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Industrial Policy Benchmarking in Dynamic Industrial Locations in the EU – Employment, Skills and Environment Factors

Implications for Developing Countries



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Industrial Policy Benchmarking in Dynamic Industrial Locations in the EU – Employment, Skills and Environment Factors

Implications for Developing Countries

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List of abbreviations

COMECON	Council for Mutual Economic Assistance
CSF	Community Support Framework
ECSF	European Community Structural Funds
EIS	European Innovation Scoreboard
EU	European Union
EU-27	European Union of 27 countries
FDI	foreign direct investment
GDP	gross domestic product
GSRT	General Secretariat for Research and Technology
HEFCW	Higher Education Funding Council for Wales
ICTs	information and communication technologies
IDA	Industrial Development Agency
IFA	Instituto de Fomento de Andalucía
KBIs	knowledge-based institutions
MNEs	multinational enterprises
NC-ELWa	National Council - Education and Learning Wales
NDP	National Development Plan
NRP	National Reform Programme
OECD	Organization for Economic Co-operation and Development
R&D	Research and Development
RDAs	regional development agencies
RIS	regional innovation system
RPG	Regional Planning Guidelines
RTP	Regional Technology Plan
SMEs	small- and medium-sized enterprises
Tekes	The Finnish Funding Agency for Technology and Innovation
WDA	Welsh Development Agency
WTB	Wales Tourist Board

Abstract

Globalization and the introduction of new production technologies are changing the industrial landscape throughout the world, a fact that poses major challenges to policymakers. The effects of these changes lead to differences between locations, which manifest themselves in several key economic factors, such as growth rates of gross domestic product (GDP), productivity rates, innovation capacities, and capabilities, among others.

This paper undertakes a descriptive analysis of the dimensions and elements of industrial policies that underpin these dynamic growth rates and which have led to widening location-related differentials within the EU. The regions for this paper, selected at the EUROSTAT NUTS3 level, comprise Uusimaa (Finland), Dublin (Ireland), Munich (Germany), Attiki (Greece), Almeria (Spain) and Riga (Latvia). They have been selected using two-fold criteria: GDP per capita growth rates over a 10-year period; and their ranking on the European Innovation Scoreboard (EIS). While a majority of the regions benefited from the European Community Structural Funds (ECSCF), not all were able to translate these investments into high innovation rates. The findings underline that the sources of dynamism differ between regional locations.

This paper is constrained by the fact that some of the information and data analysis were only available in national languages and are hence not part of the analysis. Secondly, data at the EUROSTAT NUTS3 level is limited; the level of analysis for comprehensive benchmarking, based on empirical analysis, was therefore determined by the detail of data available. Thirdly, it does not concern itself with the ongoing global and financial crisis that began in mid-2007.

Introduction

The industrial and economic landscape throughout the world is changing with the introduction of new patterns of production, technologies and the effects of globalization and inter-firm cluster development. The role of innovation has also played a major role in shaping industrial policies.¹ Seeing the effect of these changes, the EU in March 2000, in cooperation with the Lisbon European Council, drew up a 10-year strategy to make the EU the world's "*most competitive and dynamic knowledge-based economy, capable of sustainable economic growth with more and better jobs and greater social cohesion*".²

The goal set by this strategy sparked a great deal of interest among policymakers towards the establishment of industrial clusters, in particular, in the high-technology sector (information and communication technologies (ICTs), biotechnology, nanotechnology, etc.). Forward and backward linkages in regional clusters have become a focal point as opposed to the "*atomized*" linkages among enterprises of the early 1990s. These regional clusters, or agglomerations, that have experienced many new policy initiatives in the past few years, have opened a range of new location possibilities for investment [Storper, 1995; Quah, 1996].

Agglomerations of industries have played a leading role in the development of cities and regions and have formed a new industrial organizational basis for economic planning and development.³ In accordance with this trend, the focus of regional policy, which was previously an essentially narrow one concerned with influencing economic activity through industrial location,⁴ progressively shifted towards the development and support of regional institutions, and also towards a broad sphere of policy actions, such as physical and economic infrastructure, business development, research and technology development, human resources, environment, etc.

Other factors that have increased in importance have been the role and establishment of institutions that are collectively led by regional authorities and involve a wide range of partners

¹ Literature on innovation in regions in particular is explicitly displayed in Landabaso, 1997; Ronde and Hussler, 2005; Simmie, 2005; Glaeser et al. 1992; Howells, 2005; OECD, 2007.

² "The Lisbon European Council – An agenda of economic and social renewal for Europe"- Contribution of the EC to the special European Council in Lisbon, European Commission, Brussels, February 2000.

³ This is explained in detail in Fujita and Thisse, 2005; Krugman, 1997; Glaeser et al., 1992; Heidenreich, 1998; Isaksen and Hague, 2002; Ottaviano and Puga, 1997.

⁴ Bachtler and Douglas (2001), Policies and strategies for regional development: A shift in Paradigm? Regional and Industrial Policy Research Paper, Number 46, European Policies Research Centre, Glasgow, United Kingdom.

from local government, voluntary sector, business and social communities, and influence a broad band of policies [Ronde and Hussler, 2005]. For example, in Wales, the strategy plans for economic development—*A Winning Wales* strategy—aims at bringing together an array of policies and actors.⁵

Furthermore, knowledge-based institutions (KBIs) are becoming increasingly dynamic and their role in sustaining dynamism is gaining importance. Policy makers have been working towards providing the right framework conditions for innovation activities in their core industries by sharing and exchanging different forms of knowledge (including research) between institutions and actors.

Nevertheless, some locations emerge to be more dynamic than others due to an advantageous combination of economic geography, and well-configured and precisely-calibrated industrial policies that are appropriately switched or re-calibrated in time, supported by human and social capital dimensions. Differences in locations are not only observed between national economic territories but also within national territories, as some regions possess systematically better industrial policies, comparative advantages of geography and competitively higher rates of innovation. In the European Union (EU) there are several regions within national territories that have GDP per capita growth rates two to three times higher than that of the EU.

The purpose of this paper is to analyze the dimensions and elements of the industrial policies that underpin the high GDP growth rates in specific dynamic regions in the EU, and to use policies implemented successfully within them for benchmarking industrial policies. Dynamic regions have been selected on the basis of their GDP per capita growth rates as well as their ranking, in terms of innovation, within the EU. For each of these regions, several aspects have been analyzed, namely:

- Economic and research and development (R&D) indicators;
- Cluster and regional innovation policies; and

⁵ The priorities established in *A Winning Wales* will inform the plans of the Welsh Development Agency (WDA), National Council - Education and Learning Wales (NC-ELWa), the Higher Education Funding Council for Wales (HEFCW), the Wales Tourist Board (WTB) and other public bodies. The WDA and NC-ELWA, in particular, will have a crucial role in leading on many of the key economic and skills issues. Partnership with key Government Departments and Agencies of the United Kingdom in this field, notably Job Centre Plus and the Department for Work and Pensions, will also be necessary for success. An in-depth analysis is portrayed in Morgan, 1997.

- Regional institutions for employment, skills and environment.

Section 1 looks at the changing face of industrial policy, in general, with its ever-increasing emphasis on clusters and agglomerations. Section 2 establishes the key issues for benchmarks related to various policy measures, such as policy-mix, institution-building and their response to regional needs and networks. Section 3 presents case studies⁶ on selected dynamic locations in the EU, based on GDP per capita growth rates and the European Innovation Scoreboard (EIS).⁷ Section 4 draws conclusions and lessons for developing countries from successful policies in the selected dynamic locations in the EU, while section 5 delineates issues that need to be further addressed for policy research.

1. Industrial policies driven by cluster and regional innovation policies

At the end of the 1990s, industrial as well as regional policies increasingly promoted the development of clusters. Indeed, for some countries the development of regional clusters represented a new form of industrial policy [OECD, 2001].⁸

Studies on industrial clusters date back to Alfred Marshall's contribution on localization economies [Marshall, 1890]. He identifies three pre-conditions for setting up an industrial cluster: the existence of a pool of adequate labour; the existence of specialized suppliers; and the possibility of external spillovers (the rapid transfer of know-how and ideas inside the cluster). Isard (1960) expanded this concept using export-oriented industries and their linkages to other industries in the region. According to him, these strong industrial linkages indicate the existence of an industrial cluster. Since then, many economists [Piore and Sabel, 1984; Krugman, 1991; Porter, 1990; Fujita and Thisse, 2005] have been discussing the importance of regional industrial agglomeration in relation to the major transformations that have been taking place globally in the economic development and structure of cities, countries and regions.

The interest in industrial clusters increased when the dominant model of the Fordist firm was questioned [Piore and Sabel, 1984] and regional clusters were seen as key driving factors of economic growth and competitiveness [Porter, 1990]. Piore and Sabel (1984) argued that the

⁶ Data at the EUROSTAT NUTS 3 level is rather limited; the level of analysis for a comprehensive benchmarking based on empirical analysis was therefore determined by the detail of data available.

⁷ <http://trendchart.cordis.lu/scoreboards/scoreboard2006/index.cfm>

⁸ More literature on promotion of regional clusters is referenced in Behrens and Thisse, 2007; Fujita and Thisse, 2005; Howells, 2005; Rodriguez-Clare, 2007; Storper, 1995.

late twentieth century had seen the arrival of a second industrial divide that led the way to regional specialization organized around networks of small-scale producers. While the Fordist economic reality was characterized by huge industrial conglomerates, clusters provide the example of a propagative economy, based on low barriers and small amounts of capital.

Krugman (1991) argues that the origins of industrial clusters are due to economies of scale rather than to comparative advantage and that such clusters are a result of accidental reasons and sustained external scale economies. Rosenfeld (1997) emphasizes the importance of social infrastructure, information flow and cooperation between firms. In his view, a cluster is “a geographically bounded concentration of similar, related or complementary businesses, with active channels for business transactions, communication and dialogue, that share specialized infrastructure, labour markets and services, and that are faced with common opportunities and threats.” (p.10)

Porter, in his famous essays on industrial clusters (1990) and then on regional clusters (1998), describes the relationship between cluster participation and the competitiveness of firms and industries. “Enduring competitive advantages in a global economy are often heavily local, arising from concentrations of highly specialised skills and knowledge, institutions, rivals, related businesses, and sophisticated customers.” [Porter, 1998, p.86].

Much of the interest in regional clusters derives from experiences and studies of industrial districts⁹ in Italy. These districts are characterized by a high concentration of firms and, very often, small (mainly traditional) manufacturing industries, a well-developed division of work between local firms, a high level of entrepreneurship and the ‘fusion’ of social and economic life [OECD, 2001].

Recently a few countries started using the concept of regional clusters in policy design. In the United Kingdom, the notion of clusters has become a significant strand of Government policy. A recent white paper (2001)¹⁰ encouraged regional development agencies (RDAs) to continue developing existing and embryonic clusters in their regions building on strong capabilities. Other European countries, such as Austria, Denmark, Finland, France, Portugal and Spain,

⁹ Literature on industrial districts can be found in Di Giovanna, 1996.

¹⁰ DfEE and DTI (2001), Opportunity for all in the world of change
<http://www.altassets.com/casefor/countries/2001/nz3619.php>

have been undertaking several studies both at national and regional levels to identify clusters of importance.

A more recent concept is the regional innovation system (RIS)¹¹ which comprises a regional cluster of firms supported by a developed infrastructure of supplier firms and knowledge and technology diffusion organizations, which tailor their services to the specific needs of the dominating regional industry [Asheim and Isaksen, 2002]. Broadly speaking, the key dimensions of a regionalized innovation system (RIS?) are: (i) the processes and policies supporting education and knowledge transfer; (ii) arrangements for the governance of innovation; (iii) the level of investment, especially in R&D; and (iv) the type of firms and the intensity of linkages and communications, in terms of networking, subcontracting, presence or absence of supply chains and the degree of co-production and co-marketing between customers and suppliers.

Autio (1998)¹² provides a schematic illustration of the structure of RIS (figure 1). According to Autio, the RIS is made up of two sub-systems embedded in a common regional socio-economic and cultural setting: (i) the knowledge application and exploitation sub-system comprising firms, their clients, suppliers, competitors, as well as their industrial cooperation partners (that is, dominating regional clusters). Ideally, these firms are linked by horizontal and vertical networking; (ii) the knowledge-generation and diffusion sub-system, as the second main building block of a RIS, consists of various institutions that are engaged in the production and diffusion of knowledge and skills. Key elements include public research institutions, technology mediating organizations (technology licensing offices, innovation centres, etc.) as well as educational institutions (universities, polytechnics, vocational training institutions, etc.) and workforce mediating organizations.

Toedtling and Trippel (2005) added a third element to it, namely, policy actors at regional level who can play a powerful role in shaping regional innovation processes, provided there is sufficient regional autonomy (legal competencies and financial resources) to formulate and implement innovation policies.

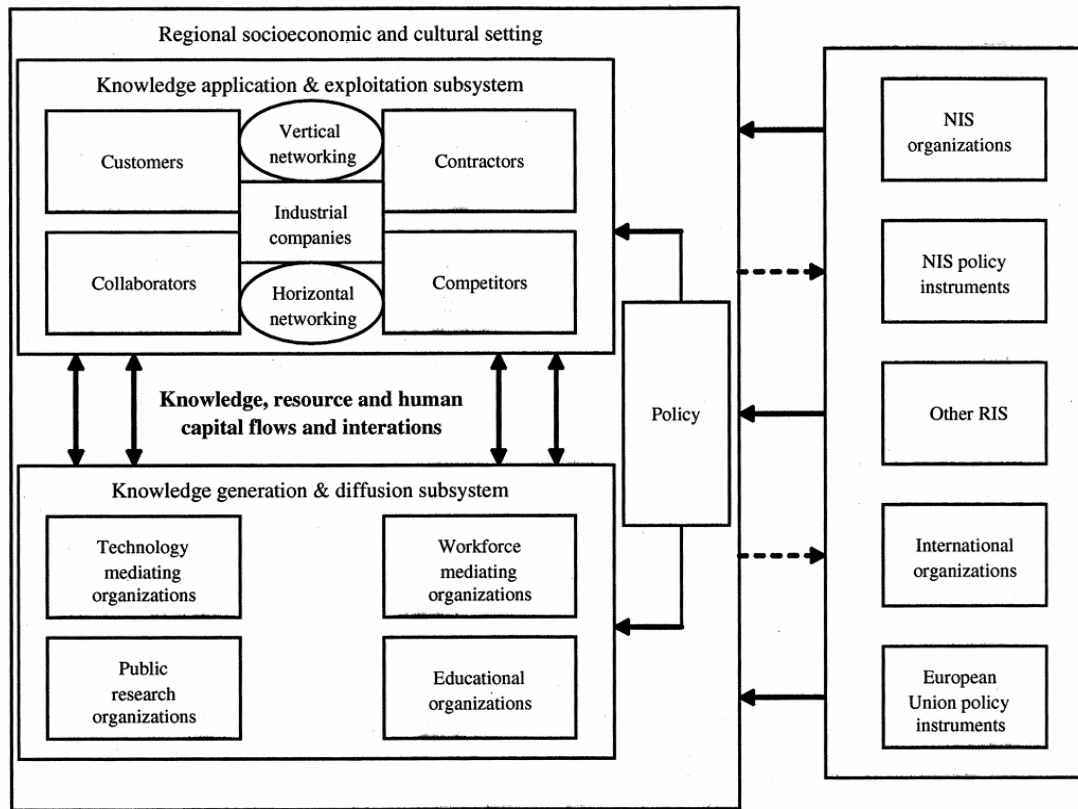
Porter (1998) also argues that a robust RIS manifests systemic linkages between external as well as internal sources of knowledge production (universities, research institutions, and other

¹¹ Detailed literature on RIS can be found in Asheim and Isaksen, 2002; Brazczyk, Cooke and Heidenreich, (eds.) 1998; OECD, 2007.

¹² This is portrayed in Toedtling and Trippel, 2005.

intermediary organizations and institutions providing government and private innovation services), large business enterprises and small firms.

Figure 1. Main structure of RIS



Source: Autio, 1998 [Adapted from Toedtling and Trippel (2005)].

2. Industrial policy benchmarks

Several studies have been dealing with questions as to why some industries concentrate in certain locations¹³, which kind of linkages and networks exist and what contributed to the success of certain clusters/agglomerations? The three ‘best practices’ examples often mentioned in literature of successful policies are: Emilia-Romagna (Italy), Baden-Württemberg (Germany) and Silicon Valley (United States of America). These are sometimes referred to as the ‘classics’ of regional clustering [Hospers and Beugelsdijk, 2002].

Storper (1995) narrates the success of Emilia-Romagna located in the northern part of Italy, also termed the Third Italy. Its success is attributed to the local tradition of clustering, making

¹³ Literature on location factors can be referred to in Martin and Ottaviano, 1999; Falck and Heblich, 2007; Crozet and Soubeyran, 2004; Heidenreich, 1998; Simmie, 2005.

it one of the richest regions in Europe. He attributes the success of cluster policy to the local government that provided consensus-building and social and business services that led to the formation of machine tools, ceramic tiles, knitting and footwear clusters.

Baden-Württemberg, one of the most significant industrial successes for the past 30 years, is based on a strong engineering cluster and has been successful due to pro-active 'state-industry-science' cooperation [Cooke, 1996]. By far, the biggest success story ever has been that of the Silicon Valley in California, where the famous microelectronics cluster owes its success to a combination of competition and cooperation among firms [Saxenian, 1994].

Box 1 presents various existing policy instruments that influence policy-making in the EU. Furthermore, according to general economic theory, these are the classical factors coupled with infrastructural and quality of living factors that drive investments in certain regions. Capital cities that are best-equipped in physical infrastructure as well as quality-of-life factors always attract high investments.

The increasing role of regional institutions that provide a pro-active policy for 'closer-to-the-ground' development cannot be over emphasised. One example of institutions that help in formulating and implementing regional development strategies are RDAs. These have developed at different times under different legal forms across Europe. As outlined by the European Association of Development Agencies, in spite of their diversity, RDAs have developed original forms of economic intervention which principally include:

- Assisting in company creation
- Counselling firms and training their staff
- Promoting enterprise zones or attracting local or foreign investors
- Stimulating technology transfer and inter-company partnership
- Creating and managing firm incubators
- Providing risk capital (in certain countries)
- Conducting studies and territorial planning initiatives
- Regenerating areas made derelict by industrial blight

Box 1. Policy instruments that influence industrial/cluster/innovation policies in the EU

Corporate taxes: Corporate taxes are particularly important for attracting new investments in a region. Ireland's success can be attributed to the lowering of corporate taxes which resulted in an increase in investments.

Foreign direct investment (FDI): Foreign capital plays a vital role in opening up and revitalizing economies. In Ireland, for example, FDI created not only jobs but was also used for training in skills and management from which indigenous capabilities emerge.

Competition policy: Anti-trust, monopoly and merger control have emerged as three key areas of European policy. National policy here must play a significant and complementary role to EU policy.

State aid policy: This policy, commonly regarded as the main core of industrial policy, has been one of the areas where the European Commission has in fact developed a powerful position, laying down clear guidelines to restrict the use of ad hoc measures, and generally dampening expectations of what national governments may do to help stricken sectors. These incentives, whether in the form of subsidies, grants, loans or tax rebates, and whether from central or lower tiers of government, go under the generic name of State aid.

Regional policy and structural funds: Regions in Europe have a growing role to develop 'bottom-up' support networks that link SMEs not only with each other but also with local universities and technical colleges, local bankers and venture capitalists, local government and local big business. Structural funds have played a vital part in encouraging regional confidence. Currently, they lay more emphasis on capital-intensive developments, such as transport investments, but not enough on innovation and human capital.

Science, technology policy and framework programmes: Main aim of these programmes is to encourage collaboration between different European countries and also enhance excellence in basic science that is the key attractor for high value multinational corporation investments.

Source: Sharp, 2003.

Another example is Wales in the United Kingdom, where its RDA followed a comprehensive strategy to improve the skills set of the region in line with the type of investments it wishes to attract (Box 2).

Box 2. Wales strategy – An integrated approach to increase the skills base to meet the demands for new industries

Wales, located in the west of the United Kingdom, with GDP per capita (purchasing power parity) at 95.8 per cent of the EU average (2004), has been growing at 4.5 per cent per year (1995-2004). Employment in the industrial sector was 23 per cent in 2005 as opposed to 75 per cent in the services sector. On the EIS, it ranked eightieth in 2006 (up from ninety-sixth place in 2002).

With a population of 2.9 million people, it has the lowest unit cost of labour in manufacturing in the United Kingdom. In the 1980s, the Wales economy underwent a major restructuring process when the traditional heavy manufacturing industries, such as coal, iron and steel, were replaced by new industries, such as automotive components, consumer electronics, aerospace, healthcare and ICTs. Wales benefited from large amounts of FDI, but a need to integrate inward investments with indigenous industries, improve the innovation capacity and upgrade the 'social capital' to ensure competitiveness in the region was felt.

Led by a strong regional economic development agency, Welsh Development Agency (WDA), with resources and expertise to develop an All Wales strategic approach, it was agreed that the Regional Technology Plan (RTP) in 1996 would focus on indigenous industries, specifically SMEs, to promote growth and introduce a 'culture which values and encourages innovation'. The WDA, along with Cardiff Business School, led the process of implementing the RTP. The RTP Action Plan focused on six major priority areas--innovation culture; global innovation and technology; supply chains and networks; education and training; finance for innovation; high quality business and innovation support.

The Wales RTP has made a significant impact on the regional economic development policy in Wales and also succeeded in embedding innovation and technology into the political agenda. The RTP priorities framework has been incorporated into the business development programme, and the corporate strategies of organizations in higher and further education and business support sectors.

Furthermore, to make Wales more competitive, in 2002 the Welsh assembly government drew up a 'Winning Wales' strategy with the objective of achieving higher GDP. To achieve this, the Government set out the twin objectives for modernizing the industrial structure of the Welsh economy to ensure that Wales has a higher share of employment in high-growth, high-skill and high value-adding industries and occupations, and moves up from the assembly-line branch factory economy; and also to ensure that more people have jobs and opportunities to benefit from the new industries. Several key sectors were identified, such as high technology automotive, aerospace, agri-food, tourism, and financial services. The following creative industries and strategies, as main drivers of growth, were implemented:

- Ensure a steady supply of specific skills by working with the relevant sector skills councils (for each of the sectors identified there exists a sector skills council; there are 20 such councils in Wales)
- Encourage the continued development of strong supply chains for individual sectors within Wales and promote productive collaboration within, and between, various sectors
- Assist the evolution of supportive sectoral fora
- Aid the development of an academic support network for these sectors
- Help boost the visibility of these sectors in export markets

These broad objectives are being implemented via a broad set of implementing agencies, such as the WDA, National Council - Education and Learning Wales, the Higher Education Funding Council for Wales, the Wales Tourist Board and other public bodies.

Sources: *RTP Wales/Cymru*, IRE network, http://ec.europa.eu/regional_policy/innovation/innovating/pdf/wales_en.pdf
Winning Wales – The National economy development strategy of the Welsh Assembly Government, January 2002; *Wales – A Vibrant Economy*, The Welsh Assembly Government Strategic Framework for economic development, November 2005; *Innovation Action Plan*, The Welsh Assembly Government, September 2006.

While institutions are important for facilitating networking and interactions between different sub-systems of innovation, the role of social capital is very important for making the network successful. The achievement of agglomeration benefits in the process of regional clustering are

based not only on economic regularity but are also dependent on close social relationships within an industrial district creating an ‘industrial atmosphere’ [Hospers and Begelsdijk, 2002].

Social capital, defined as ‘features of social organization, such as trusts, norms and networks that can improve the efficiency of society by facilitating coordinated actions’ [Putnam et al., 1993], is built through networks and civic engagement.

Benchmarking innovation policies must include a systematic perspective and assess explicit (interventionist) innovation policies (grants, subsidies, loans, training programmes, tax instruments, etc.) on the one hand, and framework-supportive policies creating competitive business environments (reform of labour markets, removal of administrative burdens, etc.) on the other. Best practice aspects are depicted in Box 3.

Box 3. Broad benchmarks/best practices for industrial policy

Broad benchmarks/best-practices for industrial policy are dependent on:

- design of policy mix
- role of regional government
- structure of governance, that is, legislative and budgetary powers relevant to innovation policy devolved to particular stakeholder
- infrastructure/institutions for economic development (for example, infrastructure, such as industrial parks), higher education/universities, funding of business development, research policy, etc.)
- networks of various industries/clusters and their linkages nationally and globally

This paper avoids the problematics of benchmarks in terms of regional ranking, whether quantitative or qualitative, the underlying reason being that regional innovation policy itself is a complex set of aspirations, influences, strategic directions etc. There may be layers of strategy/policy, spread over many years, and include many institutions and actors that would need to be considered, before funded projects with hard inputs/outputs can be defined. It is also clear that the main actors in the RIS are private sector actors and individual entrepreneurs, within a multi-level (regional, national, global) innovation system [Kaiser and Prange, 2004].

Therefore, the role of regional policy is relative given the influence and cooperation/coordination of others in a large, complex and open system. In other words, policy may be more effective and efficient if it is self-organized, on the principle of subsidiarity, in a mutual learning context. Often, the success or failure of a RIS is not so much related to the policy or funding scheme, but to how it works with real people and real organizations.

While policy efforts frequently refer to success stories of clustering in other countries, the question is whether it is possible to repeat the success story of, for example, Finland in the 1990s, when it transformed itself from a soviet economy oriented exporter to a market-oriented economy high-technology performer in Europe. Few countries are able to repeat the success of Finland. By 2005, regions in enlarged Europe accounted for very diverse performance in levels of innovation. In the next section, we look at selected success stories of innovation systems and clustering in advanced economies that are relatively wealthy, employ qualified civil servants and have more or less comparable systems of drafting and interpreting laws [Hospers and Beugelsdijk, 2002].

3. Selection of dynamic industrial locations in the EU

The inclusion of the new member States has changed the geo-economic landscape of Europe in the past decade. For centuries, the crescent-shaped metropolitan axis running from London to Milan has been Europe's breeding ground for innovation and growth.¹⁴ The new member States of the EU, comprising Central and East European countries, are catching up with their older counterparts, as they have been



recording higher GDP growth rates compared with the old member States and thus, narrowing disparities in GDP per capita over time.¹⁵ Since the mid-1990s, the EU-27 has gone through, first an upward swing in GDP per capita, at 4 per cent growth rate in 2000, then a slowdown at the beginning of the century, registering growth rates of less than 1 per cent in 2001 and 2002, and recovering modestly at 3 per cent in 2006. Among the EU-15 (old member States), Ireland

¹⁴ Hospers (2002), *Beyond the Blue Banana? Structural Changes in Europe's Geo-economy*. Paper presented at the 42nd European Congress of the Regional Science Association, August 27-31, 2002, Dortmund, Germany.

¹⁵ Fourth report on economic and social cohesion by the European Commission (2007), *Growing Regions of Europe*, Director-General, Regional Policy.

registered the highest growth rate at 8 per cent. However, the 12 new member States that entered the EU in 2004 and 2007 displayed very different growth rates. These grew at 6 per cent in 2000 and then slowed down to some 3 per cent in 2001 and 2002. They subsequently picked up, reaching 5 per cent and 6 per cent in 2005 and 2006, respectively.¹⁶ Among the new member States, the three Baltic States (Estonia, Latvia and Lithuania) doubled their GDP growth in real terms, growing at between 7 and 8 per cent a year.

Among the EU countries, several regions have been growing at higher rates than the EU average. However, most of the regions (those that have been growing at substantially higher growth rates) have GDP levels way below both the EU average (EU=100) and the EU GDP per capita level. In fact, a few have even grown by twice the EU average growth rate. These regions mainly include new member States, where GDP per capita has been much below the EU average level; for example, in Estonia and Romania, GDP per capita is below 50 per cent of the EU average. However, countries with GDP per capita much higher than the EU average level, such as Ireland, also have regions showing twice the EU average growth rate.¹⁷

The main criterion for dynamic regions is the GDP per capita growth rate, as it is a widely used measure of economic performance and constitutes a measure of economic dynamism. However, in the context of dynamic industrial locations, GDP is not the only measure of economic dynamism, since it disregards two important factors:

- Regionalization process, such as setting up institutions like RDAs, that provides more know-how/capabilities to regions to implement policies that act as catalysts for innovation-building activities and regional clusters; and
- High-technology infrastructure which provides support to learning, knowledge enhancement and innovation.

One of the many indicators available today to assess the innovativeness of regions is the EIS, an initiative of the European Commission under the Lisbon Strategy, to evaluate and compare the innovative performance of EU member States.¹⁸ The innovation indicators are assigned to five dimensions and are grouped under two main themes: innovation inputs and outputs. Innovation inputs include innovation drivers, knowledge creation, innovation and entrepreneurship. Innovation outputs include applications, expressed in terms of labour and

¹⁶ http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090,1&_dad=portal&_schema=PORTAL

¹⁷ These have been calculated for the period 1995-2004 based on real GDP per capita levels and have been extracted from the EUROSTAT REGIO database.

¹⁸ http://trendchart.cordis.lu/tc_innovation_scoreboard.cfm

business activities and their value added in business sectors, and intellectual property that measures achieved results in terms of successful know-how.

This analysis is based on EUROSTAT NUTS3¹⁹ level data.²⁰ In the selection of dynamic industrial regions, the EU is divided into several geographical groups, comprising countries or areas, based on cultural and economic ties as follows:

Group 1	Nordic countries, comprising Finland, Sweden and Denmark
Group 2	North Western Europe, comprising the United Kingdom, Ireland, France and the Benelux countries, namely, Belgium, Luxembourg and Netherlands
Group 3	Central Europe, comprising the Alpine regions, comprising Germany and Austria
Group 4	Southern Europe Mediterranean, comprising Italy, Greece, Cyprus and Malta
Group 5	Southern Europe Iberia, comprising Spain, Portugal and Gibraltar
Group 6	New Europe, comprising Slovenia, Romania and Bulgaria, the Visegrád countries, namely, Czech Republic, Hungary, Poland and Slovakia; and the Baltic States – Estonia, Latvia and Lithuania

Dynamic regions are selected from each of the above-mentioned six groups. The analysis of these groups in the EU (tables 1-6) is based on the following indicators:

- Average GDP growth rates (1995-2004)
- Industry contribution to gross value added (1995 and 2004)
- RIS for 2006 is the EIS ranking at NUTS2 level. (The EIS ranking has been taken for the corresponding NUTS2 region for each of the NUTS3 regions for which no data was available)

¹⁹ NUTS was created by the European Office for Statistics (Eurostat) as a single hierarchical classification of spatial units used for statistical production across the EU. At the top of the hierarchy are the individual member States of the EU; below that are levels 1 to 3.

²⁰ http://ec.europa.eu/eurostat/ramon/nuts/basicnuts_regions_en.html

Table 1. Fast-growing Group 1 regions at NUTS3 level

Geo	Name	GDP growth rate 1995-2004 (percentage)	RIS ranking 2006 (NUTS 2)	Share of industry GVA (percentage)	
				1995	2004
fi192	Pirkanmaa	5.63	28	38.5	38.8
fi181	Uusimaa	5.59	4	23	23
fi1a2	Pohjois-Pohjanmaa	5.57	14	36.7	38.8
fi194	Etelä-Pohjanmaa	5.43	28	26.4	32
fi1a1	Keski-Pohjanmaa	5.34	14	29.5	33.9
fi131	Etelä-Savo	5.25	70	23.5	25.7
fi133	Pohjois-Karjala	5.20	70	27.8	33.3
fi200	Åland	5.19	154	13.5	13.8
fi191	Satakunta	4.96	28	41.8	39.8
se010	Stockholms län	4.96	1	18.3	17.6
fi183	Varsinais-Suomi	4.96	4	39	38.3

Table 2. Fast-growing Group 2 regions at NUTS3 level

Geo	Name	GDP growth rate 1995-2004 (percentage)	RIS ranking 2006 (NUTS 2)	Share of industry GVA (percentage)	
				1995	2004
ie025	South-West (IE)	10.61+	77	45	53
Ukg32	Solihull	9.23+	42	23.4	25.6
ie021	Dublin	8.44	77	30.8	27
ie011	Border	8.34	133	38	33.7
ie013	West	7.95	133	33.9	32.3
ie012	Midlands	7.93	133	31	31.5
ie024	South-East (IE)	7.87	77	41.6	42
Ukn01	Belfast	7.82	113	17.8	12.6
ukj11	Berkshire	7.72	12	23.8	15.8
ukj23	Surrey	7.65	12	19	14
Ukk12	North and North East Somerset, South Gloucestershire	7.63	37	31	24.7

+ More than twice the economic growth rate of EU average.

Table 3. Fast-growing Group 3 regions at NUTS3 level

Geo	Name	GDP growth rate 1995-2004 (percentage)	RIS ranking 2006 (NUTS 2)	Share of industry GVA (percentage)	
				1995	2004
de42a	Teltow-Fläming	9.62+	84	35.4	31.8
Deg0n	Eisenach, Kreisfreie Stadt	9.53+	59	43.9	52.3
de21h	München, Landkreis	8.28	3	20	13.5
Deg0d	Sömmerda	8.07	59	37.2	46
de211	Ingolstadt, Kreisfreie Stadt	7.49	3	47.8	59
Deg0h	Sonneberg	7.08	59	37	41
Ded13	Zwickau, Kreisfreie Stadt	6.91	88	31.7	39
Dee24	Merseburg-Querfurt	6.83	110	46.5	48.8
de806	Wismar, Kreisfreie Stadt	6.79	127	36	34.9
Dee32	Aschersleben-Staßfurt	6.77	110	28.9	32
Ded21	Dresden, Kreisfreie Stadt	6.70	18	23	31

Table 4. Fast-growing Group 4 regions at NUTS3 level

Geo	Name	GDP growth rate 1995-2004 (percentage)	RIS ranking 2006 (NUTS 2)	Share of industry GVA (percentage)	
				1995	2004
gr221	Zakynthos	11.60+	NA	NA	NA
gr422	Kyklades	9.08+	203	NA	NA
Gr300	Attiki	8.87	86	NA	NA
gr213	Ioannina	8.44	191	NA	NA
gr224	Lefkada	8.33	NA	NA	NA
gr413	Chios	8.07	202	NA	NA
gr223	Kefallinia	7.79	NA	NA	NA
gr212	Thesprotia	7.55	191	NA	NA
gr253	Korinthia	7.25	199	NA	NA
gr433	Rethymni	7.02	174	NA	NA
gr131	Grevena	6.37	201	NA	NA

Table 5. Fast-growing Group 5 regions at NUTS3 level

Geo	Name	GDP growth rates 1995- 2004 (percentage)	RIS ranking 2006 (NUTS 2)	Share of industry GVA (percentage)	
				1995	2004
Es611	Almería	7.27	169	15.8	22.5
Es431	Badajoz	6.73	193	23.5	22.6
pt300	Região Autónoma da Madeira (PT)	6.69	NA	16	16.6
Es617	Málaga	6.48	169	20	23.3
Es612	Cadiz	6.48	169	28.6	29.2
Es615	Huelva	6.26	169	28.4	32.1
Es213	Vizcaya	6.15	55	35.8	34.3
Es130	Cantabria	6.10	163	32.3	33.2
pt165	Dão-Lafões	6.08	153	23.3	28.3
es513	Lérida	6.02	82	33	25.5
es114	Pontevedra	5.98	142	31.5	33.5

Table 6. Fast-growing Group 6 regions at NUTS3 level

Geo	Name	GDP growth rate 1995-2004 (percentage)	RIS ranking 2006 (NUTS 2)	Share of industry GVA (percentage)	
				1995	2004
ro115	Satu Mare	13.18+	NA	36	33
ro424	Timis	11.92+	NA	40	36
Iv006	Riga	11.38+	148	28	17.6
ro322	Ilfov	11.36+	NA	36.5*	34.6
ee001	Põhja-Eesti	11.28+	124	25.8**	23.9
lt00a	Vilniaus (Apskritis)	11.08+	143	27	26.7
ro321	Bucuresti	10.95+	NA	28.5*	28
ro423	Hunedoara	10.87+	NA	50.2	41.7
ro121	Alba	10.87+	NA	39.8	38.6
ro422	Caras-Severin	10.84+	NA	32.8	23.8
ro225	Tulcea	10.19+	NA	35.8	31.3

The regions selected are:

- Group 1** Nordic countries: Uusimaa (Finland)
- Group 2** North Western Europe: Dublin (Ireland)
- Group 3** Central Europe: Munich (Germany)
- Group 4** Southern Europe Mediterranean: Attiki (Greece)
- Group 5** Southern Europe Iberian: Almeria (Spain)
- Group 6** New Europe: Riga (Latvia)

3.1. Uusimaa (Finland)

Uusimaa, a region with a population of 1.3 million people located in southern Finland (*Etela-Suomi*), includes the country's capital region, Helsinki. It is one of the most competitive regions in the EU²¹ and, among the Nordic countries, also one of the fastest-growing regions, with a growth rate exceeding 5.5 per cent.²²



As one of the largest and most significant centres of business, science and technology, education and culture in Finland, it spends nearly 4 per cent of GDP on R&D. Out of the 5.2 million inhabitants in Finland, almost 1.3 million live in Uusimaa, with over 0.5 million living in the city of Helsinki. Besides, Uusimaa is headquarters to some of the biggest firms in Finland, for example, Nokia Corporation.

As far as educational institutions are concerned, Uusimaa is home to nine universities and nine polytechnics (universities of applied sciences) with around 100,000 students and 9,000 academic staff. Most of the 20 national public research institutes in Finland, with a staff of 10,000, are located here. Further, one third of the region's working-age population has a tertiary degree.

²¹ Robert Huggins Associates, 2004, European Competitiveness Index 2004.

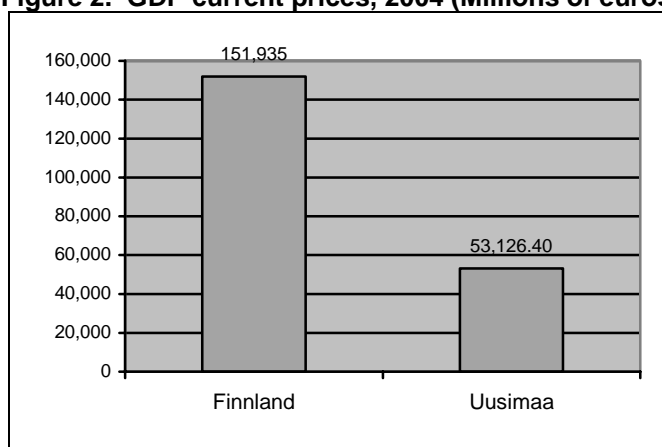
²² Eurostat General and Regional Statistics.

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090,1&_dad=portal&_schema=PORTAL

3.1.1. Economic and R&D indicators

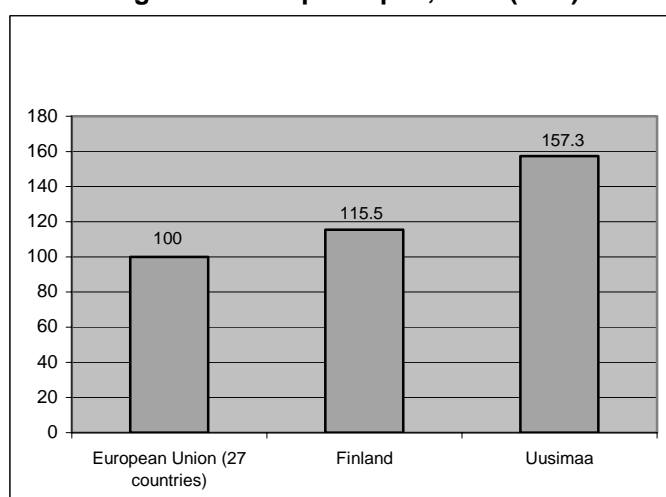
Finland suffered a severe recession that led to an unemployment rate in the region of almost 16 per cent in 1996 (Finland's unemployment rate stands at 8 per cent). This was partly due to the collapse of the economic system (COMECON²³) of the former Union of Soviet Socialist Republics. However, a rebound strategy based on technology sectors turned the economy around. As a result, Uusimaa has been growing at a very competitive rate. Figures 2-4 below show the competitive position of the region in Finland as well as the EU.

Figure 2. GDP current prices, 2004 (Millions of euros)



Source: Eurostat

Figure 3. GDP per capita, 2004 (PPS)

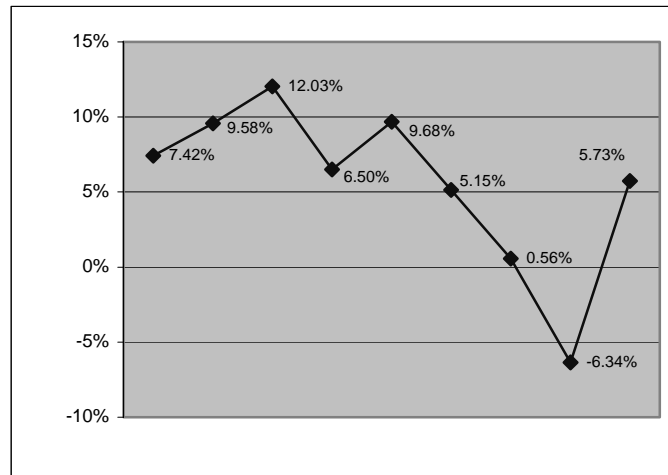


Source: Eurostat.

* Purchasing Power Standard.

²³ Council for Mutual Economic Assistance

Figure 4. GDP per capita growth rates, Uusimaa, 1996-2004 (Percentage)

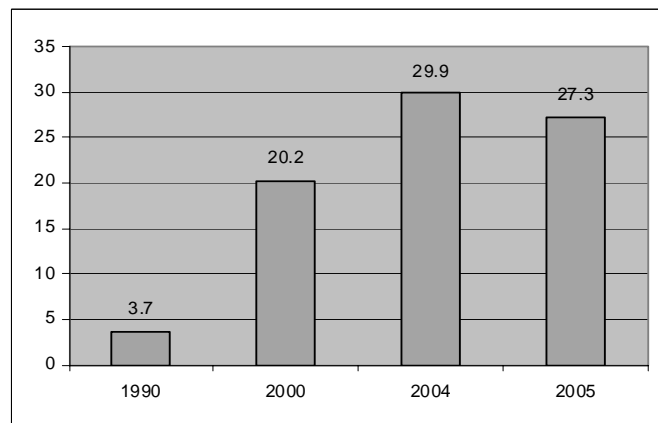


Source: Eurostat.

The regional strategy to fight recession was based on programmes which focused on strengthening and broadening the industrial base of the region. These actions strongly supported the development of technology, technology transfer, research and innovation activities, and simultaneously enhanced their importance in the Finnish policy agenda. Since then, technology has been the engine of economic growth in Finland. The fastest-growing export sector is telecommunications equipment, especially cellular phones.

Figure 5 shows the Finnish FDI stocks as a percentage of GDP for selected years. Within Finland, Uusimaa attracts a major share of foreign investments. In fact, due to its efficient transport and communication infrastructure, two thirds of the foreign firms are located in Uusimaa.

Figure 5. FDI stocks as a percentage of GDP, Finland (Selected years)

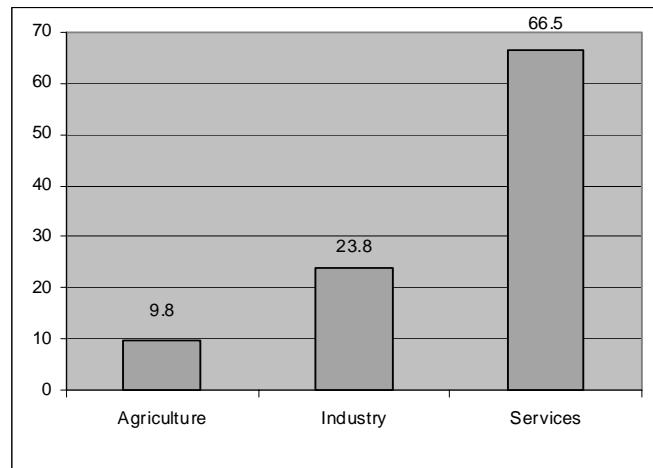


Source: UNCTAD, *World Investment Report, 2006*.

The industrial policy of Finland can be referred to as “a Nordic model” based on “economies with egalitarian system while efficiently generating innovations required for success in the

global economy”.²⁴ The service sector not only dominates the region but also employs more than three quarters of the working population (figure 6).

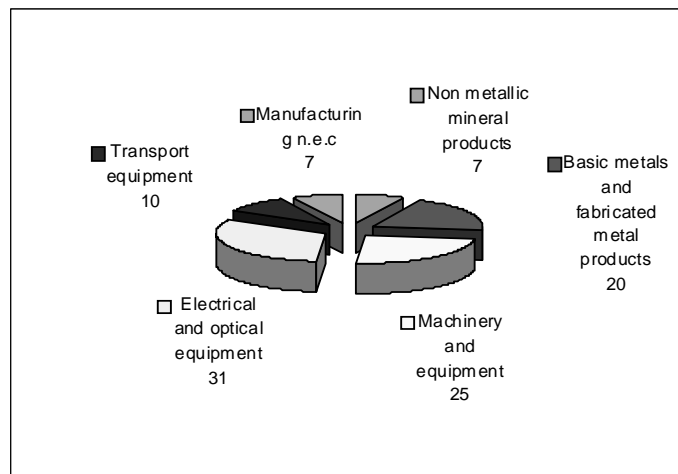
Figure 6. Employment by sector, southern Finland, 2005 (Percentage of total employment)



Source: 4th Cohesion Report on Economic and Social Cohesion, EC.

The important industrial activities are in machinery, electrical products and instruments, and publishing and printing (figure 7).

Figure 7. Share of employment in diverse manufacturing sectors southern Finland, 2004 (Percentage)

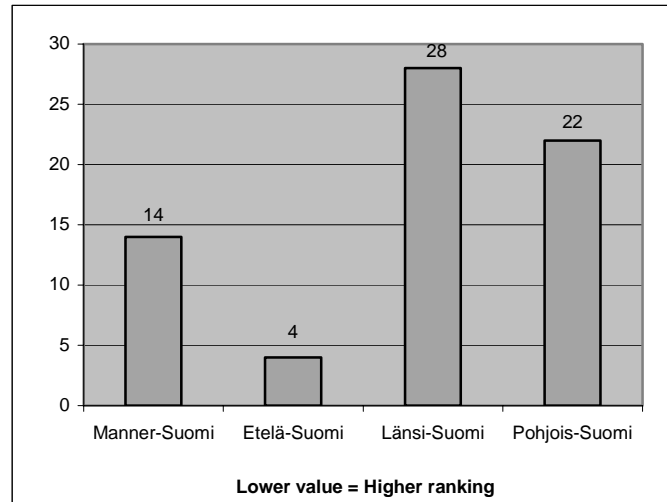


Source: Eurostat.

Uusimaa, part of southern Finland (Etela-Suomi), is the most innovative region in Finland. It is also one of the most innovative regions in the EU, ranking fourth within the EU (figure 8).

²⁴ Guidelines for Finnish Industrial Policy, Ministry of Trade and Industry, 2006; Asheim and Coenen (2005).

Figure 8. EIS ranking of Uusimaa, 2006



Source: Trendchart, European Innovation Scoreboard.

3.1.2. Cluster and regional innovation policies

Currently, the electronics and telecommunications industries have been the high growth sectors of this region. Based on several studies, nine clusters have been identified for the period 2007-2013. These are healthbio, welfare, food development ubiquitous computing, digital content, tourism and experience production, nano and micro systems and future materials, housing, and environmental technology.

Uusimaa's biggest city, Helsinki, has one of the most competitive ICT sector and is well placed in global markets to take a share of worldwide growth in demand in the future. Strong economic growth in Russia is expected to benefit manufacturing, trade, transport and business services in Helsinki, which will continue to act as a logistic hub in trade between Western Europe and Russia. Unlike most other European metropolises, Helsinki is less dependent on the markets of Central and Western Europe.

In 2005, the Helsinki region drew up a new RIS based on four pillars, namely, improving international appeal on research and expertise, reinforcing knowledge-based clusters and creating common development platforms, reform and innovation in public services, and support of innovation activity.

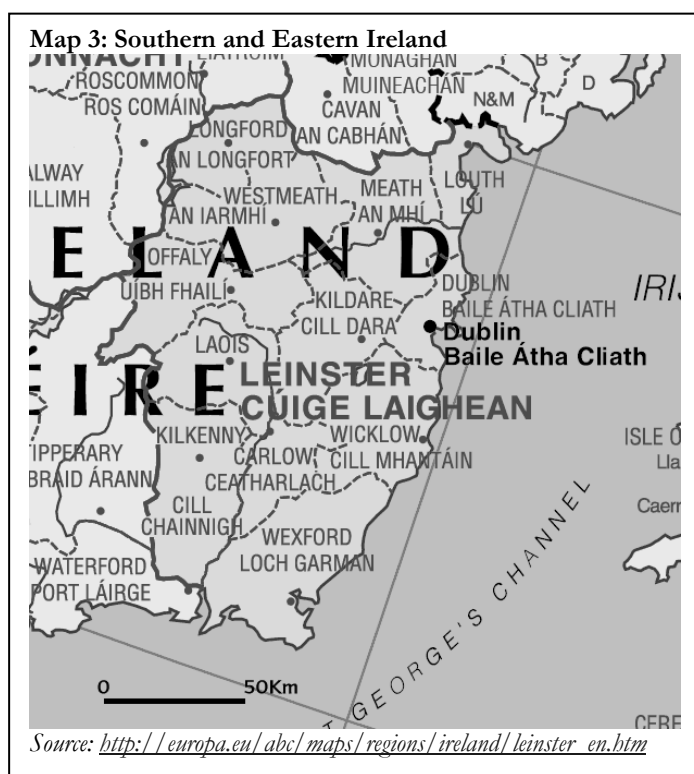
The Finnish Funding Agency for Technology and Innovation (Tekes) has been the driving force behind the funding of technology-driven firms throughout Finland. Since the early 1980s, technology has been the main focus for economic development. Nokia is a commonly cited anchor firm for many businesses not only within Helsinki, but also throughout the whole of Finland.

3.1.3. Regional institutions for employment, skills and environment

The regional plan under Finnish law is drafted and implemented by the regional councils. Culminatum Ltd. was founded as a RDA in 1995 to implement the Centre of Expertise Programme in the Uusimaa region. Besides, Culminatum Ltd. administers also regional development projects and programmes as well as international projects aimed at improving the innovation environment. The firm is owned on a triple-helix basis by the public sector (Uusimaa Regional Council and major cities), the science sector (universities, research institutes and polytechnics) and the business sector (firms, science parks, chamber of commerce, foundations and financiers). This ownership structure provides Culminatum Ltd. with a strong regional mandate. The demand of industries in the region for various skills is backed by the presence of a big university. Moreover, several big research centres of Finland are also located here.

3.2. Dublin (Ireland)

Dublin, the capital city of Ireland and part of southern and eastern Ireland, has been growing at a fast pace. Termed the Celtic tiger, Ireland, one of the fastest-growing economies in the EU, transformed itself in the past 15 years from a traditionally agricultural economy into a high-technology and internationally-traded services economy. Policies for the development of the Irish economy have centred on attracting foreign investment and increasing trade, particularly by lowering the corporate tax rate (a cut



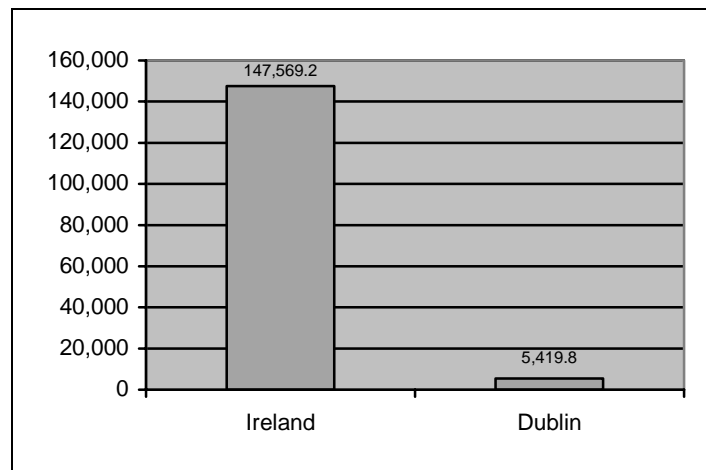
from 40 per cent in 1993 to 12.5 per cent in 2006), upgrading skills, educating the labour force and encouraging science, technology and innovation activities.

Starting in the 1970s, Ireland promoted multinational enterprises (MNEs) selectively. From the mid-1980s, it has been developing strong industrial clusters based on MNE investments in key high-technology sectors. MNEs account for some 50 per cent of manufacturing employment and have been at the centre of spatial and sectoral restructuring of the Irish manufacturing sector over the past 20 years. The industry also plays a big role in the innovation system, providing nearly two thirds of R&D in Ireland.

3.2.1. Economic and R&D indicators

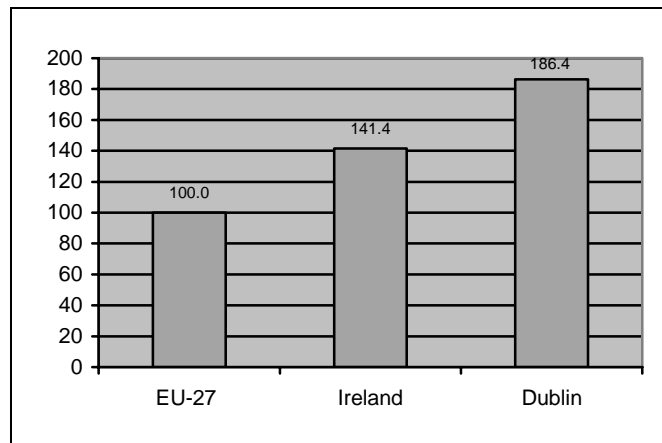
The Dublin region has been growing at over 8 per cent per annum during the past decade to 2006. Figures 9-13 show Dublin's economic position in the Irish economy as well as in the EU.

Figure 9. GDP in current prices, 2004 (Millions of euros)



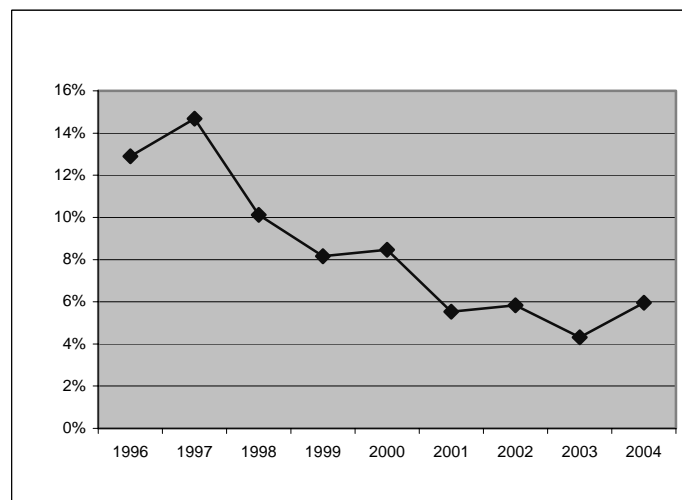
Source: Eurostat, Regional database.

Figure 10. GDP per capita (PPS)



Source: Eurostat, Regional database

Figure 11. GDP per capita growth rates, 1996-2004 (Percentage)



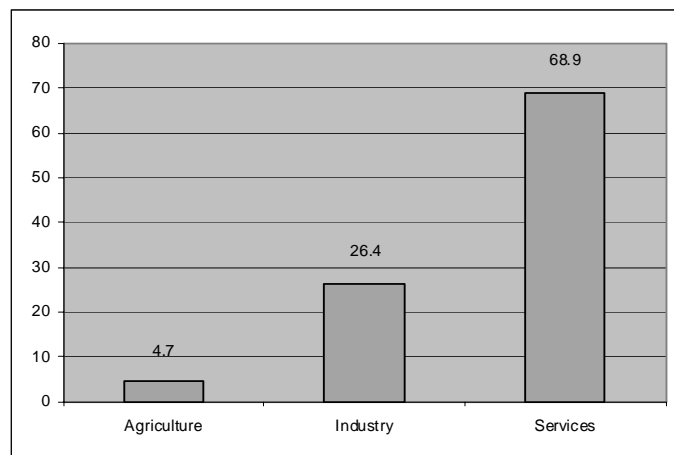
Source: Eurostat, Regional database.

The Dublin economy is characterized by large differences in high-level services along with manufacturing activities mainly concentrated in and around Dublin. Services are the most important activity in the region.

However, the economic structure of the Dublin region continues to change, breaking away from traditional manufacturing towards one where services and high-technology manufacturing are of primary importance. The decline of traditional industries will inevitably continue as Ireland in general, and Dublin in particular, struggles to compete with lower-cost production locations around the world.

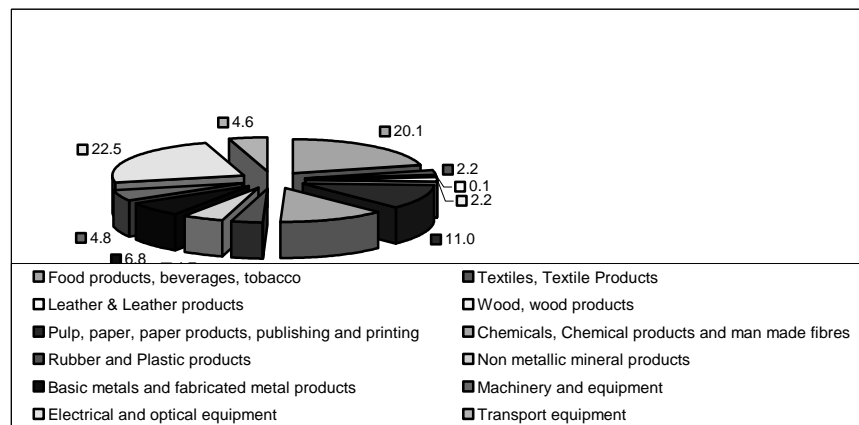
In the manufacturing sector, the major sub-sectors are pulp and paper, printing and publishing; chemicals, chemical products and man-made fibres; electrical and optical equipment; food, beverages and tobacco.

Figure 12. Share of employment in total employment southern and eastern Ireland, 2005 (Percentage)



Source: 4th cohesion report on economic and social cohesion, EC.

Figure 13. Share of manufacturing employment southern and eastern Ireland, 2004 (Percentage)

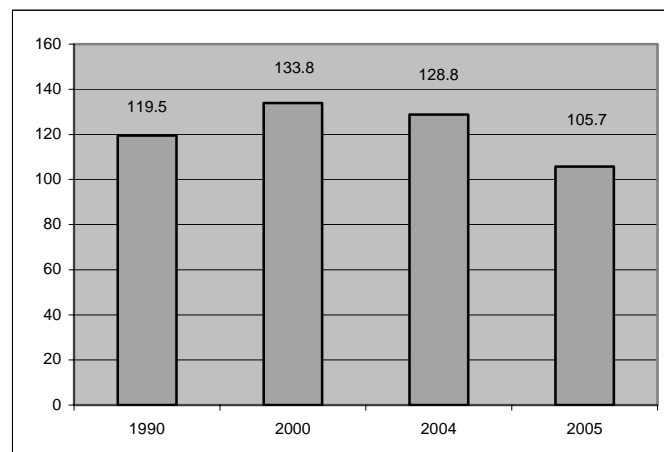


Source: Eurostat.

The Regional Planning Guidelines for the Greater Dublin area identified four sectors as offering the best potential to contribute to the future development of the Dublin region. These are Life Sciences, International Services (including financial services and e-commerce), ICT/software development and e-learning/digital media. Establishing high-quality, third-level educational institutions in the region will therefore assist in maintaining and improving the skills (social capital) required for the above sectors. During the establishment of these institutions, emphasis should be laid on their greater integration with the region's enterprise sector. The Regional Planning Guidelines stress the need for the Dublin region to strive to eliminate ongoing educational disadvantages, including early school dropouts. A culture of early and lifelong education, including training and skills upgrading, needs to be developed.

Ireland's remarkable success is owed largely to FDI where inward stocks, as a percentage of GDP, stood at 105.7 per cent in 2005 (figure 14).

Figure 14. FDI stocks as a percentage of GDP, Ireland (Selected years)



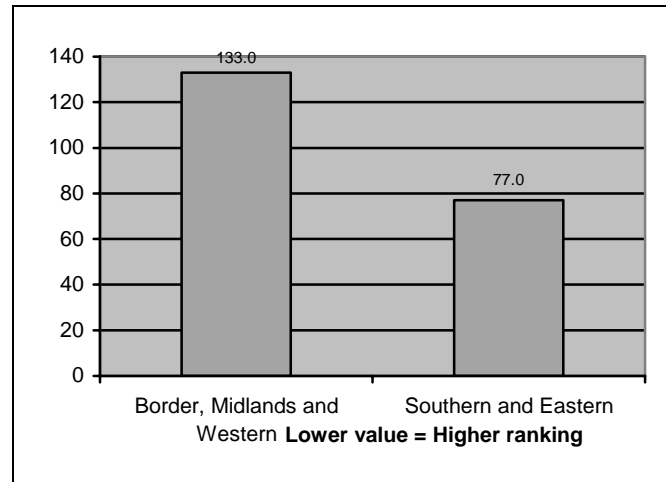
Source: UNCTAD, *World Investment Report*, 2006.

However, with globalization, manufacturing activities continue to change, with some elements migrating to low-cost locations, leaving Ireland to compete for more advanced and complex manufacturing. According to economic development plans, such advanced manufacturing demands high levels of productivity to compete against low-cost locations. The presence of highly-skilled labour, supporting infrastructure and business services tend to draw investors towards cities.

R&D is also becoming an important strategic priority, not just within existing enterprises, but also as a sector in its own right and one capable of significantly increasing its share of employment. The Dublin region will need to spearhead this new focus on R&D-based

employment. This will require new high-technology centres of excellence and facilities for R&D, such as applied research institutions and science and enterprise parks.

Figure 15. EIS ranking of the southern and eastern regions in Ireland, 2006



Source: European Innovation Scoreboard.

The major firms located in the Dublin region are related to financial services, biopharma, internationally-traded services and ICT sectors. R&D-related infrastructure includes five universities and four institutes of technology as well as several business and technology parks.

3.2.2. Cluster and regional innovation policies

The main policy document at the national level is the National Development Plan (NDP). The latest plan under implementation is the 2007-2013 Plan. The €184 billion NDP 2007-2013, launched in January 2007, and entitled Transforming Ireland - A Better Quality of Life for All, builds on the significant social and economic achievements of the NDP/CSF (2000-2006).

The focus of the central government policy is to facilitate and support the development of a framework within which each region enhances its competitive advantage and realizes the full economic and social potential. To achieve this, the Government made a commitment whereby a strategy for each region will include:

- The national spatial strategy, published in 2002, embracing all eight regions of Ireland
- Economic strategies and Regional Planning Guidelines (RPG) for the eight regional authorities
- Establishment of new regional assemblies within the context of the NDP (2000-2006)

- Increased focus by the Industrial Development Agency (IDA) Ireland and Enterprise Ireland on regionally-based initiatives to create a ‘dynamic’ within the regions to support high value sectors, such as ICT, biopharma and medical devices; and
- National plan for transport infrastructure--Transport 21.

Forfás, Ireland’s national board, is responsible for providing policy advice to the Government on enterprise, trade, science, technology and innovation. The functions of Forfás include: industrial policy development and coordination of State bodies, such as IDA Ireland and Enterprise Ireland; the promotion of scientific research and innovation in close association with the Science Foundation Ireland and the Advisory Council on Science, Technology and Innovation; and research, analysis and policy advice on competitiveness and economic development, through the National Competitiveness Council and the Expert Group on Future Skills Needs.

Eight regional authorities were set up in 1994 to:

- Promote coordination, cooperation and joint action between public services and local authorities
- Prepare regional planning guidelines
- Review overall needs and development requirements of the region
- Review development plans of the local authorities
- Monitor spending and progress of the NDP and EU funds

3.2.3. Regional institutions for employment, skills and environment

Within this overall brief, the Minister for Enterprise, Trade and Employment established an expert group on future skills’ needs to act as the central national resource on skills and labour supply for the enterprise sector and devise an overall strategy for enterprise training in Ireland.

The priority areas of work include:

- Identifying emerging needs for policy on structural changes
- Reviewing the effectiveness and value of operational programmes and delivery systems in place to meet national skills needs
- Staying committed to progressively promote lifelong learning
- Capitalizing on instructive developments internationally

Ireland has witnessed an increase in investments in several key sectors, such as biopharma, medical devices, ICT, international-trade services. Six key sectors were identified for future growth based on their past investments in the following areas, as well as their performance:

- Internationally-traded business services
- Pharmaceutical/biotechnology
- ICT hardware
- ICT software
- Medical devices
- Engineering

A baseline analysis of the availability and shortages of skills was undertaken via many studies.

Dublin developed a regional employment strategy as part of this wider project. The framework resulted from inter-agency collaboration at the regional level, represented by the Dublin Regional Authority in association with the Dublin Employment Pact. Such an employment strategy is intended to promote skills upgrading of the labour force and ensure equal access to employment opportunities by all, including groups that maybe excluded from the labour market so far, due to missing skills.

As Krugman (1997) pointed out, the Irish economy has benefited significantly from the process of clustering. However, the enterprise-centred approach, adopted some 25 years ago, together with managing the process of rapid cluster-building by policymakers, was equally beneficial. For example, policy has focused strongly on addressing skills needs (including specialized skills) and ensuring a good human resource environment for incoming investors. The education and training policy was also coordinated to ensure that the supply of skilled labour meets the needs of the sector, and that labour costs remain competitive.²⁵ The State agency involved in MNE promotion--Irish Development Agency--helps new entrants to recruit a good mix of new and experienced staff, to ensure that existing enterprises are not at risk of losing their key players to new arrivals.

²⁵ Buckley and Ruane (2006) Foreign direct investment in Ireland: Policy implications for emerging economies, Discussion paper, No.113, Institute for International Integration Studies, Trinity College, Dublin, Ireland.

3.3. Munich (Germany)

Munich is the capital of Bavaria. It is the largest city in Bavaria and the third largest in Germany. It is one of the most innovative regions in the EU²⁶ and ranks third on the regional EIS, 2006. The Munich region is one of the world's most interesting high-technology locations alongside Silicon Valley, Boston, Tel Aviv, and Austin, Texas. An agricultural state until the last century, Munich has since transformed itself into a high-technology centre.



Munich, with a population of 2.4 million people, is also one of the biggest economic centres contributing 30 per cent of Bavaria's GDP, 50 per cent of Bavaria's exports and 25 per cent employment. The economy of Bavaria is currently flourishing, mainly due to the large number of SMEs in the region that are very innovative and keen on expansion and internationalization. The region has already met the Lisbon criteria in terms of expenditure in R&D; it spends 3 per cent of its GDP on R&D activities.

3.3.1. Economic and R&D indicators

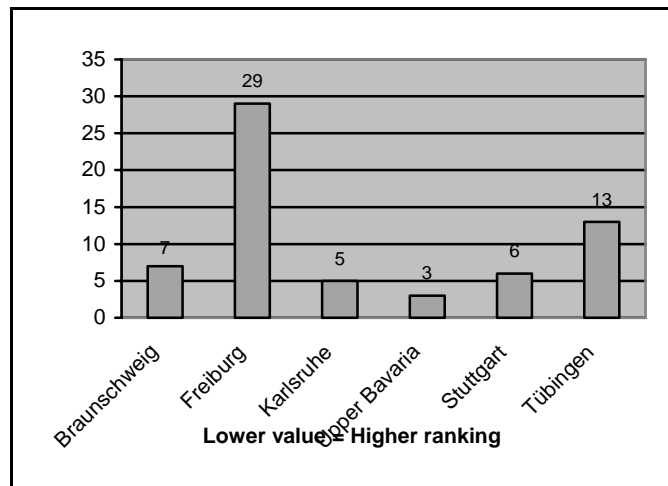
Munich²⁷ has one of the lowest unemployment rates in Bavaria as well as in Germany. It is termed the 'job motor' in southern Bavaria, with the highest employment (68,000 working places) in the R&D sector. Automotive production accounts for 23 per cent of the administrative district's employment, 19.8 per cent of electrical manufacturing, 12.2 per cent of mechanical engineering and 10.4 per cent of chemicals. Upper Bavaria has already reached the Lisbon target of 3 per cent of GDP spent on R&D (4.6 per cent in 2004). Business expenditure on R&D, as a percentage of GDP, is also high at 3.7 per cent. Upper Bavaria is the most innovative region in Germany and ranks third in the EU (EIS, 2006).²⁸

²⁶ Upper Bavaria ranks third, according to the Regional EIS.

²⁷ Although different terms are used to describe the economic space, it is to be understood that Munich is the gravitational centre of this economic space. This also implicitly accounts for the linkages within this economic space.

²⁸ European Commission, Inno Metrics, Pro Inno Europe, 2006, European Innovation Scoreboard 2006, Comparative Analysis of Innovation Performance, European Commission

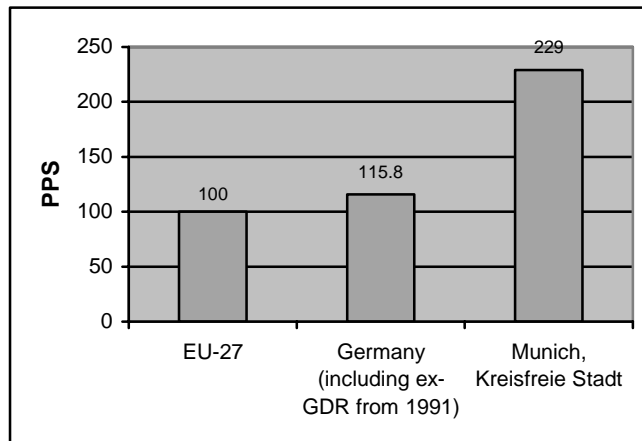
Figure 16. EIS ranking of selected regions in Germany, 2006



Source: European Innovation Scoreboard, 2006.

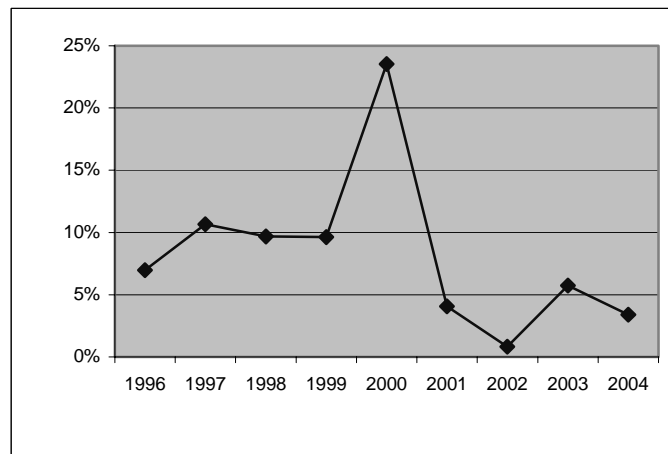
Figures 17 and 18 show Munich's economic position in the EU.

Figure 17. Munich's GDP per capita in comparison with Germany and the EU



Source: Eurostat.

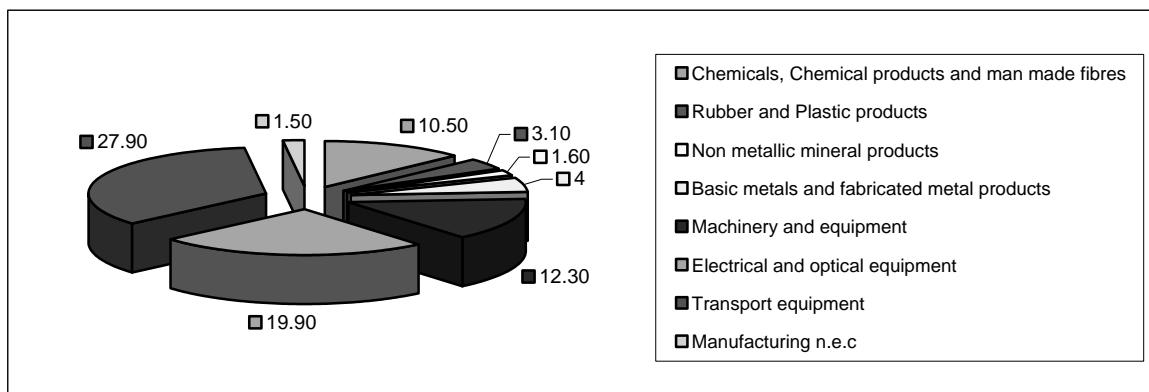
Figure 18. GDP growth, Munich, 1996-2004 (Percentage)



Source: Eurostat.

Figure 19 reveals the employment statistics for the Upper Bavaria (NUTS2) region as a percentage of total manufacturing employment.

Figure 19. Share of manufacturing employment, Upper Bavaria, 2004 (Percentage)



Source: Eurostat.

Bavaria's competitive position in Germany is highlighted by the following figures.²⁹

- Some 29 per cent are employed by the German computer manufacturing industry
- Some 36 per cent are employed in the German manufacture of electronic components
- Some 28 per cent are engaged in German television and communication technology
- Some 31 per cent of all software firms in Germany are located in Bavaria. Due to the high growth rate, many global players opt to open their German or European Headquarters in Bavaria, most of them in Munich (for example, 3Com Adobe, Apple, British Telecom, Cisco Systems, General Electric, HP/Compaq etc.)
- Some 40 per cent of all software houses in Germany as well as more than 20 per cent of all Internet service providers are located in Bavaria.

3.3.2. Cluster and regional innovation policies

Bavaria is home to top firms like Siemens, BMW, Allianz and Amazon. In Bavaria, cluster initiatives for 19 clusters have been established. These are divided into three modules: high-technology (aerospace, biotechnologies, ICT, environmental technologies), production (automotive, chemicals, food processing), and media, logistics, and cross-disciplinary technologies (nanotechnology, mechatronics and automation).

²⁹ Invest-in Bavaria <http://www.invest-in-bavaria.de/home/>

Munich is an important centre for higher education. Some 80,000 students are enrolled in the city's four universities. Famous research societies, such as the Max Planck Society and the Fraunhofer Society, have their head offices in Munich. In addition, 19 applied science universities, 11 Max-Planck-Institutes, 7 institutes of the Fraunhofer-Society, as well as large-scale research institutions, such as the German Aeronautics and Aerospace Center and the National Research Center for Environment and Health are located in Bavaria. Training programmes of various well-known media schools in Munich, such as the Academy for Television and Film, both universities, the German Journalistic School, the Academy of Bavarian Press and the Academy of Bavarian PR and Advertisement and many more, are coordinated by MedienCampus Bayern e.V.

It also boasts the presence of innovation support services, such as incubators, of which there are 30, and centres for founders and technology that help young high-technology firms to start a business.³⁰ Moreover, there are several agencies, such as Bayern Innovativ GmbH, Bayern Kapital GmbH, and Bayern International GmbH, that promote clusters and their development. They ensure the availability of funds and explore their networking potential.

3.3.3 Regional institutions for employment, skills and environment

In Upper Bavaria, RDAs work towards increasing the skill set of the region to match the needs of emerging industries. Furthermore, environmental considerations are foremost on the agenda and, apart from being a dynamic location, Munich has retained its top position as a tourist attraction. Several policies are in place to ensure sustainable development of the city.

³⁰ Mandel, L., (2004), Innovation Champion's Network: The Munich Cluster Description, Software Offensive Bayern, 2004.

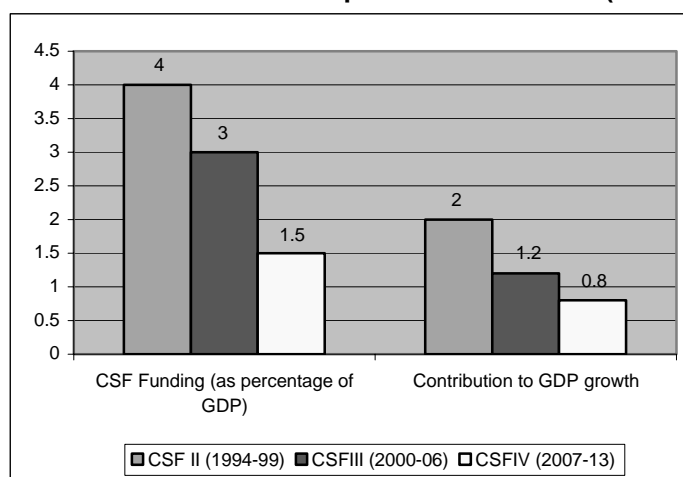
3.4. Attiki (Greece)

Attiki, which includes the country's capital region Athens, is located in the eastern part of Greece. Greece itself is a small country with a relatively small industrial base of approximately 23 per cent in 2006 (manufacturing 12.9 per cent and construction 9 per cent). Most industries are concentrated in Athens and Thessaloniki.³¹ The average share of the agricultural sector, at 6.6 per cent of GDP in 2004, exceeded that of the EU (2.2 per cent). Services accounted for the giant share, 74.4 per cent.



The reason for high growth in the past decade in this area was investments. Greece, a country with a GDP per capita growth 75 per cent below that of the EU average, was eligible for the ECSF aimed at providing development funding.

Figure 20. Contribution of European CSF to Greece (Percentage)



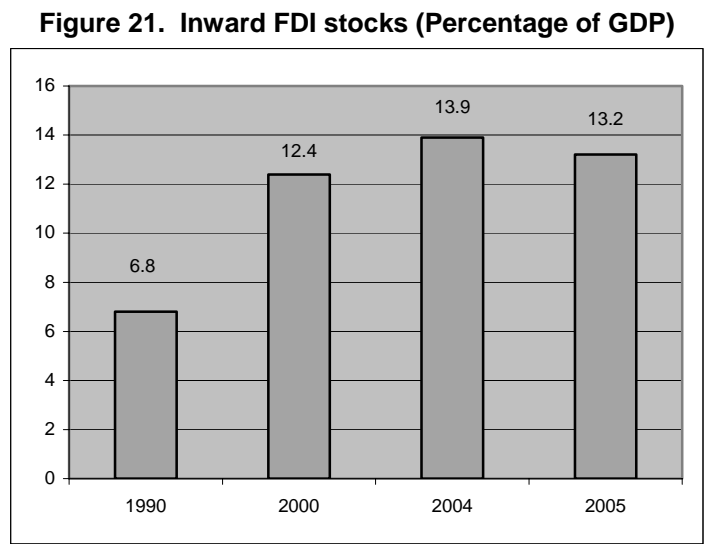
Source: EIU Country Profile, Greece, 2006.

Under CSF II (1994-1999) the transfers were equivalent to between 3.5 per cent and 4 per cent of GDP per year and contributed 1-2 percentage points to the rate of growth; under CSF III

³¹ EIU Country Profile, Greece, 2006.

(2000-2006) the transfers were estimated at an average of 3 per cent of GDP per year, contributing between 0.7 and 1.2 percentage points. Under CSF IV (2007-2013), Greece has been allocated some €20 billion in aid from regional, social and cohesion funds. This means that transfers could be reduced further to between 1.2 per cent and 1.5 per cent of GDP, and will contribute between 0.6 and 0.8 percentage points to the annual rate of growth.

One of the biggest contributors to GDP growth in the Attiki region was the Olympics that were held in Athens in 2004. Prior to that event, Athens witnessed extremely high investments in infrastructure and construction, such as hotels. However, in 2005, FDI in Greece was fairly low at 13.2 per cent of GDP, as opposed to the EU average of 31.7 per cent [UNCTAD, 2005].



Source: UNCTAD, *World Investment Report*, 2006.

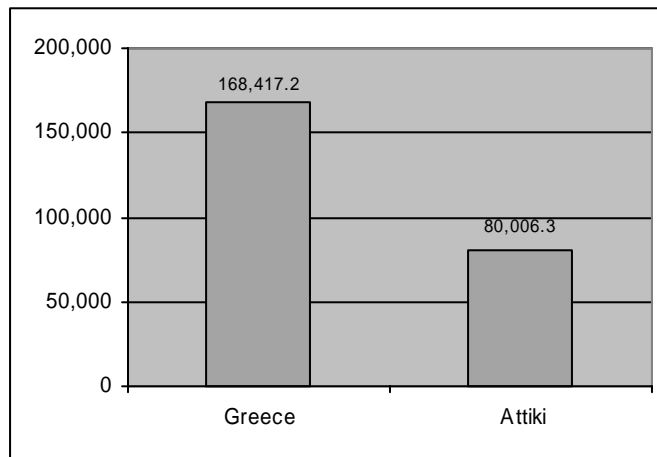
3.4.1. Economic and R&D indicators

The top 20 firms in Greece include those in cement and aluminium, olive oil, brewing and tobacco and also those engaged in refining and telecommunications.³² Thus the most profitable sectors are consumer or intermediate goods. Industries that were important in the past, namely, clothing and footwear, have declined in recent years because of competition from low-wage countries in Asia and Eastern Europe. However, large firms have shifted their focus towards providing higher value-added garments in order to restore profitability. Besides, many Greek firms in the clothing sector now subcontract their labour-intensive processes to the Balkan countries.

³² EIU Country Profile, Greece, 2006.

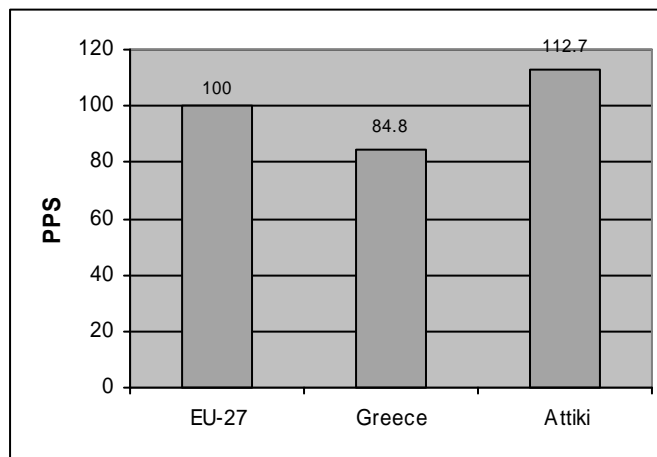
According to the report on the Greek Economy (2007) by the Foundation for Economic and Industrial Research, major structural weaknesses were detected in the country's labour market and education system. It is therefore important to restructure the education system at all levels, and transform the system into one that provides students with the required skills and knowledge to enable them to stay abreast with advances in technological innovation and take full advantage of the benefits of reform.

Figure 22. GDP at current prices, 2004 (Millions of euros)



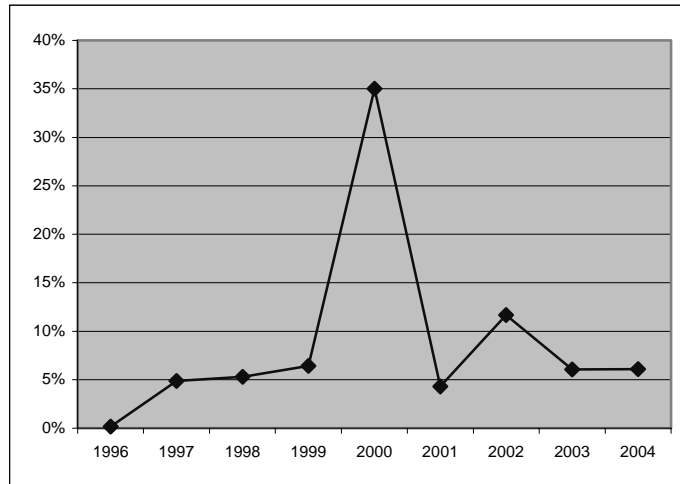
Source: Eurostat.

Figure 23. GDP per capita, 2004 (PPS)



Source: Eurostat.

Figure 24. GDP growth, 1996-2004 (Percentage)

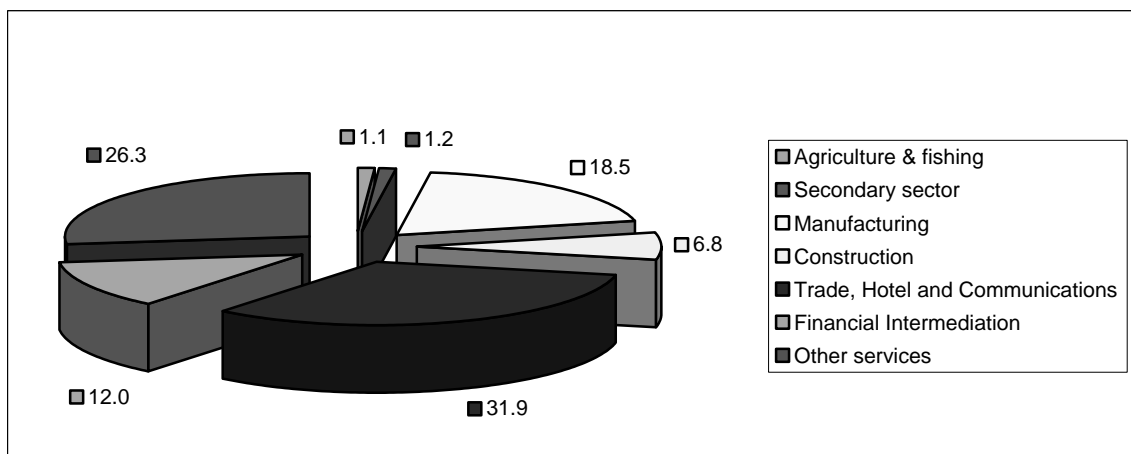


Source: Eurostat.

Attiki, one of the biggest urban agglomerations in Greece, contributes more than one third of the total gross value added of the country. Attiki's increase in GDP can be attributed to the increase in investments through CSF and to the Olympic Games that were held in 2004. The Olympic Games provided Athens with the opportunity to catch up with long overdue investments. Tourism is a major sector in the Attiki region. The Olympic Games necessitated substantial renovation and construction of hotels, supporting an enhancement of tourism.

Unemployment rates have however remained unchanged at around 7.5 per cent over the past few years. Employment in manufacturing totalled 14 per cent, of which only 4 per cent was in high- to medium-high technology manufacturing, while the rest was in low to medium technology manufacturing.

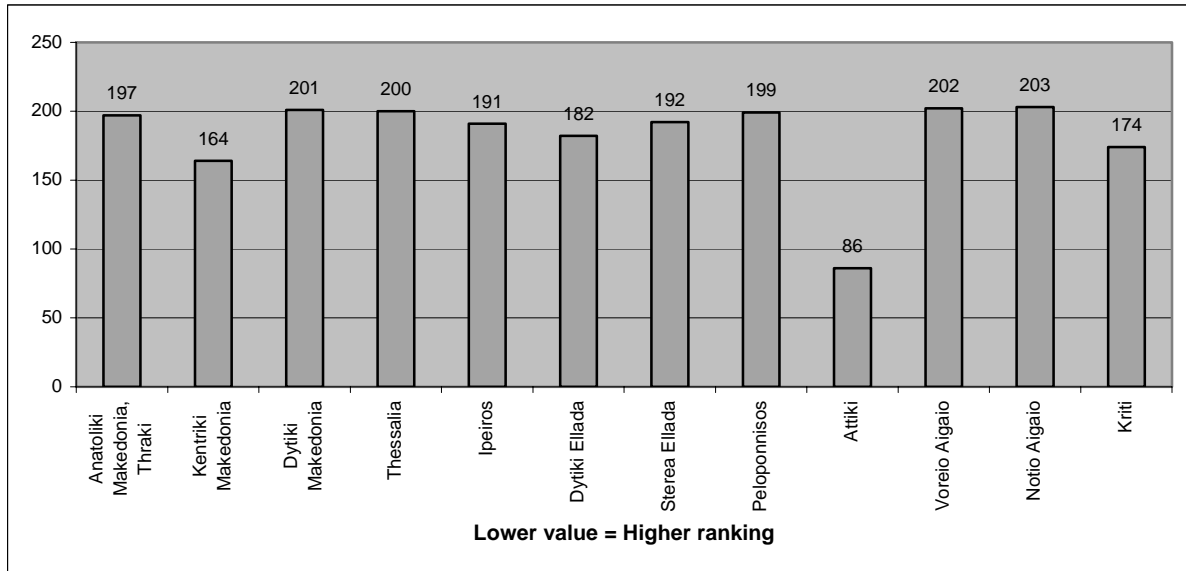
Figure 25. Percentage of total employment, 1995-2003



Source: Eurostat.

Athens possesses one of the lowest indicators, with regard to attractiveness and competitiveness. A few initiatives need to be identified to establish clusters in high-technology industry and research in the Athens region. As far as research and innovation are concerned, the region ranks the highest in Greece, and eighty-sixth (in the EU) according to the EIS 2006.

Figure 26. EIS ranking of regions in Greece



Source: Trendchart, European Innovation Scoreboard.

3.4.2. Cluster and regional innovation policies

The main entity engaged in drawing up and implementing R&D policies in Greece is the General Secretariat for Research and Technology (GSRT), which is a subordinate organ of the Ministry of Development. The GSRT coordinates research projects funded by CSF from the EU. As regards developing policies, the GSRT is backed by the National Council for Research and Technology and other joint bodies (chambers of commerce, Federation of Greek Industries, etc.).

The Ministry of Development is also responsible for issues relating to industry, energy, commerce and tourism. In this context, the Ministry coordinates all research initiatives, in particular, R&D projects funded by the Third CSF 2000-2006, and supervises the research centres engaged in a large share of national R&D efforts. The principal authority for the entire third CSF negotiations is the Ministry of Economy and Finance. However, as far as regional planning is concerned, Attiki is plagued with a multitude of agencies, at central and local levels, that form an intensely fragmented organizational structure.

3.4.3. Regional institutions for employment, skill and environment

Due to insufficient information and data, further analysis could not be undertaken for Attiki.³³

3.5. Almeria (Spain)

Almeria, located in the southern province of Andalucía in Spain, is mainly an agricultural and tourism state. It is one of the smallest cities in Andalucía, with a population of only half a million, and is famous for its greenhouse agriculture.

The region of Andalucía has undergone rapid economic expansion, with average growth rate exceeding that of Spain and the EU in the past

decade. The increase in job creation has also been higher than Spain's average. In addition to agriculture and tourism, the main regional economic sectors in Andalucía are chemicals, auxiliary automotive industry, electronics, telecommunications, aerospace and agro-food.

Andalucía spends a small proportion, some 1 per cent, of its GDP on R&D. Research programmes concentrate on life sciences, astrophysics and agriculture, resulting in weak links with the regional business community. The RIS for Andalucía showed that, in general, innovation support is widespread but lacks sufficient coordination and coherence.

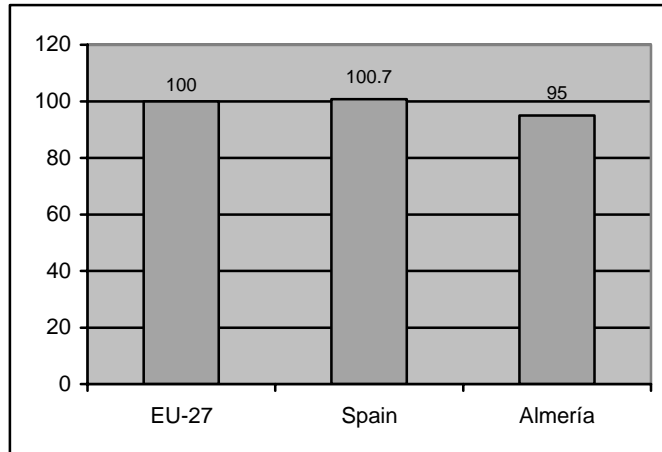
3.5.1. Economic and R&D indicators

Thirty years ago Almeria was one of the more depressed areas in Europe; but following the introduction of greenhouse farming, it has become one of the most progressive regions in Europe today. Its GDP per capita peaked in 2000 and since then it has been growing at an annual rate of between 3 and 4 per cent.



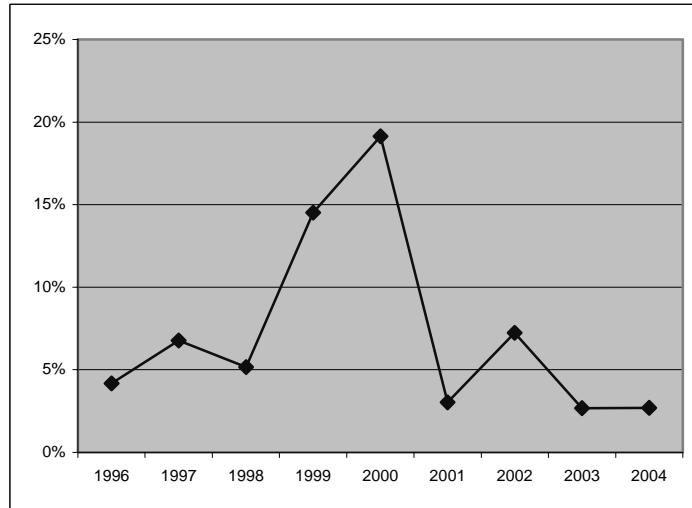
³³ Surprisingly for an area that demonstrates above-average growth with a relatively high score on the EIS (the highest among the Greek regions), general availability of information is deficient. The search made for information revealed sources which are predominantly in Greek (websites, etc.) without mirror sources in other European Languages (English, French). This makes remote analysis of regional institutions for employment, skills and environment difficult.

Figure 27. GDP per capita in comparison with the EU and Spain, 2004



Source: Eurostat.

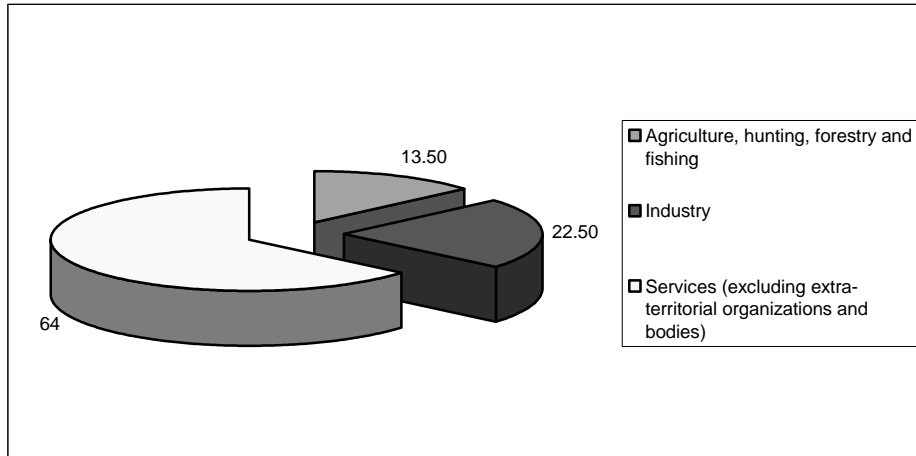
Figure 28. GDP growth, 1996-2004 (Percentage)



Source: Eurostat.

The province has one of the biggest concentrations of greenhouse farming in the world and has experienced spectacular growth during recent years as a result of manufacturing-related industry. However, the value added of industry, including construction, is as low as 22.5 per cent.

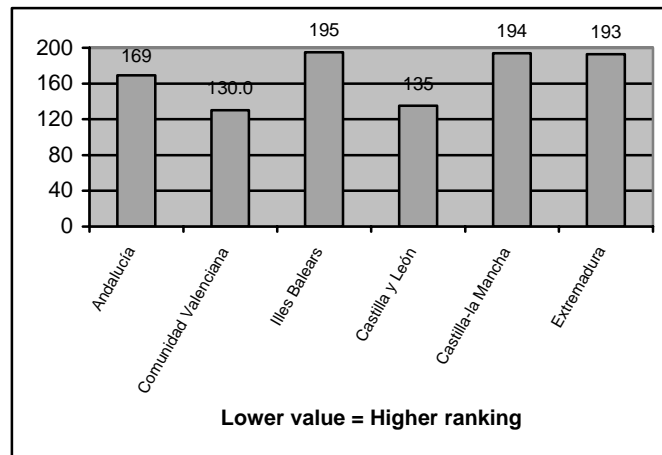
Figure 29. Contribution of economic sectors to gross value added Almeria, 2004 (Percentage)



Source: Eurostat.

Almeria ranks relatively low on the EIS.

Figure 30. EIS ranking of selected regions in Spain, 2006



Source: Trendchart, European Innovation Scoreboard.

3.5.2. Cluster and regional innovation policies

Andalucía is a region in southern Europe, with a high degree of self-government. The regional government prepared its own regional economic plan. Like the national plan, it identified generic ‘axes’ for development: (i) competitiveness and the production network; (ii) knowledge and telecommunication; (iii) environment and natural resources; (iv) human resources and employability; (v) urban and local development; (vi) transport and energy networks; (vii) agriculture and rural development; (viii) fishing and aquaculture; (ix) tourism; and (x) construction of collective infrastructure (for example, public toilets and social service

centres). The regional economic plan was accompanied by an integrated operating programme, which (like the national plan) included a breakdown of proposed spending for each axis.

The regional government also designed its own R&D policies that complement those implemented throughout Spain and the EU and passed the Third Andalucían Research Plan 2000-2003, an R&D planning instrument that, as was customary in previous plans, attributes considerable budgetary weight to the scientific aspects of the science-technology-industry system (Andalucía allocates more of its own resources than any other region in Spain for promoting research).

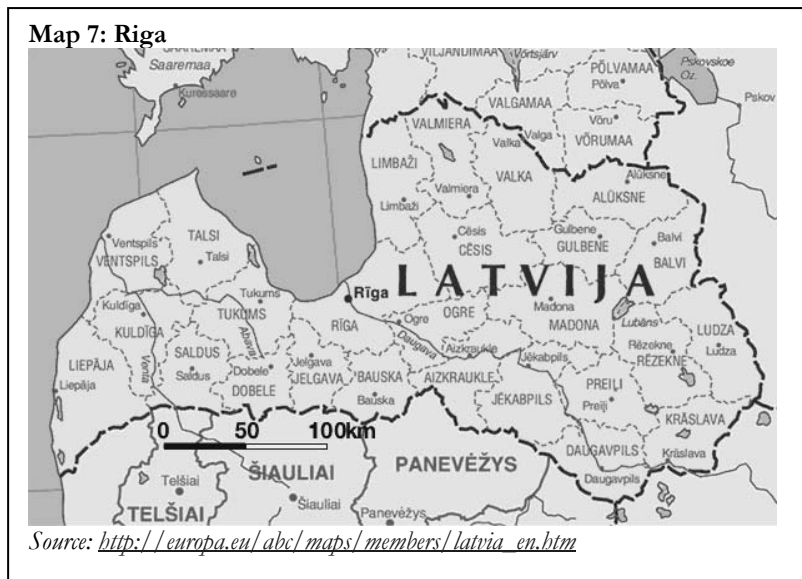
One of the main objectives of the Regional Ministry for Employment (*Andalusian Regional Government*) is the development of activities encouraging employment and the promotion of the productive sectors. In this context, the Regional Ministry for Employment created the Andalusian Foundation Training and Employment Fund as a regional scope organization, whose high-priority objective is to increase the impulse of the productive sector. To fulfil this objective, it developed promotion activities in the local industrial strategic sectors, by means of professional qualifications of human resources, development of employment promotion programmes and technical assistance to firms.

3.5.3. Regional institutions for employment, skills and environment

The main role of the Andalucía RDA, Instituto de Fomento de Andalucía (IFA), which is linked to the regional government, is cluster development in all its regions. The IFA, in its efforts to promote cluster development, has been shifting its funding focus. Its traditional role of providing capital grants to investment projects of individual firms is shifting to that of providing grants in the framework of business systems (clusters) identified by the IFA. In line with the cluster development approach, the IFA is increasing its role through more value-added public interventions, interface programming, institutional networking and or private/public complicity functions.

3.6. Riga (Latvia)

Riga, the capital city of Latvia, was one of the fastest growing regions among the new EU member States. It has a GDP per capita growth rate of 7 per cent. Situated between its Baltic neighbours, Latvia has been experiencing rapid economic growth since 2000, supported by one of the highest



productivity growth rates in the EU. However, GDP per capita, at 43 per cent of the EU average in 2004, remains the lowest in the EU. Unemployment was high and has only recently fallen below 10 per cent. Like its neighbours, a low cost base attracted much of the early FDI that helped boost economic growth.³⁴ Increase in investments in the region was because corporate taxes in the country stood at 15 per cent.

The Latvian National Reform Programme identifies five main economic policy directions: securing macro-economic stability, stimulating knowledge and innovation, developing a favourable and attractive environment for investment and work, fostering employment, and improving education and skills.³⁵ The focus of the Latvian economy is to shift more towards knowledge-intensive sectors. Accordingly, the Latvian National Reform Programme has laid the foundation with clear ambitions to raise R&D expenditure and create the framework for a coherent innovation system. On the employment side, the programme seeks to reduce regional disparities and match skills with labour market requirements by increasing the provision of education in engineering, sciences and vocational training.

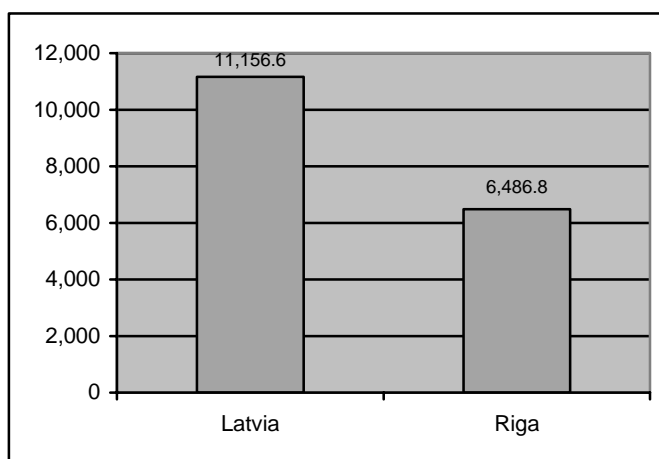
³⁴ European Economy News, Directorate of Economic and Financial Affairs
http://ec.europa.eu/economy_finance/een/002/article_4073_en.htm

³⁵ European Commission, 2006, Commission Analyses National Reform Programme, MEMO/06/40, 25th January 2006, Brussels.

3.6.1. Economic and R&D indicators

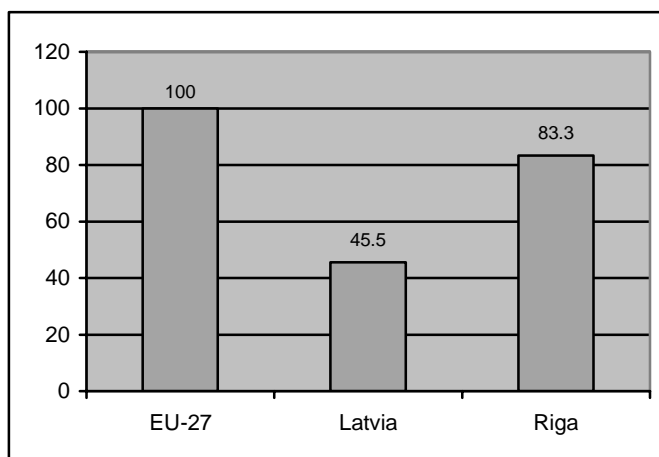
Riga, and the surrounding region, is the most populous and prosperous area in Latvia. In 2004, the Riga region produced some 60 per cent of Latvia's total GDP.³⁶ Riga's economic position in Latvia and the EU is reflected in figures 31-33.

Figure 31. GDP at current prices, 2004 (Millions of euros)



Source: Eurostat.

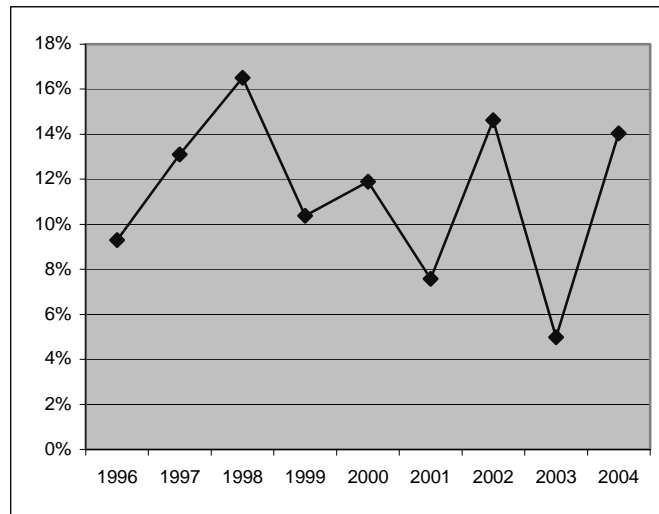
Figure 32. GDP per capita, 2004 (PPS)



Source: Eurostat.

³⁶ EIU Country Report Latvia, 2006.

Figure 33. GDP per capita growth rates, 1995-2004 (Percentage)

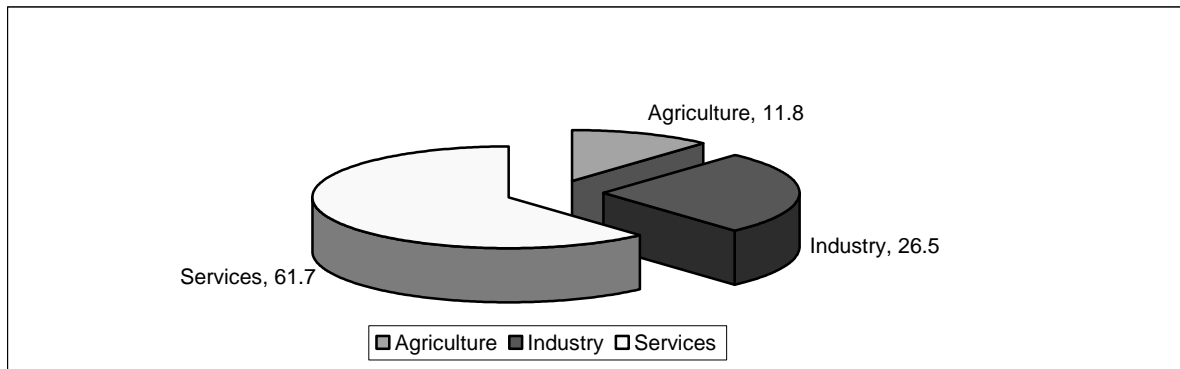


Source: Eurostat.

Latvia's industrial base, which previously provided most of the former Union of Soviet Socialist Republics with telephones, radios, minibuses and other equipment, did not keep abreast with international competition following trade liberalization in the early 1990s. Restructuring in the 1990s enabled the Latvian industry to regain competitiveness in some niche markets, but the bulk of Latvia's industrial production was concentrated on wood and wood products and food processing. The main market for this production is the EU15 countries. In recent years, growth of the wood and wood products industry has been much slower than overall industrial production, and its export share in Latvia has plummeted.³⁷ Manufacturing accounts for 26.5 per cent of GDP. The services sector has boomed since independence, growing from 33 per cent of GDP in 1991 to some 74 per cent by 2006. Commercial services and financial intermediation continue to reveal the highest growth potential.

³⁷ EIU Country Report Latvia, 2006.

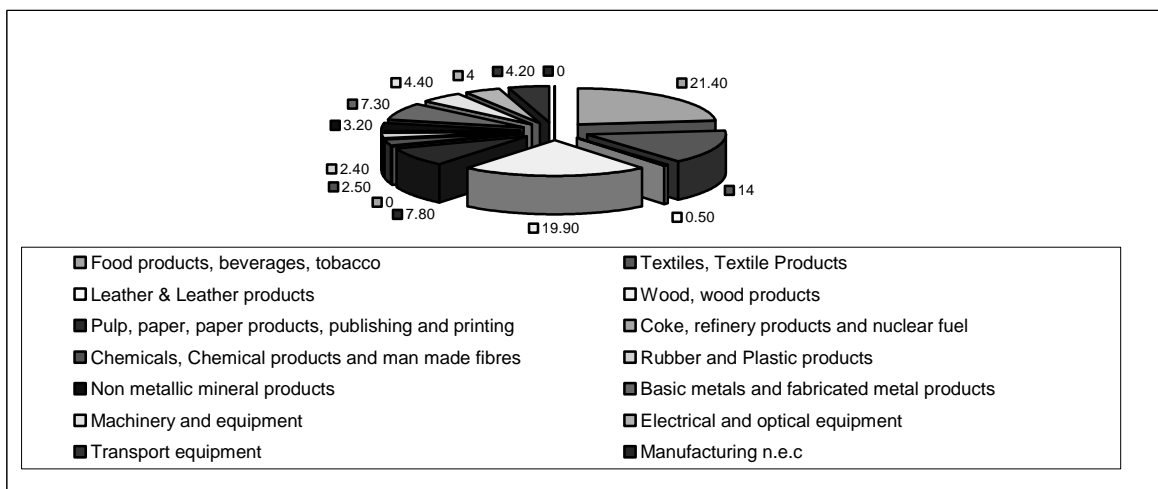
Figure 34. Employment by sector, percentage of total employment, 2005 (Percentage)



Source: Fourth report on Economic and Social Cohesion, EC, Brussels, 2005.

In the manufacturing sector, the main contributors are food processing, wood and wood products and paper and publishing.

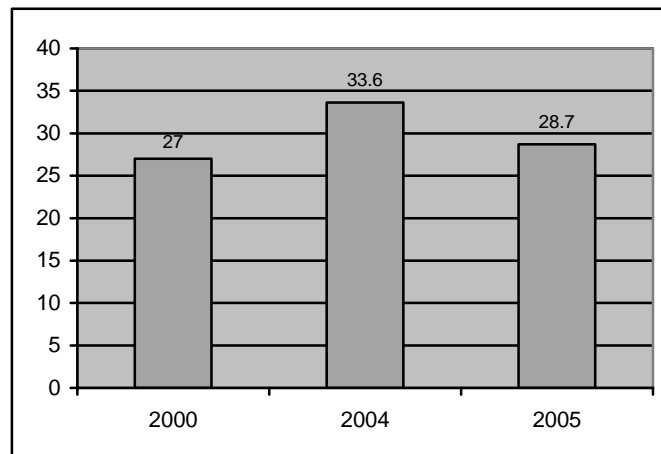
Figure 35. Share of manufacturing employment, 2004 (Percentage)



Source: Eurostat.

Trade, as a proportion of GDP, fell with the collapse of traditional markets during the Russian crisis of 1998, but has since recovered. In 2005, inward stocks of FDI stood at 20.7 per cent as a percentage of GDP.

Figure 36. FDI stocks as a percentage of GDP, selected years (Percentage)



Source: UNCTAD World Investment Report, 2006.

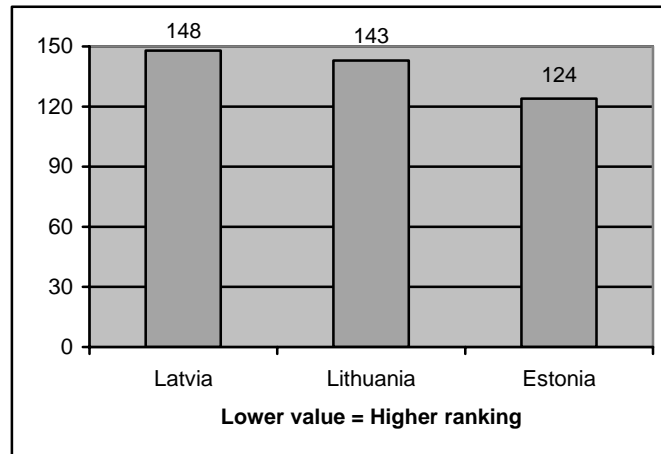
3.6.2. Cluster and regional innovation policies

The 2005-2008 National Reform Programme (NRP) for the country was prepared by all EU member States. According to the Latvian programme, one of the major aims is to ensure continued growth also in the future, and the transition from a labour-intensive economy to a knowledge-based economy. Latvian business activities at present are characterized by production based on low value-added output, with a very small share of high technology. One of the most prominent problems is the incompatibility of education and skills with labour market requirements, as well as marked regional disparities.

To overcome the deficit between the economic structure and education and skills, the NRP delineated the following tasks to be undertaken during the period 2005-2008:

- Strengthen cooperation between public administration institutions, education establishments and employers in order to maintain a balance between the education system and the needs of the labour market;
- Raise cost efficiency at all levels and forms of education;
- Improve the availability of education at all levels;
- Raise the overall level of technological skills and knowledge of natural sciences; and
- Improve the professional orientation system and ensure the availability of professional orientation services for the entire population in the context of lifelong learning.

Figure 37. Innovation (EIS) ranking of the Baltic countries in the EU, 2006



Source: Trendchart, European Innovation Scoreboard.

Currently, Latvia is rated as one of the least innovative countries in the Baltic region. To improve R&D and make Latvia more innovative, a series of measures have been planned. These include an increase in R&D expenditure from the present 0.38 per cent to 1.1 per cent of GDP by 2008. In 2007, a technology agency was established to encourage private sector investment in applied research, promote transfer of technologies and ensure the efficient introduction of research results into production.

As far as industry is concerned, at present the highest growth rates are observed in the timber industry, machine building and metalwork production. However, as productivity levels are still below EU levels, and considering the high proportion of low-technology sectors in the manufacturing sector, the aim is to introduce a series of measures between 2005 and 2008 to strengthen the competitiveness of the industrial base. These measures include:

- Undertaking sectoral studies to identify competitiveness factors in industrial sectors and existing problems; and
- Promoting the development of clusters in order to increase the competitiveness and productivity of enterprises and promote their mutual cooperation and collaboration with educational, scientific, research and other related institutions.

The RIS for Latvia was developed between 2002 and 2004 and aimed at improving competitiveness by stimulating the creation of a high number of knowledge-based SMEs and

their capacity to adapt to new technologies. Special attention was paid to interdisciplinary technology transfer, the growth of traditional industries and the development of networks and clusters.

3.6.3 Regional institutions for employment, skills and environment

The Riga RDA was set up in 2005. The key objectives are to enforce regional development and investment policies set out by the regional planning council, promote business development, attract international and local funding, and promote cooperation between private and public sector.

4. Lessons for developing countries

The dimensions and elements of the industrial policies that underpin the dynamism and widening location differentials in the case study regions are different. The regions selected for

this case study were drawn from widely varying geographical areas, with equally diverse elements of industrial policy underlying the dynamism prevalent within them.

The Irish capital, Dublin, lowered its corporate taxes in conjunction with high FDI due to a concerted effort to attract investment. This, together with European CSF, led to dynamic growth. Uusimaa and Munich are the two high-technology clusters of Europe with a strong university base. Furthermore, they are also home to large European corporations, like Nokia in Uusimaa, and Siemens, BMW and a diverse set of ICT firms in Munich. In addition to being a major tourist attraction, Almeria in southern Spain has been a pioneer in greenhouse agricultural production. Attiki, a tourist region encompassing the capital city of Athens, is not a major industrial region, but has services as its main economic activity. It received a boost in investments primarily due to two reasons: firstly, after joining the EU, along with Spain, Portugal and Ireland, it became a cohesion country, and received CSF; and secondly, it hosted the Olympic Games in 2004, which led to an increase in investments in physical infrastructure as well as in hotels, etc. Riga, the capital city of Latvia, which is one of the poorest countries in the EU, has a low-technology, low-cost manufacturing base. But recognizing this as a potential drawback to its economy, Latvia is re-directing investments to improve its skill base to more knowledge-intensive sectors of the economy by improving the knowledge infrastructure.

Similarities between factors of dynamism in selected regions	Differences in factors of dynamism in selected regions
<ul style="list-style-type: none"> <input type="checkbox"/> Coherent policies for cluster development <input type="checkbox"/> Regional innovation policies in order to strengthen the Triple-Helix model (link between government–industry–university) <input type="checkbox"/> Unique cluster-based strategies <input type="checkbox"/> Coherent policies to attract FDI 	<ul style="list-style-type: none"> <input type="checkbox"/> Impetus to growth via the European CSF scheme <input type="checkbox"/> Innovation strategies to strengthen the technology base <input type="checkbox"/> Competitive advantage via low cost manufacturing <input type="checkbox"/> Technology as an engine of growth

The lessons one can draw from these case studies for developing countries are that in trying to emulate successful policies, policymakers should keep in mind that:

- a) *Sources of dynamism are different in each region.* Hence, a proper assessment of one’s own strengths and sources of dynamism is extremely important. A helpful tool in this respect is the SWOT (strengths-weaknesses-opportunities-threats) analysis, which can help policymakers identify key sources of dynamism. These sources of dynamism would then be helpful to recognize other regions that possess similar advantages and thus support benchmarking or ‘policy-learning’.

- b) *Sustaining dynamism* requires policymakers to nurture sources of dynamism. Implications for policy action are, as mentioned above, to first identify the competitive strengths of their own region and subsequently, to implement policies for sustaining them. For example, in the case of Munich, ICT is a strong cluster. The Bavarian government is involved in a diverse set of activities via its regional agencies to maintain this cluster. Developing countries should portray the political will which should be reflected in their institutions and strategies. The agenda of regional institutions, such as development agencies, cluster support services etc., should include working with current and potential investors in order to maintain regional dynamism. Regional strategies, such as regional development strategy, regional economic policy, spatial policy, environmental policy etc., play a key role in sustaining dynamism. This entails a two-pronged strategy, first, to develop institutions and the requisite strategies to sustain them, while also promoting competitiveness among them; and second, to develop strategies to sustain the entire process of dynamism. Furthermore, policy action is needed to tap intellectual capital and connect it better to financial capital, as this would expand the competitiveness of the region.

- c) *Unique cluster-based strategies* are imperative, based on an assessment of region-specific structural and cultural characteristics, instead of trying to replicate successful cluster policies. The strategies which dynamic regions have to design with “local lenses filter” as location-specific strategies are very important. An interesting article in the *The*

Economist (13-19 October 2007)³⁸ is how multinationals recruit local engineers and designers in places like Beijing and Bangalore to manufacture products and provide services that cater to the local market by playing close attention to trends, customs and practices at local level.

- d) New *clusters are mostly spin-offs* of existing ones. In Baden-Württemberg, Germany, for example, the multimedia cluster has its roots in the infrastructure and activities of the traditional engineering cluster in the region. Developing countries should bear in mind that spin-offs are positive spillovers from current clusters. For such positive spillovers to take place, it is very essential that the right incentive structures via local laws and by-laws are in place. The incentive structures are reflected in local tax laws, fiscal incentives, grants as well as regional development strategies. The subsidiary function of having incentives and measures in place at regional/local levels is extremely crucial.
- e) The *role of various actors and stakeholders* and, most importantly, that of intermediaries in facilitating the process of innovation through means such as regional agencies, venture capital funds, etc., should not be underestimated. This is seen in the case of Munich, where the government of Bavaria has laid special emphasis on the establishment of initiatives and agencies for each of the clusters and innovation support services. The role of RDAs as facilitators and seekers of investment is important. Governments keen to promote innovation need to monitor market distortions and over-regulation which could delay or discourage potential investments. Thus policy action at both national and regional levels calls for quick and easy access to markets. Intermediaries too have to act economically and efficiently in order to overcome government failures. The development agency has to perform an out-reach function. It should undertake surveys, formulate strategies, and provide information to policy makers at regional and national levels. Furthermore, the role of venture capitalists at the regional level is extremely important, since they act as catalysts for innovation.
- f) The rich texture of regional innovation infrastructure, for example, *universities, R&D facilities and knowledge centres*, is an important precondition for the development of knowledge infrastructure. Knowledge economy is becoming a key pillar of competitive advantage. It is very important for developing countries to establish and maintain organizations and institutions in the knowledge-based sector, such as, *inter alia*, universities, R&D centres (both public and private). Furthermore, links and

³⁸ The Economist, 2007, Can Dinosaurs dance? Responding to the Asian Challenge, The Economist, 13-19 October 2007.

collaborations within the rest of economy, namely, the government and private sector should be strengthened. Some of the ways to strengthen these links can be through continuous participation in forums and networks, for example, the organization of innovation conferences in which the participation of not only key regional stakeholders but also the media is extremely important. In other words, national and regional systems of innovation are important. The “triple-helix” model should be strengthened in this respect.

- g) Social networks facilitate knowledge transfers and enhance economic growth and competitiveness of a region. The *role of networks and tacit knowledge* is immense in the promotion of regional innovations. Social capital includes dialogue, networking, etc. At the regional level, it is very important to have formative mechanisms, such as regional forums, which keep the networks alive.

Apart from fundamental economic variables, which are responsible for location-specific advantages, there is a crucial role for the local policy-making community. Important factors include:

- Local system of incentives, such as tax incentives, grants and subsidies, consistent with the national system of incentives
- Strategic planning for locality laid out in transparent form which shows the political will embedded in political leadership
- Crucial role of knowledge-based institutions. Universities, R&D centres, *inter alia*, are key institutions for keeping policymakers informed on agenda-setting, namely, objectives, regional goals and policy-making commitments that are possible and feasible
- Furthermore, the role of regional agencies, specifically for employment and skill development in their specific region, is very essential. Therefore, the setting up of institutions to monitor these developments and strategies to back such institutions is crucial.

5. Issues for further policy research

The following presents a non-exhaustive list of topics which should be addressed further:

- a) A continuous monitoring of regions which show high GDP growth rates over a certain time frame will provide a deeper understanding of how the sources of dynamism change over time. This will enable policy-learning for regions that are endowed with

fewer sources of dynamism.

- b) Regional systems of innovation should be further researched in regions with moderate GDP growth rates; regions which, at the same time, portray well-developed and effective regional institutions and networks. This would provide important learning opportunities for regions that are in the process of developing such institutions.
- c) The importance of knowledge-based infrastructure and benchmarking.
- d) Problems with data availability, especially on qualitative indicators, such as the role and quality of networks and the role of tacit knowledge.

Annex I. Corporate taxes for EU 27, 1995-2007

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Austria	34	34	34	34	34	34	34	34	34	34	25	25	25
Belgium	40.17	40.17	40.17	40.17	40.17	40.17	40.17	40.17	33.99	33.99	33.99	33.99	33.99
Bulgaria											15	15	10
Cyprus							28	28	15	15	10	10	10
Czech Republic	41	39	25	25	35	31	31	31	31	28	26	24	24
Denmark	34	34	34	34	32	32	30	30	30	30	28	28	28
Estonia											24	23	22
Finland	25	28	28	28	28	29	29	29	29	29	26	26	26
France	36.66	36.66	36.66	41.66	40	36.66	35.33	34.33	34.33	34.33	33.83	33.33	33.33
Germany	59	59	57.5	56.6	52.3	51.6	38.36	38.36	39.58	38.29	38.31	38.34	38.36
Greece	35	35	40	40	40	40	37.5	35	35	35	32	29	25
Hungary			18	18	18	18	18	18	18	16	16	16	16
Ireland	38	38	36	32	28	24	20	16	12.5	12.5	12.5	12.5	12.5
Italy	53.2	53.2	53.2	41.25	41.25	41.25	40.25	40.25	38.25	37.25	37.25	37.25	37.25
Latvia											15	15	15
Lithuania											15	15	15
Luxembourg	40.29	40.29	30.34	37.45	37.45	37.45	37.45	30.38	30.38	30.38	30.38	29.63	29.63
Malta											35	35	35
The Netherlands	35	35	35	35	35	35	35	34.5	34.5	34.5	31.5	29.6	25
Poland			38	36	34	30	28	28	27	19	19	19	19
Portugal	39.6	39.6	39.6	37.4	37.4	37.4	35.2	33	33	27.5	27.5	27.5	25
Romania							25	25	25	25	16	16	16
Slovak republic							29	25	25	19	19	19	19
Slovenia											25	25	23
Spain	35	35	35	35	35	35	35	35	35	35	35	35	32.5
Sweden	28	28	28	28	28	28	28	28	28	28	28	28	28
United Kingdom	33	33	31	31	31	30	30	30	30	30	30	30	30

Source: KPMG's Corporate and Indirect Tax survey, 2007.

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