is here considered.

The average *electricity efficiency* is relatively high, while *electricity self – sufficiency* and electricity production capacity using renewable sources are relatively low, compared to the average observed in the other Union eligible regions.

The national level implies the attribution to the intermediate class.

Tab. 22 Transport indicators

IRELAND	TR1 (vehicles density)	TR2 (non fuel transportation)	TR3 (traffic intensity)	Overall ranking
Border, Midland and Western	0.022	0.002	-1.131	intermediate
Southern and Eastern	0.022	0.002	-1.131	intermediate

1) Every transport indicator - TR1, TR2 and TR3 – should be interpreted according its own dimension (and colour in column chart). Indicators cannot be compared with each other because of the difference in scales used. See Annex.
The value of the traffic intensity indicator (TR3) could be some time negative because of the method of normalization used to calculate it. Such a normalization method allows us to summarize the two heterogeneous variables which make up the indicator ("total number of driven intra-regional trips/Total Area" and "Total number of kilometres made by journeys produced-generated by the region/Total Area). Values produced by normalization are relative and not absolute values.

Vehicles density, non fuel transportation and traffic intensity indicators assume very low values in both the regions, compared to the average levels observed in the European Union.

Tab. 23 Biodiversiry indicators

IRELAND	NA1 (degree of protection)	NA2 (wilderness degree)	NA3 (anthropic degree)	NA4 (Urban- Rural typology)	Overall ranking
Border, Midland and Western	0.117	0.129	0.005	5.000	intermediate
Southern and Eastern	0.068	0.137	0.017	3.902	intermediate

The percentage of protected areas in the Border, Midland and Western region (around 11% of the territory), according to the Habitat and Birds Directives, is in line with the average observed at Union level, whereas in the other region is lower.

The wilderness degree is quite low (2 percentage points under the EU average, in both the regions).

On average, human influence and urban density remain very low, compared to the EU average. The Irish regions present a high rate of rural settings, in particular Border, Midland and Western.

The composite indicator which synthesizes the previous ones shows that Ireland belongs to the intermediate natural/rural assets endowed Countries' group.

Tab. 24 Risk prevention indicators

IRELAND	RK1 (flood hazard potential)	RK2 (burnt areas)	RK3 (polluting sites density)	Overall ranking
Border, Midland and Western	0.000	0.000	0.147	low
Southern and Eastern	0.146	0.000	0.284	low/intermediate

The risks the Country has to face are of two different types, the natural risks, such as flood hazards, burnt areas, and the technological risks, like the polluting sites density (sites under IPPC Directive).

The Irish eligible regions for article 5 are not involved in natural hazards, except for the Southern and Eastern region, with, anyway, a very low value. Furthermore, the polluting sites density remains low, compared to the Union average.

In conclusion, the Border, Midland and Western region face a low level of natural and technological risks, while the Southern and Eastern region has an intermediate level of technological risk.

5.3 Additional information

Greenhouse gases

Ireland's emissions of greenhouse gases in 2002 as a percentage of the Kyoto target for 2008-2012 was 114.1 (1990=100). The target for Ireland was to reduce emissions to 8 per cent below the 1990 levels therefore Ireland should not increase greenhouse gas emissions by more than 13 per cent of their 1990 levels by 2012. Ireland was 131 per cent of their target in 2001 but has reduced this with the 2003 level at only 124.7 per cent of the 1990 level. However it should be noted that the levels of emissions is still considerably worse than the EU 25 average of 91 per cent of the 1990 level in 2002. This is important because transport is one of the heaviest contributors to emissions and road transport growth in Ireland is very strong.

The level of acid rain precursor emissions has dropped in each of the years 2001 to 2003. The most significant factor is the decrease in sulphur dioxide emissions. The Gothenburg Protocol for 2010 has a target of 300 for Ireland and in 2001 Ireland was 50 per cent above this target but by 2003 the level had reduced to 26 per cent above target.

Smoke concentrations in Dublin decreased considerably in from 269□g per m^3 in 1989-1990 to 58 □g per m^3 in 1992-1993. This was extended to Cork in 1995 and to Limerick in 1998. This reduced levels in Dublin, Cork and Limerick to 21 □g per m^3, 37 □g per m^3 and 32 □g per m^3 in 2002-2003 respectively. It is too early to identify the effects of the recent introduction of no smoking in public places.

Energy use

The energy intensity ratio was 236.6 in 1994 and in 2003 was only 161.3 (this ratio is calculated by dividing the total usage of all energy by GDP). The ratio for the EU 25 in 2003 in 1995 constant prices was 209.9kgoe per €1,000 of GDP. Ireland was the third lowest of all the EU 25 using GDP but was 7th if GNI is used.

Waste

The amount of waste collected in Ireland between 2001 and 2003 increased by 11 per cent but total landfill waste decreased from 86.7 per cent to 71.6 per cent. Ireland is ranked only 16th out of the EU 25 which has an average value of 534Kg collected per person and 48.9 per cent of waste land filled.

Water pollution

There are only a marginally small number of rivers in Ireland that are seriously polluted. Close to 70 per cent of the rivers are classified as unpolluted however about one fifth of rivers are slightly polluted. There are only minor concerns over water quality and risk from flooding.

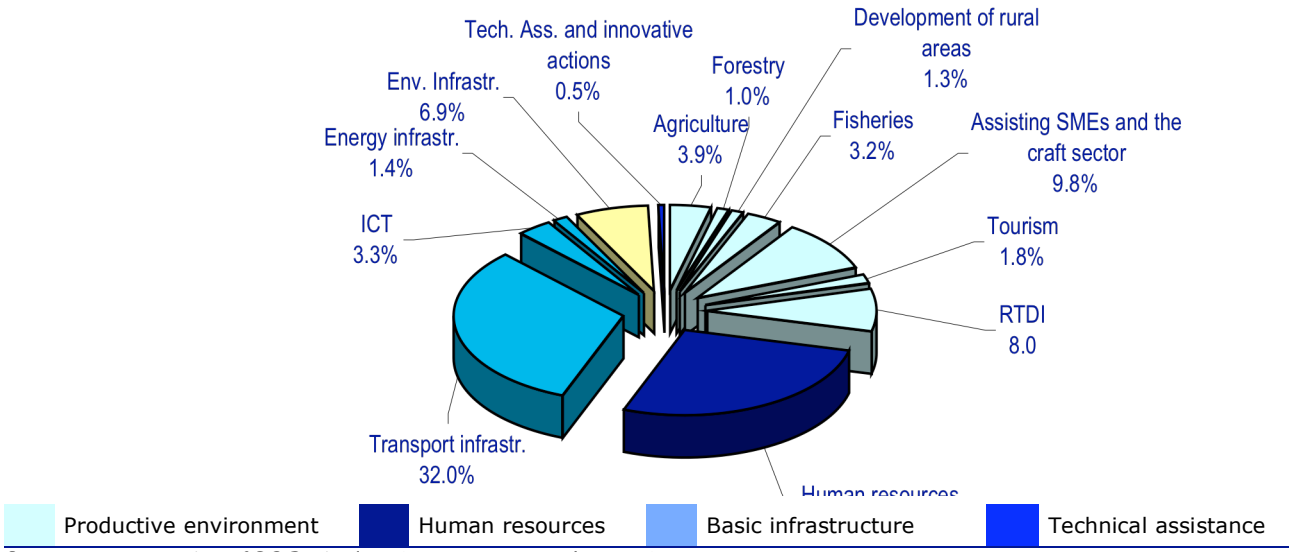
There is some disagreement among the Irish government about the degree of risk facing it with respect to the environment. Sustainable energy (especially on areas on the Atlantic coats) remains an issue as does areas liable to some flooding (even though this is quantified as low risk). Structural funds are also thought of as essential to cleaning up sites despite the fact Ireland has a low number of these. It is the belief of the Irish government that structural funds provide benefits to the environment. Even with a low degree of risk, funding for Ireland should be considered here to continue the progress on environmental issues.

6. Implementation of Structural Funds

6.1. The 2000-2006 Structural Funds Programming period

In the 2000-2006 programming period Ireland receives Structural Funds under Objective 1 through four national and two regional programmes (one of which is in the transition phase). Furthermore, a special multi-regional programme for peace and reconciliation (PEACE II, 2000-2004) is set up in the areas along the border with Northern Ireland. From the 2007-2013 programming period the entire Ireland will fall under the new Competitiveness and Employment Objective.

Fig. 6 EU Contribution by priority area, Objective 1 (2000-2006)



Source: our processing of DG Regio data (programme complements).

Ireland receives 3,543 million € for Objective 1 programmes. Furthermore, 92.74 million € are committed to INTERREG programmes, 5.38 to URBAN, 35.3 to EQUAL, 49.68 to LEADER and 584 to Cohesion Fund programmes. The total amount of Structural Funds is 4,311 million €[11]. Moreover, around 20% of total contributions of PEACE II programme (that is, about 106 million €) is allocated to Border regions of Ireland.

[11] 2004 prices, performance reserve included.

National programmes cover the following priority areas: economic (transport and energy) and social infrastructures, employment and human resources, productive sector (RDTI, SMEs support, fisheries, tourism, cultural heritage), technical assistance.

Regional programmes for both Border, Midland and Western regions and Southern and Eastern regions focus on four priority areas: local infrastructures (roads, water conveyance, waste management, Internet), local enterprise development (micro-enterprises, tourism, forestry), agriculture and rural development (agricultural competitiveness, diversification of activities, the environment), social integration and youth care.

In general, the most financed area of intervention is basic infrastructure, with transport infrastructure accounting for one third of total contributions. Human resources measures represent more than a quarter of total funds, while in the context of policies for productive environment great relevance is given to SMEs support (9.8%) and RTDI (8%). According to the Third progress report on Cohesion, however, proportion of ERDF and ESF commitments allocated to non-Lisbon objectives accounts for only 4%.

6.2. Implementation of regional policies: lessons learnt

There appears to be agreement amongst analysts that the SFs have had a favourable impact on the economic performance of Ireland during earlier programme interventions in the 1990s and in the current programming period. Beutel[12] estimates that the SF interventions raised the annual average Irish growth rate of GDP between 2000-2006 from 5.88% to 5.91%.

Beutel points out that the SFs contributed more to Ireland's growth in the earlier part of the period than later, suggesting that "quite in contrast to the past economic growth in Ireland is not any more depending on community actions" (page 74).

- The Economic and Social Research Institute (ESRI) in Dublin also take the view that the SFs have had a favourable impact on economic growth in Ireland[13], suggesting a long-run impact to 2002 of 0.7% of GNP.

As regards benefits from SF, the following comments apply:

[12] J Beutel *The economic impact of objective 1 interventions for the period 2000-2006*. Final Report to the DG for Regional Policies, May 2002.

[13] ESRI *The Mid-Term Evaluation of the National Development Plan (NPD) and Community Support Framework (CSF) for Ireland, 2000 to 2006*. Final report to Department of Finance in association with others, October 2003. This document is a principal source for the present paper.

- SF investment in infrastructure, especially roads, has generated high returns.
- Investment under the SF has generated higher returns than the domestic investments under the National Development Plan (NDP). But this is due to a composition effect with SF investment favouring infrastructure and human capital, which generate higher returns than other forms of investment.
- There have also been favourable effects in achieving the horizontal objectives of the NDP/CSF in Ireland. Significant investment in social housing and in education and training[14] has promoted social inclusion. There has been a "mild positive" impact of the NDP/CSF on balanced regional development, although there was a less than desired impact on rural development.
- Environmentally friendly outcomes have been supported by investment in public transport and waste water treatment but the impact of NDP/CSF on economic growth has led to greater greenhouse gas emissions.
- Little progress has been made on co-operation with the north of Ireland due to the political hiatus in Northern Ireland.

On the input and process effects of the SFs in Ireland, the main benefits have been:

- the introduction of effective long-term planning of public investment;
- the SF programme approach has led to attention being focused on specific policy problems and those involved in the planning process considering the wider implications of individual measure;
- there has been a wider involvement of people and groups in investment decision making processes;
- the introduction of a set of evaluation procedures has contributed to changing the way the Irish government administration approaches public expenditure.

The main weaknesses on the input and process side lie in:

- the relative lack of transparency in project selection and prioritisation;
- the capacity of implementing Departments or Managing Authorities to undertake appraisals and CBAs has been weak;

[14] Which has significantly reduced earnings dispersion.

- weaknesses in project management which have resulted in excessive costs and delayed delivery of projects;
- small projects have had a greater tendency to involve unacceptably high transactions costs if funded under the SFs, so some agricultural projects have high compliance costs with a large proportion of funding going in consultants' payments for help in drawing down funds.

The main lessons for future programmes appear to be:

- multi-annual budgeting of investment is beneficial producing more efficient delivery, a higher rate of return and greater continuity;
- where the government has invested in activity considered desirable there has been a lack of information on the rates of return from different projects, hence it is argued that the development of a competitive bidding process as in the UK PMEs would be beneficial here. It is arguable that this would help solve other cost problems associated with SF investment in Ireland e.g. too high costs of road building, which may have blunted the value for money of the largely successful infrastructure expenditures under the SFs in Ireland.
- An effective physical planning process is considered to be essential if infrastructure is to be delivered on time. There have been major improvements here but there is room for further improvement.
- There has been a slowly developing view in favour of the government as 'regulator' rather than 'supplier' of 'public goods' i.e. a move from 'make' to 'buy' in favour of the private sector. However, it is considered that PPPs or Public private Partnerships as the basis for delivering 'public' investments should be deployed only where they bring efficiency gains.

It seems likely that Ireland will continue with two regions for Structural Funds purposes post 2006, with greater decentralisation to the Regional Assemblies and implementation of the NSS and regional planning guidelines. BMW region is unlikely to qualify for transitional arrangements and current transitional arrangements for S&E region will cease. Some fear that under new arrangements Ireland will receive not more than 10% of its current SF allocation. It is also expected greater focus in Ireland on thematic initiatives and co-operative programmes such as INTERREG post 2006.

7. Policy priorities assessment

7.1. Findings from the statistical analysis

In order to perform a combined analysis between the indicators of economic performance and those concerned with the other thematic areas, we first consider variables related to innovation & knowledge economy and access to ICT and transport infrastructure. Later, we sum-up those referring to environment and risk prevention.

Table 25 depicts the relation between the first group of thematic indicators and the economic performance ones.

1. The main area of policy intervention seems to be that of increasing (especially in the extensive dimension) the innovative and knowledge base of the country, in order to render sustainable over time the recently achieved high economic performances.

2. Moreover, also in the degree of ICT diffusion, a bigger effort may be needed, especially targeted at reducing the natural divide between the two regions which still have different levels of development.

3. Finally, concerning the transport infrastructure, a strong priority arises for Border, Midland and Western, aimed at improving its connectivity infrastructure whose gap could undermine its potential for further growth. Moreover, both regions could profit from interventions aimed at increasing the accessibility potential.

Tab. 25 Economic performance versus innovation & knowledge economy, access to ICT and access to transport

	Economic performance	Innovation and knowledge economy		Access to TLC and ICT		Access to transport	
	Ranking	Ranking	Joint analysis	Ranking	Joint analysis	Criticality	Joint analysis
Border, Midland, Western	High	Intermediate	Uncorrelated	Low	Strongly uncorrelated	Low connectivity & accessibility	Strongly uncorrelated
Southern and Eastern	High	Intermediate	Uncorrelated	Intermediate	Uncorrelated	Low accessibility	Strongly uncorrelated

Table 26 summarises the environment and risk prevention situation of Ireland, highlighting, as already said, a quite satifactory situation.

Tab. 26 Economic performance versus environment and risk prevention

	Economic performance	Energy sustainability	Transport impact	Natural/rural assets	Natural risk	Technological risk
Border, Midland, Western	High	Intermediate	Intermediate	Intermediate	Low	Low
Southern and Eastern	High	Intermediate	Intermediate	Intermediate	Low	Intermediate

Tab. 27 Economic performance versus innovation & knowledge economy, access to ICT and access to transport.

	Innovation and knowledge economy		
Economic performance	**High**	**Intermediate**	**Low**
High		Border, Midland, Western Southern and Eastern	
Intermediate			
Low			

	Access to TLC and ICT		
Economic performance	**High**	**Intermediate**	**Low**
High		Southern and Eastern	Border, Midland, Western
Intermediate			
Low			

	Access to transport (connectivity)		
Economic performance	**High**	**Intermediate**	**Low**
High		Southern and Eastern	Border, Midland, Western
Intermediate			
Low			

7.2. Findings from the field analysis

The national context

The main concern from both academic experts and the Irish government is that the regions are too large and that NUTS3 regions should be considered. Even within NUTS3 regions evidence from smaller sub-regions should be used to identify potential problems e.g. high unemployment, low innovation etc. This would allow a more balanced assessment of the situation within a particular country.

- An example of this is that in the last reference year Ireland created 90,000 jobs but there is a problem with the spatial distribution of these jobs.
- Another example is that Donegal is heavily dependent on textiles but is now an unemployment black spot but this is not clear in the NUTS 2 level analysis.

Innovation

There is an argument that innovation funding should not be reduced for Dublin. What would be more useful across the two regions would be the use of Structural Funds to focus the attention of SMEs on innovation, particularly SMEs. This should not be done at the expense of existing programmes in Dublin however nor should multi-national R&D spending be discouraged. Within Dublin and to a certain extent Cork, R&D and innovation should continue to be stimulated. Structural Funds can also help with the encouragement of SMEs to collaborate with the higher education sector in order to realise more spin-offs, commercialisation of research etc.

Promoting entrepreneurship and new firm start up also remains important to the Irish economy. Clearly more significant steps could be taken to realise the potential of the indigenous economy thus stimulating latent economic forces. Building up more medium sized capitalised firms into large firms (more than €1.1million) will benefit the domestic economy and increase GNI.

Ireland and Northern Ireland: PEACE and INTERREG

With Ireland and Northern Ireland a special case exists in that the PEACE and INTERREG programmes can be used to improve economic and social conditions. What is important here is that there is at times, a lack of urgency on the part of the UK government in bringing north-south projects through the design, operation and completion phase. An example of this is the M1 from Dublin to Belfast which would open up the southern ports to Northern Ireland and the

northern ports to the Republic of Ireland for routes to the UK. This would be especially advantageous for the Border and West sub-regions. It would then be possible to develop an east west road link across Ireland into the Border Midland Western region. The Ireland tourism model works very well and could be adopted for transport delivering significant economic benefits both north and south of the border.

Transport

TEN-T routes are also now a problem as they have already attracted funding but cannot be re-designated therefore the regulations prevent further government funding. An example of this is the N17. Co-funding remains important to transport infrastructure. A national transport strategy would have huge economic benefits for the whole of Ireland. One of the current paradoxes of the Irish economy is that the secondary road network is being improved first and will be linked to a primary road network where, in places, the roads will be of a poorer quality. Another significant problem is the popular demand for the Sligo to Limerick railway which is estimated to cost €250 million but will only carry 200 to 300 people per day. Despite this being uneconomical there will be little or no return on this investment but criticism of the use of EU funds will follow, once an evaluation of the project takes place. While bus services remain good in Dublin and there is general satisfaction with air services, there is still scope to do more to help with rural transport.

Broadband and access to knowledge economy

Ireland supports the use of broadband technology and had investigated a scheme where local authorities could be the investors (and suppliers). This has captured the private sector interest although primarily due to increased demand they are once again willing to get involved. There are two main problem facing Ireland: cost of provision and backhaul connectivity (where the local area supplied with broadband provision but is not connected to a fast regional centre e.g. Dublin. As consumers know this they will not buy into poor service provision. The target for Ireland is to have universal access to broadband by 2006. Satellite provision is the main vehicle for rural areas but structural funds could make a difference here. While Ireland wants to engage SMEs in the knowledge economy the priority is to get them to innovate rather than try to stimulate demand for electronic trading. Some major firms e.g. Marks & Spencer do not offer online retailing in Ireland due to cultural factors. Tourism, financial services, high technology sectors and some sub-sectors of retailing are the most likely sectors to take up online trading.

Environment

The Irish government and the academic experts were concerned that the EU may decrease environmental investments eligibility under the Structural Funds. While they realise there will be a substantial reduction in EU funding they do not want to lose funding for the environment. The provision of renewable energy is a priority (both wind and tidal energy). The tourism industry wants the Atlantic coast preserved however so location of renewables is still a controversial issue. Ireland is also concerned about the contamination of the water supply e.g. by agriculture where EU funds can be accessed for clean up operations. The government would rather use EU funding to prevent this happening in the first place. This would be a more cost effective use of EU funds. One of Ireland's top priorities is waste management but this is no longer eligible according to the draft ERDF regulation. The safeguarding of water catchment areas and the management of these sites is important.

In conclusion there is general agreement that all three areas have differing priorities but that for Ireland as a whole innovation, accessibility and environment remain crucial to the economy. The balance of resources tends to favour innovation and accessibility with the environment scoring slightly less.

The regional context

Border Midland and Western: the context now

- The Border Midland and Western region of Ireland is a largely rural region with a significant share of primary employment. It has a low population density (only one quarter of the Irish population lives in this region) and the presence of manufacturing is classified as intermediate. The share of manufacturing employment is slightly higher than the Southern and Eastern region.
- The rate of unemployment is significantly higher than Southern and Eastern and is close to the EU average for the eligible regions.
- Innovation activity in the region is relatively low and more could be done to stimulate the activity of SMEs. There are areas within Border Midland and Western, that perform relatively poorly compared to other areas in Ireland and in the EU e.g. the counties with low household disposable income are indicative or rural areas that do not have access to high wage income or high technology employment.

- Border Midland and Western have 11 of the 17 poorest counties within it. Rural deprivation can be seen in Connemara, Donegal Gaeltachs, Inishowen, Leitrim, West mayo, Roscommon (parts of) and Cavan. Galway, Drogheda and Dundalk exhibit high unemployment and other indicators of extreme disadvantage.

Border Midland and Western: recommendations

- Encouraging more SMEs to engage in innovation is important or getting them to collaborate with an R&D/innovation centre in Dublin would be desirable. The partnership programme being run by the Irish government is useful here and should be extended. Attempts to force innovation at the expense of already successful centres within Dublin should be avoided as this would be counter productive. Ireland should continue to encourage entrepreneurship and new firm formation.

- Accessibility is significant problem in Border Midland and Western than it is in Southern and Eastern. Transport is a significant issue in that the road is the main method of accessing the west of Ireland. There are no motorway links or fast train services linking the west of Ireland with Dublin, the south or the north of Ireland. In comparison there are effective rail and road links north and south (principally Dublin to Belfast) but also to the south west of Ireland (Cork).

- The use of internet or broadband is mainly confined to urban areas and the ict score is low compared to Southern and Eastern.

- There are significant concerns over the risk of flooding, management of water catchment areas and water pollution in some parts of the region. In particular there are greater risks from contamination of water supplies from agriculture than elsewhere albeit the risk is relatively low. There are few contaminated sites but SFs have been used in the past to help clear areas like this and if this was required an option should be left open here. Tourism is important to the Border Midland and Western economy (the north of the west coast) and preservation of sites is a priority. In this area reducing landfill waste is a high priority.

These are the main areas of concern in the Border Midland and Western region. Structural Funds would be useful in pursuing economic development in this region in these areas. This would also produce social benefits as a spin off.

Border Midland and Western: justification and typology

The Border Midland and Western region by its nature and characteristics is rural; less densely populated than Southern and Eastern region and has lower levels of economic activity. This leads to less employment, slightly higher unemployment and reduced disposable household income.

Innovation

Attempting to increase innovation would be important for the region particularly if SMEs could be attracted to the programme. Many SMEs are unlikely to engage in innovation believing that this is the domain of large or high technology companies. The evidence of manufacturing innovation and profitability states the contrary is true. Firms of all sizes can innovate and will reap the rewards of higher profits and increased sales (or in some cases small increases in market share). This is viewed as more important than the use of ICT in SMEs. Enhancing regional R&D is not thought to be that high a priority because the focus of R&D in Ireland is in Dublin. There is little point into trying to artificially boost R&D if the preferred location of R&D participants is a regional cluster e.g. Dublin. This is why increasing R&D should be given less weight in the financial allocation. Promoting entrepreneurship and new firm formation remain central to developing an entrepreneurial culture and increasing the stock of new firms. The programmes could be targeted towards areas of higher unemployment, sectors where firm formation is poor or towards new areas of growth e.g. biotechnology, creative software etc. Equally and probably the best option would be to allocate resources on a broad basis under this heading and allow the operational programme managers to decide the where the best returns lie. Ireland would want to continue to provide incubation facilities for business.

Environment and risk protection

Despite the perception at national level the environment and risk protection is the relatively least concerning priority of the Border Midland and Western region but nevertheless remains an area where SFs can play an important part in economic development. Ireland is committed to implementing their sustainable energy policy and as part of that both wind and tidal energy would be a central part of that provision in the Border Midland and Western region. As previously discussed there are issues surrounding tourism but there are areas in Border Midland and Western region that will benefit from this as well as providing cheaper and more effective energy to Ireland. There are other economic spin-offs here as well particularly those related to technology. We suggest that around three quarters of the resources under this heading are proposed to fund natural risks. This is the top priority in the Border Midland and

Western region under this category. Flood prevention, water contamination, the prevention of water contamination, the management of water catchment areas are all issues that rate relatively highly in the region.

Accessibility

Lastly, accessibility issues are the highest priority of the three broad areas for the Border Midland and Western region. Overall we suggest that around one half of EU structural funds would be allocated to this category. While transport infrastructure has diminished as a priority across much of the EU this is not the case in this region. Transport networks are not particularly well developed and there is a compelling case for the development of the secondary road network. Urgent re-consideration should be given to the TEN-T system however as this may result in secondary roads of a higher quality than the primary network, it will connect to. The Western corridor to the Border Midland and Western region and the connection to Northern Ireland remain crucial for this region. The latter would open up the northern ports for access to the UK.

There are issues about the best implementation for transport in Ireland – an integrated transport strategy, strategic objectives for Border Midland and Western region alone or an all Ireland transport strategy similar to the tourism model. There is also the need for the Irish government to address the 'decoupling issue' of economic growth and growth in road transport. This is rather more simplistic as a policy objective but will be difficult to implement. However, addressing the transport issues will have two important benefits for the region:

- cut the amount of emissions (again a policy target of Ireland) and
- relieve congestion on the roads (although this is not such a problem in Border Midland and Western region as it is in Southern and Eastern).

There is a great deal to do in achieving universal broadband access by 2006. The 2007-2013 budgeting period could help to resolve some related issues however as satellite access, backhaul connectivity, pilot programmes and other initiatives to promote broadband usage. A clear issue here is the cultural position about shopping – Irish citizens prefer to access goods and services in person. The demand for online retailing is not very strong. This may change however, particularly if major retailers were to adopt this technology. There may be significant benefits to rural areas here.

In conclusion the Border Midland and Western region would benefit significantly if this allocation of resources were adopted. This would allow the Irish to maintain high economic performance but to try to improve their performance in energy sustainability (intermediate), transport impact (intermediate) and in natural/rural assets (intermediate). Natural and technological risks would remain classified as low.

Southern and Eastern: the context

- The Southern and Eastern region of Ireland is the more prosperous of the two regions in Ireland. 75 per cent of the Irish population lives in the region and Dublin is the main centre for economic activity although Cork, Limerick and Waterford are also important centres. Unlike Border Midland and Western region the two major urban centres are key drivers of service sector employment and have higher labour productivity. Regional income in the Southern and Eastern region is relatively higher than that in Border Midland and Western region.
- The increase in population particularly in the major centres (and even more pronounced in Dublin) has led to increased pressure for housing, transport, services, energy and education. Similar pressures do not exist in Border Midland and Western region. Dublin is the main centre for higher education.
- In the period 1986 to 1996 employment increased by 20 per cent in Ireland and 75 per cent of that increase took place in the Southern and Eastern region. The rate of unemployment is significantly lower here but nevertheless there are disadvantaged areas e.g. Tralee, Ennis, Wexford, Kilkenny, Clonmel and Carlow. The highest incomes are in Dublin and Kildare (higher than the state average) and only one sub-region within Southern and Eastern region, Kerry has incomes in the bottom band (83.5 to 89.4).
- Innovation activity in the region is relatively high but predominately in Dublin and the position with the use of high technology ICT is also dominated by Dublin.

Southern and Eastern: recommendations

1. One of the priorities for the region is to maintain and develop the existing economic success the region enjoys. A greater spatial distribution of economic activity would be desirable but there is little the state or the EU can do to influence the private sector location decisions in a relatively successful and prosperous region.

2. The second top priority for the region is innovation and the knowledge economy. The region is already building on its success here and maintaining a critical mass is vital. This is a prime reason that indicatively half of the resources are allocated to developing regional R&D and innovation capabilities. Reputation and the global excellence strategy are two key factors in the pursuit of even higher levels of activity. SFs can still make a difference in this category. A share of the resource allocated is proposed for stimulating SME innovation across the region. As in the Border Midland and Western region, the remaining funds are expected to be devoted to promoting entrepreneurship and for the creation of incubation facilities/financial instruments. This is in line with EU and state objectives.

3. Accessibility should be allocated the most resources in the Southern and Eastern region. The main thrust is for the uptake of ICT by SMEs and the provision of high quality, high speed ICT services. There have been significant improvements in transport in the Southern and Eastern region, particularly the road and rail link between Dublin and Belfast. The development of further transport links would depend on the strategy adopted by the Irish government. It would be much more beneficial if there was an all Ireland strategy and efficient and effective co-operation by the Northern Ireland authorities could lead to considerable economic benefits both north and south of the border. Some rural bus services and roads need to be improved but there are no critical urban transport services in urgent need of EU funding, with the exception of congestion relief. This is why we suggest that less than one third of the resources are allocated to this category.

4. The environment is given the least priority in the Southern and Eastern region. The position here is virtually identical to Border Midland and Western region where renewable energy is important and it is proposed it receives around one fourth of the environment funding. Waste management is critical in this region due to the large amounts of waste generated by the four urban centres and the requirement to reduce landfill waste. There are still some contaminated sites in the Southern and Eastern region and SFs are helpful in transforming land to be 'fit for purpose' thus allowing new industry/commerce to locate in a particular site. Water quality and the prevention of pollution as well as the management of water catchment areas are also an area of importance in the Southern and Eastern region.

These are the main priorities in the Southern and Eastern region. Co-funding is still important to this region to achieve the critical outcomes for continued economic success.

Southern and Eastern: justification and typology

The Southern and Eastern region while being the more prosperous of the two Irish regions and significantly higher levels of economic activity still has areas that are less well developed than others. Structural funds do make a difference to regional economic development and should be used to assist the Southern and Eastern region where appropriate.

Innovation

Out with Dublin R&D spending is less and there is less innovation activity particularly by SMEs. In this region it would be beneficial to the economy to use the experience of past innovation interventions and roll out best practice to other urban centres or to the areas surrounding Dublin. The government has a clear aim to preserve R&D and innovative capacity within Dublin and this attracts private sector capital. For smaller projects e.g. seed capital, best practice adoption etc. to use EU co-funding to achieve these aims. Additionality is a key issue here.

Environment

The environment is the least most important of the categories for the Southern and Eastern region. The need to meet the Kyoto and Gothenburg targets however means that the requirement for renewable remains very important. As with Border Midland and Western region there are issues surrounding tourism. Structural funds would be important in assisting the shift from conventional power to renewables. In the Southern and Eastern region space (and therefore land prices) is coming under increasing pressure from housing. More effective methods of dealing with waste are required. It would be prudent for the EU to assist Ireland in the prevention of water contamination rather than the contributing to the higher costs of clean up operations once contamination has taken place.

Accessibility

Similarly to Border Midland and Western region accessibility issues are the highest priority of the three broad areas for the Southern and Eastern region but for different reasons. A high percentage of the total financial allocation will be probably allocated to accessibility, with a major allocation to ICT for SMEs. The rationale here is that in order to access the knowledge economy and in order to innovate, many of the economic tools will be delivered online. The use of ict is also expected to be high quality ICT. Co-funding would be crucial to deliver and reinforce the current pilot partnership that the government is currently running. In transport there has already been some excellence progress in the Southern and Eastern region that could be followed up. This is why a smaller part of the accessibility resources are allocated to secondary networks. The problem of inferior quality primary networks will remain.

Implementation issues

There are several implementation issues for Ireland. What is known at the outset however is that EU Structural Funds have made an important contribution to economic development in Ireland. It is clear however that it is not possible to separate the simple single effect of the EU funding from government co-funding, the single market, Emus or even European enlargement. It is also clear that Ireland will suffer a substantial reduction in EU funding under the next budget period 2007-2013. Consequently a great deal more planning and evaluation of past projects has gone into the coming budget priorities. It is a sign of the effectiveness of the Irish government's approach to this that inspires confidence in the allocation of resources.

Following the 2000-2006 budgeting period the Irish government has introduced multi-annual budgeting for capital purposes which produces a more efficient delivery and higher return on the investment. This is important because the Irish taxpayer funds the greater part of the expenditure and leads to an optimal outcome.

Evaluation and monitoring of expenditure

The evaluations and monitoring of the expenditure is now also stronger and more effective. Both the Irish government and the EU are more likely to get a higher return on their investment because of value for money as effective monitoring eliminates waste. Schedules are constantly update and information dissemination is optimal. Given the evaluations where lessons have been learnt then only the more successful methodologies in project management survive into the next period. Best practice is constantly rolled out. The importance of this successful approach to these types of investment cannot be underestimated.

Knowledge economy

In the knowledge economy there is a clear focus by Ireland on creating global excellence in innovation centred on Dublin. This is all very well but caution must be exercised so that this does not become a barrier to promoting innovation across the rest of Ireland. The expert advice on innovation is to encourage innovation across all sectors and firms regardless of their geography or ownership. It is more than likely that externally owned firms will innovate as will large firms and there rightly will tend to be a centre (Dublin) where many innovative practices start out. This should be encouraged and Dublin should not be diluted. There are many small schemes across the whole of the EU that small firms have found attractive in assisting them to pursue innovation. Ireland could review these or continues with its existing policy.

Transport

In transport a clear problem exists between north and south co-operation. The M1 from Dublin to Belfast runs from Dublin to the border but then returns to an A class road on the north. These types of project should have a firm agreement on planning, monitoring, methodology, project management, timescales and a clear authority from the decision making body. It would be useful to suggest that the all Ireland tourism model could be adopted here. There are clear benefits both to the UK and to Ireland. Ireland also needs to have good communication with the north on the INTERREG and PEACE initiatives so that there is no duplication of effort and so that information is open and transparent.

Secondly, the TEN-T network poses a problem in that governments cannot improve roads after co-funding has been awarded. The primary roads network in Ireland requires further investment (given the significant rise in traffic that has accompanied economic growth) or a dramatic change in modal share. It may be that the regulations need amended to allow state involvement in the primary road network.

A third transport problem exists, although it is clearly not unique to Ireland. This is the decoupling of transport growth from economic growth. More attention needs to be given to the practical issues that arise here at an EU level rather than at the member state level.

Waste management

It is also clear that the EU does not envisage EU funding for Ireland for waste management. This is inconsistent with National priorities given the serious issues that Ireland is facing in relation to landfill sites. The EU should enter negotiations with Ireland in order that co-funding can support this type of beneficial activity.

The last issue is one of additionality. This must be a clear and unequivocal objective. This is what EU funds should be used for, starting an initiative that a member state will not undertake on its own. The benefits from some of the environmental issues have been clear yet many would not have gone ahead without EU funding.

ANNEX I: Methodology for transport indicators

The multi-index approach

Finding a unique measure of the transport conditions in a given region, even if the analysis is focused on one main aspect like accessibility, is a very difficult task. Both demand and supply conditions play a role and both can be seen from different perspectives so that each indicator is hardly more than just a limited point of view. For that reason, we decided to use different indicators, namely three indexes:

- Infrastructure Usage Index - IUI_j
- Accessibility Index - AI_j
- Connectivity Index - CI_j

The Infrastructure Usage Index measures the level of road and rail demand entering the region and leaving the region (i.e. generated and attracted traffic excluding trips starting and ending in the same region) in comparison to the supply of major roads and rails. The index is computed separately for road and rail and for passenger and freight[15] by taking the ratio between the demand and the length of the main infrastructures (e.g. motorways, dual carriageway roads, etc.). Thus four separate ratios are computed. Then the logarithm of each ratio is computed and a weighted average of the four logs is computed where the weights are the modal shares of road and rail on passenger and freight demand. The weighted average is the Infrastructure Usage Index. The index is greater for zone where the ratio between demand and supply is higher, that is where infrastructure are more exploited.

The Accessibility Index is a synthetic measure of multimodal potential accessibility. It is based on the assumption that the attraction of a destination increases with its size (in terms of population or GDP) and declines with distance, travel time and costs. The accessibility model used in the ESPON study assumes the centroids of NUTS3 regions as origins and destinations and, then, calculates the minimum travel time (with respect to different modes of transport, that is by road, rail and air) between the various centroids. This indicator of potential accessibility contains parameters that need to be calibrated so that it cannot be expressed in

[15] Generated and attracted traffic is estimated from the results of the European transport model SCENES.

familiar units. The higher is the index the higher is the accessibility. As a consequence, NUTS3 data are standardised to the average accessibility of the EU25 countries. NUTS2 indicators have been computed by the Statistical Team by averaging NUTS3 data provided by the ESPON database.

The Connectivity Index is expressed as the reciprocal of the hours needed to reach by car different transport nodes (rail stations, motorways accesses, seaports and airports) starting from the centroid of each NUTS3 region. Thus, regional centroids are taken as origins while transport terminal as destinations. The higher is the index the higher is the connectivity. Again such an indicator is available for NUTS3 European regions from ESPON and it has been averaged by the Statistical Team to obtain NUTS2 indexes.

All three indexes provide a piece of the story and there is not a hierarchy among them. As the analysis in section 2 will show, the Infrastructure Usage Index is somewhat correlated to the Accessibility Index, in the sense that zones where the former is greater than the median (showing a lower performance in terms of availability of infrastructures with respect to the generated and attracted demand), also the latter is greater than the median (showing a better performance in terms of accessibility). In other words, not surprisingly, the most accessible zones tend to be attract and generate more demand, in relative terms, than less accessible zones.

Furthermore, more than the numeric values, the most useful information is how the regions within a country are ranked according to each index and especially which performs better and which worse. When a region underperforms according to all the indexes, this is a hint that some problems exist concerning accessibility, and vice-versa if a region overperforms.

Therefore, the analysis consisted in the following steps:

a) For each index the median across the NUTS2 regions of a given country has been computed: *MED(IUI)*, *MED(AI)*, *MED(CI)*. The median has been preferred to the mean because in most of the countries the distribution of the indexes is strongly asymmetrical and so the mean can be influenced by one or two very high (or low) values.

b) Each region in the country has been classified as underperforming or overperforming in terms of each of the three indexes: underperforming have been considered those regions where the index is lower than the median (for the accessibility and the connectivity index) or, vice-versa, higher than the median (for the infrastructure usage index). This classification allows to compare regions in terms of a specific index.

c) For each region has been computed the ratio between the value of the index for that zone and the median value computed above across all the zones of the country: $AI_j/MED(AI)$ and $CI_j/MED(CI)$ for the accessibility and the connectivity index or, vice-versa, the ratio between the median value and the value of the index for the zone: $MED(IUI)/IUI_j$ for the infrastructure usage index. These ratios are greater than one for zone overperforming and lower than one for the regions underperforming.

d) For each region the three ratios computed above have been summed. The higher is the sum and the better the region performs. However, as the aim of the analysis is not computing a super-index, the value of the sum is not really relevant in itself. Instead, the average and the standard deviation of the sums have been computed. The zones where the sum of the ratios is lower than the average minus one standard deviation ($SUM_j < Average - DevSt$) can be considered as highly problematic with respect to the average conditions in the country. The zones where the sum of the ratios is lower than the average minus 75% of standard deviation ($SUM_j < Average - 0.75*DevSt$) can be considered as problematic even if at a less extent. On the opposite side, zone where the sum is higher than the average plus one standard deviation ($SUM_j > Average * DevSt$) can be considered as those with less problems concerning their accessibility.

This analysis mixes quantitative and qualitative indications to provide a comparative picture of region's performances. It should be stressed that the results make sense in relative terms (e.g. comparing the regions each other) rather then in absolute terms. In other words, a region can perform worse than other regions of the country but this does not mean that the accessibility is absolutely poor; if the overall situation is good in the whole country, even regions classified as underperforming can enjoy a good level of accessibility.

Multi index analysis

The multi index analysis is based on three different indicators:

- Infrastructure Usage Index - IUI_j
- Accessibility Index - AI_j
- Connectivity Index - CI_j

The multi-index analysis consists essentially in a comparison between the two NUTS II regions. From the table below, it can be seen that the "Southern and Eastern region" is more accessible and better connected and this can explain at least partially why it has also a higher use of

infrastructures. The summary statistic is higher for this region, although the difference between the two regions does not seem really significant.

Indexes for the NUTS2 regions of Ireland

NUTS2 region	IUI	AI	CI	Summary
Border, Midland and Western	17.6	59.3	1.8	2.84
Southern and Eastern	23.9	77.0	2.7	3.21
Median	20.7	68.2	2.3	3.02
St. Dev.				0.26

The data clearly shows the dramatic increase in road transport that has accompanied GDP growth. The EU objective (Transport and Integration Strategy, *European Council*, 1999) of decoupling the link between road transport and economic growth has not been achieved in Ireland. It would be to promote the use of rail for freight transport on a north-south basis where rail connections are already good. Passenger trains run once every hour. This would have direct economic benefits but also it would reduce road congestion and probably result in a decline in emissions thus benefiting the environment also. In order to assess this more effectively data should be collected on the number of tonne-equivalent miles by mode and for vehicle-kilometres by mode. Currently only very limited data is available for this. The modal share of transport should be targeted to meet the 1998 levels of rail, waterway and short sea shipping perhaps by 2010. The EU and the Irish government should continue to try to shift freight from road transport to other modes of transport. An important caveat exists here. Stringent and transparent evaluations need to be carried out in order to find out if this is cost effective and if it will increase competitiveness. Cost-benefit analysis and existing evaluation methodologies could be employed here. The forecast for air transport demand is also very strong and consideration needs to be given the strong demand factors that impact on the transport industry.

ANNEX II: Telecom indicators levels

Sources and definitions

The source is: ESPON project 1.2.2 Telecommunication Services and Networks: Territorial Trends and Basic Supply of Infrastructure for Territorial Cohesion.

Main telephone lines per 100 inhabitants:

Level 1 = >70

Level 2 = 60-69

Level 3 = 50-59

Level 4 = 40-49

Level 5 = 30-39

Level 6 = <30

Cellular mobile subscribers per 100 inhabitants:

Level 1 = >90

Level 2 = 80-89

Level 3 = 70-79

Level 4 = 60-69

Level 5 = 50-59

Level 6 = <50

Estimated PC per 100 inhabitants:

Level 1 = >50

Level 2 = 40-49

Level 3 = 30-39

Level 4 = 20-29

Level 5 = 10-19

Level 6 = <10

Internet (users per 10000 inhabitants):

Level 1 = >5000

Level 2 = 4000-4999

Level 3 = 3000-3999

Level 4 = 2000-2999

Level 5 = 1000-1999

Level 6 = <1000

ANNEX III: Methodology for environment indicators

Sources and definitions

Indicators at regional level Nuts II

1 - Energy

Indicator	Definition	Year	Source
EN1	GDP / total electricity consumption	2000	EUROSTAT – New Cronos (Regio)
EN2	Total electricity production capacity/ total electricity consumption	2000	EUROSTAT – New Cronos (Regio)
EN3	(Total electricity production capacity – Thermal power – Nuclear power)/ Total electricity production capacity	2000	EUROSTAT – New Cronos (Regio)
Energy sustainability	Energy sustainability indicator + Energy efficiency indicator	2000	EUROSTAT – New Cronos (Regio)

2 - Transport

Indicator	Definition	Year	Source
TR1	Vehicles Density: Total Number of Vehicles/Total Area	2000	EUROSTAT – New Cronos (Regio)
TR2	Non-fuel Transportation: Electricity Consumption in the Transport Sector/ Total Electricity Consumption	2000	EUROSTAT – New Cronos (Regio)

TR3	Traffic Intensity: (Total number of driven intra-regional trips/Total Area) + (Total number of kilometres made by journeys produced-generated by the region/Total Area)	2001	EUROSTAT – New Cronos (Regio)
Transportation impact	Traffic intensity sustainability indicator – Clean transportation indicator		EUROSTAT – New Cronos (Regio)

3 - Natural resources

Indicator	Definition	Year	Source
NA1	Degree of protection: Area under Nature Protection/Total Area	2003	Irena Database
NA2	Wilderness degree: (Forest Area + Semi-Natural Area)/ Total Area	1996	Espon Corine Landcover Database
NA3	Anthropic degree: Artificial surface/ Total Area	1996	Espon Corine Landcover Database
NA4	Urban-Rural typology	1996	Espon Corine Landcover Database
Natural/rural assets indicator	(factor score – lowest score)/ (highest score – lowest score)*100		

4 - Natural hazard and Technological risk

Indicator	Definition	Year	Source
RK1	Natural hazards with anthropic implications-1: Regional flood hazard potential	1996-2002	Espon Database

RK2	Natural hazards with anthropic implications-2: (Size of burnt areas/Total area)*1000	2000	Espon Database
RK3	Polluting Sites Density: Number of Installations under IPPC obligation (IPPC Sites)/Total Area (hundreds Km2)	2000-2001	Eper-EEA
Natural risk indicator	[(RK1 – lowest value)/(highest value – lowest value)*100] + [(RK2 – lowest value)/(highest value – lowest value)*100]		

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