Regional Disparities and the Effects of Innovation Activities on Regional Integration

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1 Introduction

The EU has played a major role in disseminating good practice in Research and Development (R&D) policy by helping to create a "European Research, Technology, Development and Innovation Community", where decision-makers, researchers, and other interested parties can communicate and work together, in both formal and informal ways, in official advisory committees, specific R&D programmes and policy exchange initiatives. By assisting in this, and through its influence on policy formation and implementation, EU policy has indirectly contributed to closing the R&TD and innovation gap between member states and regions, and, by changing the culture, it has, in some respects, improved the policy planning process.

To improve the quality of regional development strategies the Commission intends to support the latest ideas, which have not yet been adequately exploited. They are expected to provide the regions with the scope for experimentation, which they sometimes lack but need to meet the challenges of the information society and to make their economies more competitive.

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The Commission has laid down three working topics for ERDF innovative actions in 2000–2006: (1) Regional economies based on knowledge and technological innovation; (2) Information society at the service of regional development; and (3) Regional identity and sustainable development. The European Union is increasingly becoming a knowledge-based economy and society. The development of knowledge has a direct effect on competitiveness and employment as well as on the way society functions in general.

The only possible way for technologically weak countries to converge and *catch up* on the advanced countries is to imitate the more productive technologies. The outcome of the international innovation and diffusion process is uncertain; this process may generate a pattern in which some countries follow diverging trends or a pattern where countries converge towards a common trend. This article attempts to investigate and measure the role and effects of European innovation policy on the convergence process and elimination of regional disparities in member states.

2 Regional Disparities: Regional Domestic Product (RDP), Population and Employment

The economic development of a region is, as a rule, expressed in terms of its Gross Domestic Product (GDP). It is also an indicator frequently used as a basis for comparisons between regions. But what exactly does it mean? And how can comparability be established for regions of different size and different currencies?

Regions of different size achieve different GDP levels. However, a real comparison can only be made by indicating the regional GDP per inhabitant for the region in question. This is where the distinction drawn between place of work and place of residence becomes significant: Gross Domestic Product (GDP) measures the economic performance achieved within national or regional boundaries, regardless of whether this was attributable to resident or non-resident employed persons. Reference to GDP per inhabitant is therefore only straightforward if all employed persons engaged in generating this value are also residents of the region in question.

In areas with a high proportion of commuters, regional GDP per inhabitant can be extremely high, particularly in such economic centres as, for instance, London or Vienna, Hamburg, Prague or Luxembourg, and relatively low in the surrounding regions, even if these are characterised by high household purchasing power or disposable income.

Regional GDP is calculated in the currency of the country in question. In order to make GDP comparable between countries, it is converted into euros using the official average exchange rate for the given calendar year. However, not all differences in price levels between countries are reflected in exchange rates. In order to compensate for this effect, GDP is converted, which currency conversion rates being used, known as Purchasing Power Parities (PPPs), to an artificial common currency, called Purchasing Power Standards (PPS).

Prague (Czech Republic), the region with the highest GDP per inhabitant in the new Member States, has already risen to 16th place with PPS 31 639 (149% of the EU-25 average) among the 268 NUTS 2 regions of the countries examined here (EU-25 plus Bulgaria and Romania). It should be noted, however, that Prague is an exception. The next regions of those joining the EU in May 2004 follow a long way behind: Bratislavský kraj (Slovakia) is in 65th place with PPS 23 782 (112%), Közép-Magyarország (Hungary) is 147th with PPS 18 993 (89%), Cyprus is 157th with PPS 18 281 (86%), Malta is 179th with PPS 16 221 (76%) and Mazowieckie (Poland) 196th.

In 2001, the highest per capita GDP was more than twice the lowest in 12 of the 19 countries examined here incorporating NUTS 2 regions. The largest regional differences are in the United Kingdom, where there is a factor of 4.4 between the two extreme values (Inner London: 288% of the EU-25 average; Cornwall and the Isles of Scilly: 65%), and in Belgium, with a factor of 3.1. In ten countries, the highest regional per capita GDP is between twice and three times that of the lowest. Half of this group of countries is made up of the older Member States, plus four of the new Member States and Romania.

Therefore, comparatively marked regional disparities in per capita GDP therefore emerge in both the old and the new Member States. Moderate regional disparities in per capita GDP (i.e. factors between the highest and the lowest value of less than two) are, however, almost exclusively found in the older Member States. This is particularly true of Sweden (Stockholm: 159%; Norra Mellansverige: 98%) and Ireland (Southern and Eastern: 141%; Border, Midland and Western: 97%). Bulgaria (Yugozapaden: 40%; Yuzhen tsentralen: 24%) is the only country in this group that is not one of the older Member States.
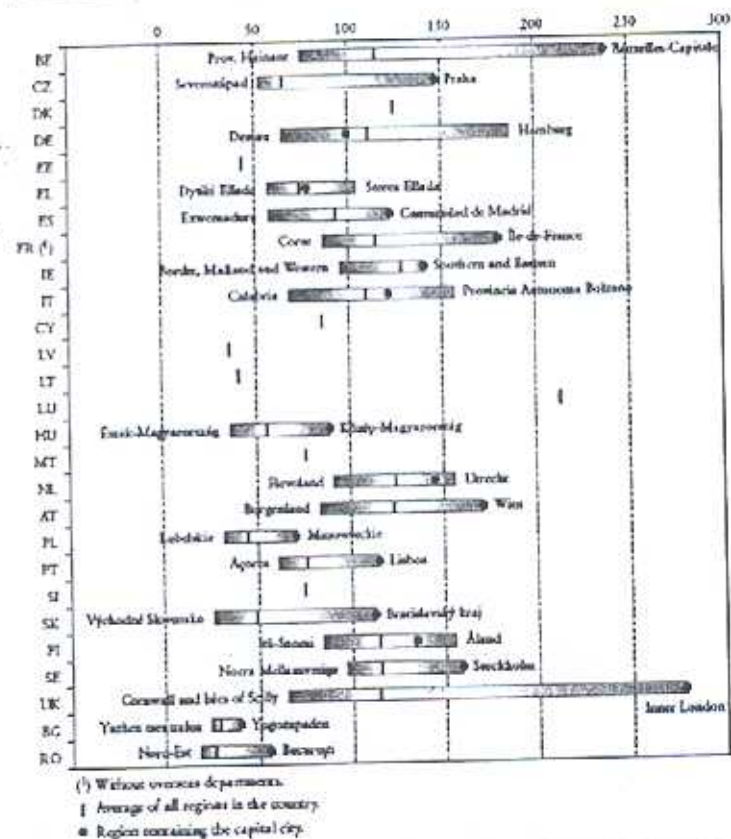
Fig. 1. GDP per capita (in PPS) 2001, NUTS 2 level, in percentage rate of EU-25 average (EU-25 = 100)

Economically dynamic regions, whose per capita GDP increased by more than one percentage point when compared with the average, are shown in orange and red. Less dynamic regions (those with a fall of more than one percentage point in per capita GDP as against the EU-25 average) are shown in yellow. Figures range from + 21.2 percentage points for Inner London in the United Kingdom to – 7.1 percentage points for Schwaben in Germany. Of the ten most dynamic NUTS 2 regions, three are in Greece and one each in the Czech Republic, Ireland, the Netherlands, Hungary, Slovakia, the United Kingdom and Romania. The fastest growing regions are therefore scattered relatively broadly across the 27 countries examined here.

Conversely, six of the ten least dynamic regions are in Germany, with two in the United Kingdom and each in Austria and Romania. Upon closer examination, we can see that between 1999 and 2001, numerous somewhat peripheral regions of the enlarged European Union managed to catch up by comparison with central regions with higher per capita GDP. This is

particularly true of Ipeiros (+ 9.6 percentage points) and Peloponnissos (+ 9.3) in Greece, Região Autónoma da Madeira (+ 6.7) in Portugal and Pohjois-Suomi in Finland (+ 5.1), but also of Alentejo (+ 1.4) in Portugal, Andalucia (+ 1.4) in Spain and South Western Scotland in the United Kingdom (+ 1.3).

2.1 The Regional Employment

The employment rate of the 15–64 age group represents employed persons aged 15–64 as a percentage of the population of the same age group. In 2002, this employment rate was generally lower in Southern Europe. Poland's low employment rate was an exception in the northern part of Europe. There were 24 NUTS 2 regions with an employment rate below 50% — two in Spain, five in France (including all four overseas regions), six in Italy, one in Hungary and five each in Poland and Bulgaria. Of the six Italian regions below 50%, three (Campania, Calabria and Sardegna) had the lowest rates (41.9%) of all European NUTS 2 regions studied. In all Polish regions except two (Lubelskie, Mazowieckie), the employment rate of the 15–64 age group was less than 55%.

NUTS 2 regions in which the employment rate exceeded 75% in 2002 (altogether there were 21 of them) can be found in the Netherlands (4), Finland (2), Sweden (3) and the UK (11). Denmark (comprising one NUTS 2 region) also had an employment rate above this level. Among the new Member States, only six NUTS 2 regions exceeded 65%: four in the Czech Republic (the capital region Praha, Střední Čechy, Jihozápad, Severovýchod), one in Slovakia (the capital region Bratislavský kraj) and Cyprus (which, like Denmark, comprises a single NUTS 2 region).

In most countries, there was a positive trend in employment between 2001 and 2002. Only two of the former EU-15 Member States recorded a decrease in total employment (Germany 0.7% and Denmark 0.5%); the highest increase was observed in Spain (2%, representing an increase of 312,000 employed persons), Italy (1.9% or 315,000 employed persons) and Ireland (1.9% or 33,000 employed persons). The intensity of the decline in the new Member States, and especially Romania, was substantially greater: 9.5% in Romania (decrease of 1.01 million employed persons), 3% in Poland (decrease of 424,000 employed persons) and 5.5% in Lithuania (decrease of 81,000 employed persons). The biggest upturn was recorded in Latvia (2.5%, representing an increase of 24,000 employed persons) and Bulgaria (1.5%, or 41,000 employed persons).

In 17 countries, most NUTS 2 regions recorded a rise in 2001–2002 in total employment – this was the case for Ireland, the U.K., Spain, France,

the Netherlands, Austria, Sweden, Finland, Italy, Greece, the Czech Republic, Hungary and Bulgaria and also the Member State Luxembourg, Cyprus, Latvia and Estonia, each comprising one NUTS 2 region.

The greatest decrease in total employment (more than 5%) was recorded in no fewer than seven Romanian regions, in Poland (Mazowieckie, Opolskie, Podlaskie, Warmińsko-Mazurskie), the Ionian Islands in Greece and Lithuania. In Poland, the greater absolute decrease (108,000 employed persons) was observed in the region of Mazowieckie; in Romania it was the region of Nord-Est (214,000 employed persons). At the other extreme, the most positive development in total employment in 2002 (increase of more than 5% in comparison with the previous year) was in Spain (Ciudad Autónoma de Melilla), France (Champagne-Ardenne, Poitou-Charentes, Languedoc-Roussillon and also two overseas regions, Guyane and Réunion, despite their high unemployment rates), Greece (Ipeiros, Sterea Ellada, Peloponnissos, Voreio Aigaio, Notio Aigaio) and Portugal (Região Autónoma da Madeira).

The unemployment rate, representing unemployed persons as a percentage of the economically active population (i.e. employed persons and the unemployed), stood at 7.7% in the former EU-15 Member States, at 14.9% in the new Member States, at 18.2% in Bulgaria and at 8.4% in Romania. Seventy-four NUTS 2 regions had unemployment rates below 5%: eight in Austria (only one Austrian region exceeded 5%), 19 in the UK, nine in Italy, three in the Czech Republic, eight in Germany, all 12 regions in the Netherlands, two in Hungary, three each in Portugal and Sweden, one each in Spain, Finland and Ireland, and the three single-region States of Denmark, Luxembourg and Cyprus.

In 22 regions unemployment was particularly high (i.e. those with an unemployment rate over 20%): three in Italy (Campania, Calabria, Sicily), all four French overseas regions, two regions in Germany (Dessau, Halle) and no fewer than half the regions in Bulgaria, Slovakia and Poland. In the case of Italy, there were big differences between the northern (low unemployment rate) and southern regions (high unemployment rate).

The situation in the labour market was more stable in the former EU-15 Member States, among which only Greece and Italy improved between 2001 and 2002 (decrease of 0.5 percentage points). Even though the unemployment rate rose the most in Portugal (by 1 percentage point), the overall level still remained very low (5.1%). The changes in the new Member States and in Bulgaria and Romania were more dynamic — with the biggest decrease of the unemployment rate being in Estonia (2.9 percentage points), Latvia (2.8 percentage points) and Bulgaria (2.1 percentage points), as well as notable increases in Poland (1.7 percentage points)

and Romania (1.8 percentage points). In the case of Romania, the unemployment rate in 2002 was relatively low: 8.4%.

In 2002, an improvement of more than 0.5 percentage points in comparison with 2001 was observed in 57 NUTS 2 regions, whereas an equivalent worsening was noted in 107 regions. The greatest decline in the unemployment rate (over 2 percentage points) was recorded in Bulgaria (Severen tsentralen, Severoiztochen, Yugoiztochen, where the latter two had an unemployment rate above 20%), France (two overseas regions, Guyane and Réunion, both with high unemployment rates), Greece (Sterea Ellada) and the new Member States Estonia and Lithuania.

Regions with the largest increase in the unemployment rate (more than two percentage points) in 2002 were as follows: six Polish regions, two Spanish regions (La Rioja and Extremadura), two in Greece (Voreio Aigaio and Notio Aigaio), two in Romania (Sud-Est and Sud) and one French region (Franche-Comté).

In 2002 female unemployment in the former EU-15 Member States was 8.7% (countries with a rate higher than 10% were Spain (16.4%), Greece (15.0%) and Italy (12.2%)); in the new Member States, it stood at 15.6% (more than 10% in Lithuania (12.9%), Latvia (11.0%), Slovakia (18.7%) and Poland (20.9%)); in Bulgaria and Romania it was 17.3% and 7.7% respectively. At regional (NUTS 2) level, a female unemployment rate below 5% was recorded in eight regions in Austria, two each in Belgium, Portugal and Italy, 30 in the UK, six in Sweden, 10 in the Netherlands, nine in Germany, three in Hungary, one in Finland, Ireland and the Czech Republic. In Denmark, Luxembourg and Cyprus the female unemployment rate was also below 5%.

In 2002, regions with a female unemployment rate over 20% could be found in Poland (ten of the 16 regions), France (all four overseas regions, with Réunion exceeding 30%), three regions in Bulgaria and two each in Germany, Slovakia, Spain and Greece. The situation in Italy was marked by a big difference across the country – of the six regions in this category, Campania and Calabria were over 30%. In Germany the female unemployment rate was noticeably higher in the regions of the former GDR.

The youth unemployment rate represents unemployed persons aged 15–24 as a percentage of the economically active population of the same age group. However, there is a greater divergence between the former EU-15 Member States (14.9%), and the new Member States (32.4%), Bulgaria (37.2%) and Romania (23.2%). In the former EU-15 Member States, a youth unemployment rate of over 25% was observed in Italy (27.2%) and Greece (26.5%), whereas it was below 10% in Denmark (7.4%), Germany (9.7%), Ireland (7.8%), Luxembourg (7.0%), Austria (6.2%) and the Netherlands (5.0%).

In the new Member States, the only countries that to have less than 20% youth unemployment were Slovenia (16.5%), the Czech Republic (16.9%), Hungary (12.4%), Cyprus (7.7%), Malta (15.3%) and Estonia (17.6%). The highest level of this indicator was recorded in Poland (42.5%). Across the enlarged EU, Bulgaria and Romania youth unemployment was below 10% in 76 regions. At the other extreme, regional youth unemployment rates above 50% were observed in Bulgaria (Severozapaden), France (Guadeloupe, Martinique), Italy (Campania, Calabria, Sicily) and Poland (Dolnośląskie, Lubuskie, Warmińsko-Mazurskie, Zachodniopomorskie).

The long-term unemployment rate represents persons unemployed for one year or longer, as a percentage of the sum of those unemployed for less than one year and those unemployed for one year or longer. In 2002, relatively low long-term unemployment rates (below 20%) were recorded in five Swedish regions, 17 British regions, three Austrian regions (Salzburg, Tirol, Vorarlberg), one Spanish region (Illes Balears), one Italian region (Valle d'Aosta) and in Denmark. In spite of the high youth and female unemployment in the Spanish region of Andalucía, the long-term unemployment rate was relatively low here. The opposite situation was observed in Slovenia. A long-term unemployment rate of more than 65% was observed in four Bulgarian regions (Severozapaden, Yugozapaden, Yuzhen tsentralen, Yugoiztochen), all four French overseas regions, in four Italian regions (Lazio, Campania, Puglia, Sicily), two Greek regions (Western Greece/Dytiki Ellada and Inland Greece/Sterea Ellada), two Slovak regions (Západné Slovensko and Východné Slovensko) and in the Polish region of Podkarpackie.

2.2 The Regional Population

In general one could say that the ageing of the population is caused by a population dynamic which is too low: the relative influx of youngsters and outflow of older people is too low to compensate each other. Population dynamics are the result of demographic behaviour and are mainly influenced by mortality (the mean life expectancy), fertility (the average number of children born and the mean age at which women have children) and migration (the relative number of immigrants and emigrants and their age distribution). Figure 2 shows these working age people and their children.
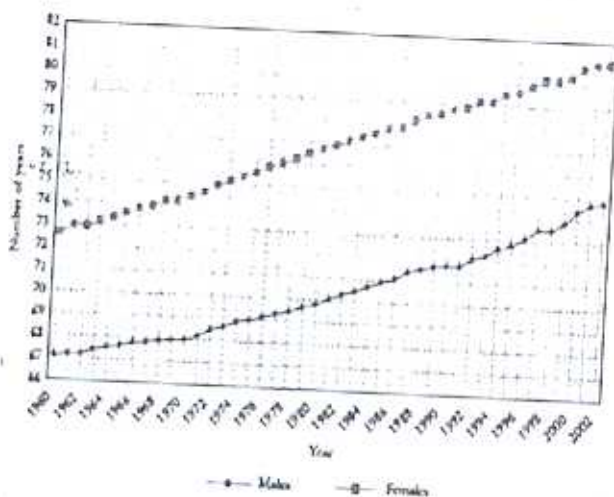
Fig. 2. Life expectancy at birth 1960–2002, EU-25

In the course of the 20th century, life expectancy increased considerably. In 1960 the average life expectancy at birth was 67.1 years for men and 72.6 for women. During the following years this expectancy increased for men by nearly eight years and for women by nearly nine years to respectively 74.8 and 81.1 years in 2002. However such an increase in the number of expected years to live at birth does not necessarily mean an increase in years of good health. Researchers have different opinions on this point: some say that the increase in life expectancy has been accompanied by an increasing frailty of people at higher ages, others hold the opposite view.

Fig. 3. Total fertility rate 1960–2002, EU-25

In most of the countries of the European Union, there were high numbers of births during the first 25 years after the Second World War. However, after 1970 birth rates dropped dramatically as women had fewer children and at a later age.
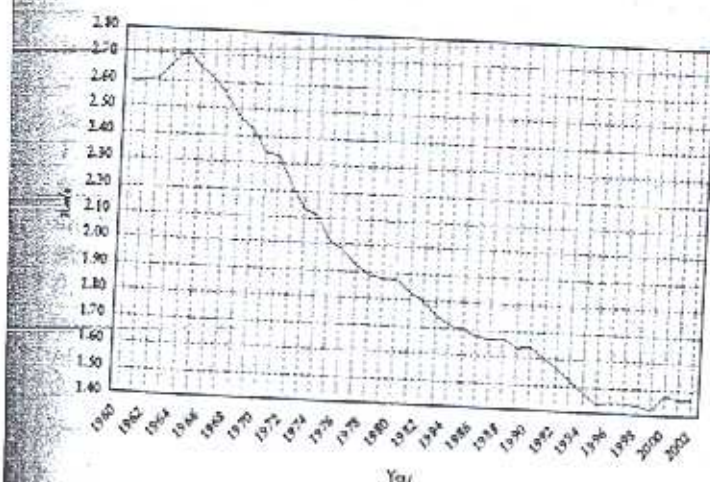
3 The Regional Policy in European Union

The European Union is one of the most prosperous economic areas in the world but the disparities between its member states are striking, even more so if we look at the EU's various 250 regions. To assess these disparities, we must first of all measure and compare the levels of wealth generated by each country, as determined by their Gross Domestic Product (GDP) mentioned earlier. For instance, in Greece, Portugal and Spain, average per capita GDP is only 80% of the Community average. Luxembourg exceeds this average by over 60 percentage points. The ten most dynamic regions in the Union have a GDP almost three times higher than the ten least developed regions.

3.1 Priority Objectives

The regulations adopted in 1993 for the period 1994–1999 established six priority Objectives for the Structural Funds:

- Objective 1: promoting the development and structural adjustment of regions whose development is lagging behind;
- Objective 2: converting regions seriously affected by industrial decline;
- Objective 3: combatting long-term unemployment and facilitating the integration into working life of young people and of those excluded from the labour market;
- Objective 4: facilitating the adaptation of workers to industrial changes and changes in production systems;
- Objective 5a: speeding up the adjustment of agricultural structures in the framework of the reform of the Common Agricultural Policy and facilitating the structural adjustment of the fisheries sector in the framework of the reform of the Common Fisheries Policy;
- Objective 5b: facilitating the development and structural adjustment of rural areas A further Objective for the Structural Funds was created by the Act of Accession for Austria, Finland and Sweden;
- Objective 6: promoting the development of regions with an extremely low population density.

3.2 The New Priority Objectives

Three priority Objectives have been established for the period 2000–2006:

- Objective 1: promoting the development and structural adjustment of regions whose development is lagging behind

The title of this Objective remains unchanged; the regulation stipulates that regions currently eligible under Objective 6 and the outermost regions as defined in the Amsterdam Treaty shall be integrated into Objective 1 for the 2000–2006 period.

- Objective 2: supporting the economic and social conversion of areas facing structural difficulties

This new Objective, which focuses on economic and social conversion, brings together Objectives 2 and 5b of the current programming period and extends them to cover other areas (urban areas in difficulty, areas in crisis dependent on the fishing industry, and areas undergoing conversion which are highly dependent on the services sector) facing the same problems due to a lack of economic diversity.

- Objective 3: supporting the adaptation and modernisation of education, training and employment policies and systems

This new Objective brings together the previous Objectives 3 and 4 and will take as its starting point the new title on employment introduced by the Amsterdam Treaty. It will assist regions throughout the EU except those covered by the new Objective 1, taking into account the general needs of areas facing structural difficulties with regard to economic and social conversion. It constitutes a reference framework for the development of human resources throughout the Member State, notwithstanding regional specificities. Measures previously funded under the former Objective 5a will henceforth be supported by the Guidance section of the EAGGF within the framework of the new Objective 1 programmes (as is currently the case, except as regards compensatory allowances for disadvantaged areas, which are financed by the EAGGF Guarantee section), and elsewhere in the European Union by the EAGGF-Guarantee section and the FIFG within the framework of accompanying measures to the Common Agricultural Policy and the Common Fisheries Policy.

Objective 2: converting regions seriously affected by industrial decline during the 1994–1999 period eligibilty under Objective 2 was linked to three conditions:

- an unemployment rate above the Community average;
- a percentage share of industrial employment exceeding the Community average;
- a decline in this employment category.

A series of secondary criteria meant that eligibility under Objective 2 could be extended to include adjacent areas, urban areas, and areas facing or threatened by a severe increase in unemployment, problems related to the regeneration of derelict industrial sites or the impact of the restructuring of the fisheries sector.

Objective 5b: facilitating the development of vulnerable rural areas during the 1994–1999 period, the general criterion for eligibility under Objective 5b was a low level of socio-economic development (assessed on the basis of per capita GDP).

There were three additional main criteria, two of which had to be met for an area to be eligible:

- a high level of agricultural employment;
- a low level of agricultural incomes;
- low population density and/or significant migration trends.

Eligibility could be extended to other areas not covered by Objective 1 but with a low level of development, if one or more of the following secondary criteria were met: the remote location of the area, sensitivity to trends in the agricultural sector or the restructuring of the fisheries sector, the structure of agricultural holdings and of the agricultural working population, the environment, etc.

Objectives 3 and 4: Objective 3: combating long-term unemployment and facilitating integration into the labour market. The current Objective 3 aims at combating long-term unemployment and facilitating the integration into working life of young people and those threatened by exclusion from the labour market. Objective 3 also promotes equal opportunities for men and women on the labour market. Interventions under Objective 3 are not limited to specific regions.

Objective 4: adaptation to industrial change. This objective facilitates the adaptation of the workforce to industrial changes and to changes in production systems. As for Objective 3, interventions under Objective 4 are not subject to regional limitation.

New Objective 3: development of human resources for the 2000–2006 period, the new Objective 3 will focus primarily on the adaptation and the modernisation of national and European policies for employment, education and training. Objective 3 funding will be available in all areas except

those covered by the new Objective 1. The new Objective 3 will also serve as a reference framework for all human resource actions in the Member States. It will take into account the Employment Title in the Amsterdam Treaty and the new European employment strategy. The regulation takes into account the wide variety of policies, practices and needs in the different Member States based on their national action plans for employment and the ex-ante evaluation. In view of the length of the period covered (2000–2006), the areas in which the European Social Fund (ESF) will apply have been broadly defined. They include active labour market policies to combat unemployment, promote social inclusion and equal opportunities for men and women, strengthen employability through lifelong education and training systems, and measures to anticipate and facilitate adaptation to economic and social change.

3.3 The Structural Funds

The 1993 regulations list three Structural Funds:

- the European Regional Development Fund (ERDF);
- the European Social Fund (ESF);
- the Guidance section of the European Agricultural Guidance and Guarantee Fund (EAGGF). The Financial Instrument for Fisheries Guidance (FIFG) is not a Structural Fund as such, but finances structural actions in the fisheries sector within the framework of Structural Fund programmes.

The European Union's regional policy is based on financial solidarity inasmuch as part of Member States' – contributions – to the Community budget goes to the less prosperous regions and social groups. For the 2000–2006 period these transfers will account for one third of the Community budget, or 213 € billion:

- (a) 195 € billion will be spent by the four Structural Funds (the European Regional Development Fund, the European Social Fund, the Financial Instrument for Fisheries Guidance and the Guidance Section of the European Agricultural Guidance and Guarantee Fund);
- (b) 18 € billion will be spent by the Cohesion Fund;
- (c) 70% of the funding goes to regions whose development is lagging behind. They are home to 22% of the population of the Union (Objective 1);
- (d) 11.5% of the funding assists economic and social conversion in areas experiencing structural difficulties. 18% of the population of the Union lives in such areas (Objective 2);

- (e) 12.3% of the funding promotes the modernisation of training systems and the creation of employment (Objective 3) outside the Objective 1 regions where such measures form part of the strategies for catching up;
- (f) There are also four Community Initiatives seeking common solutions to specific problems, namely Interreg III for cross-border, transnational and interregional cooperation, Urban II for sustainable development of cities and declining urban areas, Leader for rural development through local initiatives, and Equal for combating inequalities and discrimination in access to the labour market.

According to the estimations of Hermin model, the estimated effect is to increase real GDP in 2006 by around 6% in Greece and Portugal and by 2.4% in Spain as compared with the situation without intervention. The effect is relatively modest in Ireland (1.8%), where the Community Structural Funds (CSF) only account for under 10% of total public expenditure. The CSF will increase investment by much more, especially in Portugal (by 23%) and Greece (14%), which will add to effective demand via multiplier effects and, over time, also tend to increase productivity, through improved infrastructure and human capital as well as the use of more modern, and therefore efficient, plant and equipment. Table 1 illustrates the annual breakdown of commitment appropriations for 2000 to 2006 (referred to in Article 7(1)) (€ million – 1999 prices).

The Structural Funds have three main priority objectives: Objective 1: facilitate the catch-up for regions lagging behind in development. Objective 2: promote the socio-economic conversion of industrial, urban or rural zones or zones which are dependent on fisheries. Objective 3: provide improved training and job opportunities. In addition, aid is also granted by Community initiatives which encourage cross-border, transnational and interregional cooperation throughout the EU (Interreg III) and equality in the labour market (Equal).

The Cohesion Fund supports environmental and transport projects in the least prosperous Member States. The followings Tables 2–7 illustrate the structural fund and FIFG interventions are divided as follows between the priority Objectives, the coherence between areas eligible for structural funds and eligible for regional state aid as a percentage of EU population, the cohesion Funds: resources committed by area of intervention.

Table 1. Annual breakdown of commitment appropriations for 2000–2006 [referred to in Article 7(1)] [€ million – 1999 prices]

2000	2001	2002	2003	2004	2005	2006
29,430	28,840	28,250	27,670	27,080	27,080	26,660

1993 1999, the effect of community structural intervention on GDP and Employment, 1989–1999, the population in regions eligible for Structural funds but not for regional state aid as a percentage (%) of total population in each country and the structural funds by broad area of intervention under Objective 1 as a % of total.

Table 2. Structural Fund and FIFG interventions are divided as follows between the priority Objectives

Objective 1	ERDF	ESF	EAGGF Guidance
Objective 2	ERDF	ESF	EAGGF Guidance
Objective 3		ESF	EAGGF Guidance
Objective 4		ESF	EAGGF Guidance
Objective 5a		ESF	EAGGF Guidance
Objective 5b	ERDF	ESF	EAGGF Guidance
Objective 6	ERDF	ESF	EAGGF Guidance

Table 3. Coherence between areas eligible for Structural Funds and eligible for Regional State Aid as a percentage of the EU population

	Regions eligible for Structural Funds		Regions not eligible for Structural Funds		Total	
	1994–1998	2000–2008	1994–1998	2000–2008	1994–1998	2000–2008
Areas eligible for regional state aid	44.0	35.6	2.7	6.7	46.7	42.3
Areas not eligible for regional state aid	6.6	5.8	46.7	51.9	63.3	57.7
Total	50.6	41.4	48.4	59.6	100	100

Source: European Union, Eurostat, DG-Regio.

Table 4. Cohesion Funds: resources committed by area of intervention, 1993–1999

	Transport: % total	Environment: % total	Total mill.€
Greece	51.2	42.3	2992
Spain	49.7	50.2	9251
Ireland	50.0	50.0	1496
Portugal	48.1	51.9	3006
Total	49.7	50.2	16761

Source: European Union.

Table 5. Effect of Community Structural Intervention on GDP and Employment, 1989–1999

	Greece		Ireland		Portugal		Spain	
	GDP	Unemploy-ment rate	GDP	Unemploy-ment rate	GDP	Unemploy-ment rate	GDP	Unemploy-ment rate
1989	4.1	-3.2	2.2	-1.4	5.8	3.6	0.8	0.4
1993	4.1	-2.9	3.2	-1.0	7.4	-4.1	1.5	-0.8
1999	9.9	-6.2	3.7	-0.4	8.5	-4.0	2.1	-1.6
2006	7.3	-3.2	2.8	0.4	7.8	2.8	2.4	1.7
2010	2.4	0.4	2.0	0.5	3.1	-0.1	1.3	-0.4

Source: European Union, estimates on the HERMIN model, 2000.

Table 6. Population in regions eligible for Structural funds but not for regional state aid as percentage (%) of total population in each country

	B	DK	D	EL	E	F	RL	I	L	NL	A	P	FIN	S	UK	EU-15
1994–1999	0	0	5.3	0	8.9	9.6	0	7.5	6.4	10.4	5.9	0	12.6	9.7	9.0	8.6
2000–2008	3.4	0.1	2.3	0	4.3	8.8	0	7.0	0.3	8.2	3.9	0	12.0	7.4	9.8	5.8

Source: European Union, Eurostat, DG-Regio.

Table 7. Structural Funds by broad area of intervention under Objective 1 as % of total

	1989–1993	1994–1999	2000–2006
Infrastructure	25.2	29.8	24.3
Human Resources	29.6	24.5	23.9
Productive Environment	23.6	41.0	24.9
Other	1.6	4.7	7.0

Source: European Union.

4 The European Innovation Policy

The European Union's 2010 goals in R&D, as set by the Lisbon summit strategy and endorsed by European Heads of State and Government in Barcelona in 2002, are to achieve a R&D intensity (R&D expenditure as percentage of GDP) of 3% for the Union as a whole as well as to have two thirds of R&D expenditure financed by the Business Enterprise Sector (BES). Sweden and Finland are ahead of most Member States for the EU 2010 R&D goals with R&D intensities well above the 3% mark and over two thirds of their R&D expenditure being financed by the BES.

In 2001, 55% of the EU-25's R&D expenditure was financed by the BES, still lower than the 66%-goal. With R&D expenditure representing

1.93% of its GDP, the EU-25 still had a lower R&D intensity than its Triad partners Japan (3.12%) and the United States (2.64%) in 2002. China's R&D intensity leapt from 0.70% in 1998 to more than 1.20% in 2002. In the ten years to 2002, the US's R&D expenditure grew more than twofold to over 225 billion constant 1995 PPS. The EU and Japan's amount of R&D likewise more than doubled in one decade. Table 8 illustrates the top 15 Eurpean Union regions in R&D expenditure and employment in high-tech and medium high-tech manufacturing, whereas, Table 9 indicates the top 15 regions in employment in the knowledge-intensive services and patenting.

Bearing in mind that the EU's enlargement to 25 Member States only took place in 2004, the inclusion of the ten new Member States would have already added about 4% of additional R&D expenditure to the then 15 Member States' Union's total R&D expenditure (in million constant 1995 PPS) between 1999 and 2002.

Denmark, Sweden, Finland are leading EU Member States in Research and Development, boasting among the highest R&D intensities (R&D expenditure as a percentage of GDP). Likewise, these three Nordic EU countries have the highest number of R&D personnel as a percentage of total employment in the European Union. More than three out of 100 employed people were active in R&D in Finland in 2002 and so was more than 2.5% of Sweden's workforce in 2001 and more than 2.25% of Denmark's in 2002. The European Union's percentage of R&D personnel among employed people is 1.44. Estonia, Latvia, Lithuania, Portugal and the Slovak Republic had among the highest shares of female researchers in the European Union.

In most countries, female researchers are especially concentrated in the GOVernment (GOV) and Higher Education (HES) Sectors. In most countries, a significant proportion of Business Enterprise Sector researchers (more than 40%) gets employed in large enterprises of more than 250 employees. Only in smaller countries such as Estonia, Cyprus or Malta is this less the case. In Estonia and Cyprus for instance, enterprises of one to nine employees attracted about respectively 20% and 30% of Business Enterprise Sector researchers. Tables 10 and 11 illustrate the leading region by Member States in R&D expenditure and employment in high-tech and medium high-tech manufacturing, respectively. Finally, Table 12 indicates the top 25 European Union regions and leading region by Member State in terms of GDP.

Table 8. Top 15 EU regions in R&D expenditure and employment in high-tech and medium high-tech manufacturing

Total R&D expenditure in 2001			Business R&D expenditure in 2001			Employment in high and medium high-tech manufacturing 2002		
Region	Mio current €	% of GDP	Region	Mio current €	% of GDP	Region	Thousands HC	% of total employment
Braunschweig (DE)	2896	6.99	Vastsverige (SE)	2445	5.19	Stuttgart (DE)	401	21.2
Stuttgart (DE)	6146	4.94	Braunschweig (DE)	2140	5.17	Tubingen (DE)	158	18.7
Oberbayern (DE)	6959	4.58	Stuttgart (DE)	5566	4.49	Braunschweig (DE)	121	17.5
Berlin (DE)	3222	4.22	Stockholm (SE)	3005	4.37	Franche – Comte (FR)	88	17.4
Pohjois – Suomi (FI)	5766	4.10	Oberbayern (DE)	5575	3.66	Kozep – Dunantul (HU)	76	16.6
Tubingen (DE)	1757	3.85	Eastern – NUTS 1 (UK)	4684	3.32	Karlsruhe (DE)	204	16.4
Karlsruhe (DE)	2949	3.77	Sydsverige (SE)	1017	3.11	Niederbayern (DE)	90	15.6
Dresden (DE)	1050	3.63	Tubingen (DE)	1423	3.10	Unterfranken (DE)	96	15.6
Etela – Suomi (FI)	2794	3.61	Pohjois – Suomi (FI)	435	3.09	Rheinhessen – Pfalz (DE)	138	15.4
Lansi – Suomi (FI)	1056	3.50	Noord – Brabant (NL)	1796	2.82	Freiburg (DE)	151	14.9
Ile de France (FR)	14132	3.36	Ostra Mellansverige (SE)	984	2.79	Schwaben (DE)	122	14.5
Midi – Pyrenees (FR)	1841	3.35	Lansi – Suomi (FI)	818	2.71	Mittelfranken (DE)	111	14.1
Noord – Brabant (NL)	2011	3.21	Mittelfranken (DE)	1273	2.56	Oberbayern (DE)	285	13.9
Koln (DE)	3675	3.18	Damstadt (DE)	3394	2.54	Damstadt (DE)	237	13.5
Mittelfranken (DE)	1551	3.10	Etela – Suomi (FI)	1948	2.52	Peimonte (IT)	235	13.2

Source: European Union.

Table 9. Top 15 regions in employment in knowledge-intensive services and patenting

Employment in knowledge-intensive services in 2002			Patent application to the EPO in 2002			High technology patent application to the EPO in 2002		
Region	Thousands HC	% of total manufacturing	Region	Number	Per million inhabitants	Region	Number	Per million inhabitants
1. Inner London (UK)	788	59.14	Noord– Brabant (NL)	2593	1084	Noord – Brabant (NL)	1201	502
2. Stockholm (SE)	532	54.84	Stuttgart (DE)	2952	749	Oberbayern (DE)	973	238
3. Outer London (UK)	1118	50.35	Oberbayern (DE)	3034	741	Stockholm (SE)	305	168
4. Ile de France (FR)	2353	46.80	Karlsruhe (DE)	1430	535	East Anglia (UK)	358	161
5. Surrey, East and West Sussex (UK)	532	46.02	Mittelfranken (DE)	845	500	Sydsverige (SE)	181	141
6. Vastsverige (SE)	395	45.45	Tubingen (DE)	871	492	Mittelfranken (DE)	211	125
7. Berlin (DE)	552	45.07	Freiburg (DE)	1031	481	Gloucestershire, Wiltshire and North-Sommerset (UK)	228	103
8. Ostra Mellansverige (SE)	318	44.49	Vorarlberg (AT)	100	456	Berkshire, Bucks and Oxfordshire (UK)	199	93
9. Wien (AT)	332	44.46	Rheinhessen – Pfalz (DE)	912	454	Oberpfalz (DE)	95	88
10. Noord – Holland (NL)	593	44.12	Sydsverige (SE)	582	454	Karlsruhe (DE)	221	82
11. Denmark (DK)	1205	43.98	Darmstadt (DE)	1550	414	Stuttgart (DE)	315	80
12. Berkshire, Bucks and Oxfordshire (UK)	510	43.78	Oberpfalz (DE)	420	397	Ile de France (FR)	873	79
13. Hamburg (DE)	344	43.44	Prov. Brabant Wallon (BE)	135	382	Bretagne (FR)	215	73
14. Eastern Scotland (UK)	388	42.46	Koln (DE)	1598	372	Hampshire and Isle of Wight (UK)	125	70
15. Etela – Suomi (FI)	530	41.79	Unterfranken (DE)	480	365	Prov. Antwerpen (BE)	97	59

Table 10. Leading region by member states in R&D expenditure and employment in high-tech and medium high-tech manufacturing

	Total R&D expenditure in 2001			Business R&D expenditure in 2001			Employment in high & medium high-tech manufacturing 2002		
	Region	Mio current €	% of GDP	Region	Mio current €	% of GDP	Region	Thousands HC	% of total employment
Poland	Mazawieckie	543	1.28						
Portugal	Centro	338	1.44	Centro	233	0.90	Lisboa	65	4.90
Slovenia	Slovenia	341	1.50	Slovenia	197	0.80	Slovenia	85	2.22
Slovakia	Bratislavsky	59	1.00				Zapadne Slovensko	83	11.10
Finland	Pohjois – Suomi	570	4.10	Pohjois – Suomi	435	3.00	Lanse – Suomi	52	8.75
Sweden				Vastsverige	2445	5.19	Ostra Melansverige	71	2.87
United Kingdom	Eastern NUTS1	4505	3.80	Eastern NUTS1	4564	3.32	Hertfordshire, Worcestershire and Warks	75	12.04

Source: European Union.

Turnover from products which are either new to the market or just new to the enterprise accounted for about 30% of total turnover in Spain, Italy, Germany and Finland, for those enterprises with some form of product innovation. Over 80% of all large enterprises (250 or more employees) in Luxembourg and Austria had innovation activity. Too high innovation costs were generally cited by enterprises as the most important factor hampering innovation. In nearly all countries, the main highly important effect of innovation was cited as improved quality in goods or services.

The proportion of enterprises with co-operation arrangements for innovation activities (such as cooperation with other enterprises within the enterprise group or cooperation with suppliers) ranged from half of all enterprises with innovation activity (Finland, Latvia and Lithuania) to less than 10% (Italy). In general, enterprises with innovation activity had a higher propensity to undertake strategic or organisational change, compared to enterprises without innovation activity.

In summary, we can state that there is a widening tendency for differences between European regions in the fields of innovations and new technologies and in particular in the subjects of Research and Development Expenditures per inhabitant. According to econometric evidence, we can also state that the European Union should improve the distribution of regional funds for research and development, in order to diminish these differences and to support researchers in less favoured regions, and consequently to affect the socio-economic and regional growth and convergence of member states (Guisan, Cancelo and Diaz-Vazquez, 1998).

Table 11. Leading region by member states in R&D expenditure and employment in high-tech and medium high-tech manufacturing

	Employment in knowledge-intensive services in 2002			Patent application to the EPO in 2002			High-technology patent application to the EPO in 2002		
	Region	Thousands HC	% of total manufacturing	Region	No:	Per million inhabitants	Region	No.	Per million inhabitants
Belg.	Region de Bruxelles-Capita Brussels	168	49.71	Prov. Brabant Walon	135	382	Prov. Antwerp	97	59
Czech	Praha	245	40.27	-	-	-	-	-	-
Denm.	Denmark	1205	43.98	Denmark	1149	214	Denmark	240	45
Germ.	Berlin	852	45.07	Stuttgart	2952	749	Oberbayern	973	238
Eston.	Estonia	179	30.85	Estonia	12	9	Estonia	3	3
Greece	Atiki	467	29.80	Kriti	8	14	Kriti	2	3
Spain	Communidad deMadrid	874	37.08	Catalonia	384	62	Communidad deMadrid	51	10
France	Ile de France	2353	48.80	Ile de France	3407	313	Ile de France	873	79
Ireland	Southern and Esatern	405	35.40	Southern and Esatern	287	101	Southern and Esatern	104	30
Italy	Latzio	584	33.54	Emilia Romana	710	177	Valle d; Aossa	3	25

Table 10: (continued)

	Employment in knowledge-intensive services in 2002			Patent application to the EPO in 2002			High technology patent application to the EPO in 2002		
Region	Region	Thousands HC	% of total manufacturing	Region	No.	Per million inhabitants	Region	No.	Per million inhabitants
Cyprus	Cyprus	83	28.17	Cyprus	7	10	Cyprus	1	1
Latvia	Latvia	245	24.83	Latvia	14	8	–	–	–
Lith.	Lithuania	351	24.73	Lithuania	9	3	Lithuania	4	1
Lux.	Luxembourg	72	38.05	Luxembourg	89	201	Luxembourg	3	8
Hung.	Kozep-Mayaskip	405	34.08	–	–	–	–	–	–
Malta	Malta	42	28.45	Malta	7	18	Malta	0	1
Neth.	Utrecht	209	45.20	North Hol-land	2503	1084	North Holland	1201	502
Austria	Wien	332	44.40	Vorsteng	103	450	Wien	77	48
Poland	–	–	–	–	–	–	–	–	–
Port.	Lisboa	399	30.88	–	–	–	–	–	–
Sloven.	Slovenia	211	22.82	–	–	–	–	–	–
Slovek.	Bratislavsky	117	38.93	Slovenia	85	18	Slovenia	7	3
Finl.	Aand	7	55.99	–	–	–	–	–	–
Swed.	Stockholm	532	54.84	Ita-Suomi	57	84	Ita-Suomi	14	20
U. K.	Inner London	788	59.14	Sydsverige	582	454	Sydsverige	350	168
				East Anglia	771	340	East Anglia	358	181

Source: European Union.

Table 12. Top 25 EU regions and leading region by Member State in terms of GDP

	Top 25 EU regions in GDP per head in PPS in 2001		Leading region by Member States in GDP per head in 2001			
Region	Mio current €	PPS per head	Country	Region	Mio current €	PPS per head
1. Inner London (UK)	183.230	58.881	Belgium	Region de Bruxelles-Capitale Brussels	48.716	48.721
Region de Bruxelles (BE)	48.710	48.721	Czech	Praha	17.308	30.252
Luxembourg (LU)	22.020	43.601	Denmark	Denmark	177.871	26.851
Hamburg (DE)	73.650	38.275	Germany	Hamburg	73.669	88.276
Ile de France (FR)	420.878	36.915	Estonia	Estonia	6.668	8.791
Wien (AT)	57.970	35.459	Greece	Sterea Ellada	9.471	21.331
Berkshire, Bucks and Oxfordshire (UK)	80.380	33.297	Spain	Communida de Madrid	114.157	25.455
Oberbayern (DE)	152.530	33.163	France	Ile de France	420.878	26.915
Stockholm (SE)	88.807	32.488	Ireland	Southern and Eastern	92.092	28.698
Provincia Autonoma Bolzano – Bozen (IT)	14.059	32.124	Italy	Provincia Autonoma Botzano-Bozen	14.059	32.124
Utrecht (NL)	37.970	32.037	Cyprus	Cyprus	10.205	17.588
Darmstadt (DE)	133.544	31.906	Latvia.	Latvia	9.227	7.659
Aland (FI)	921	31.796	Lithuania	Lithuania	18.505	8.341
North Easstern Scotland (UK)	17.719	30.530	Luxembourg	Luxembourg	22.020	48.601
Bremen (DE)	22.479	30.439	Hungary	Kopez-Magyaroszag	25.494	18.315
Praha (CZ)	17.308	30.252	Malta	Malta	4.294	15.379
Groningen (NL)	17.833	29.876	Netherl.	Utrecht	37.906	32.037
Noord – Holland (NL)	79.605	29.734	Austria	Wien	57.970	85.459
Lombardia (IT)	262.331	29.403	Poland	Mazowieskie	42.404	14.629
Southern and Eastern (IE)	92.092	28.693	Portugal	Lisboa	46.086	23.476
Emilia-Romagna (IT)	100.082	28.227	Slovenia Rep.	Slovenia	21.345	15.296
Stuttgart (DE)	124.424	28.103	Slovekia Rep.	Bratislavsky	5.919	22.930
Salzburg (AT)	15.202	27.975	Finland	Aland	921	81.796
Prov.Antwerpen (BE)	47.123	27.701	Sweden	Stockholm	68.807	32.488

Therefore, by pursuing their own interests, regional authorities can increase the momentum towards the establishment of a European Research Area as well as ensuring its effectiveness and consistency. The establishment of a European Research Area, however, is not confined to the most central and competitive regions. The instruments available – the Framework Programme, the Structural Funds and action at national and regional level – should be used together in a more coherent way, each according to its objectives, in order to enable all regions to participate fully in the area

5 Conclusions

Technological progress has become virtually synonymous with long run economic growth. It raises a basic question about the capacity of both industrial and newly industrialized countries to translate their seemingly greater technological capacity into productivity and economic growth. In the literature there are various explanations for the slow-down in productivity growth for OECD countries. One source of the slow-down may be substantial changes in FDI, and in the industrial composition of output, employment, capital accumulation and resource utilization. The second source of the slow down in productivity growth may be that technological opportunities have declined; otherwise, new technologies have been developed but the application of new technologies to production has been less successful. Technological factors act in a long run way and should not be expected to explain medium run variations in the growth of GDP and productivity. The Regional Policy, supported through Structural Funds and a Cohesion Fund has created objectives that have thus far been moderately successful in reducing disparities between the regions of the EU15. Greece, Portugal, Ireland and Spain, the four countries, which qualified for the Cohesion Fund, witnessed almost an 11% average increase in per capita GDP from 1988–1998. On average, the poorest EU regions saw the per capita GDP rise by almost 7% over the same ten years. The funding provided through Regional Policy contributed significantly to these GDP increases.   Moreover, the European research and innovation policy has adopted an approach oriented more towards innovation than technological excellence as such, better addressing the deficiencies of less favoured regions as a result. An improvement in the interaction between the deployment of the Structural Funds and research policy is important to accelerating the "catching up" of lagging regions. The Structural Funds can provide the necessary support for firms and research institutes in the latter to participate on equal terms in future research programmes.

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