Case Study Regional Report on the Regional Dimensions of Investment in Research

OBJECTIVE
The main objective of this regional case study report is to provide a better understanding of the structural and techno-economic characteristics of the European region analysed, to present the key factors conducive to increased investment in R&D and to identify the key R&D policy challenges the region is facing.

BACKGROUND
In partnership with DG Research, the Institute of Prospective Technological Studies of the Joint Research Centre (JRC-IPTS) has been conducting a watching brief on policy developments aimed at promoting both private and public investment in R&D (RIP-WATCH). A stated aim of this policy watch activity is to take stock of developments aimed at increasing investments in R&D in the European regions.

In the design phase of the activity, a typology of the European regions was produced. A balanced mix of regions was selected from each of the nine regional types identified, representing fifteen member states of the European Union.

REGIONS COVERED

<table>
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<tr>
<th>Phase 1</th>
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<td>1. Andalusia (ES)</td>
<td>11. Bavaria (DE)</td>
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<td>2. Catalonia (ES)</td>
<td>12. Corsica (FR)</td>
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<td>3. Carinthia (AT)</td>
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<td>4. Crete (EL)</td>
<td>14. Etelä-Suomi (FI)</td>
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<td>6. Jihozápad (CZ)</td>
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THE REPORTS
The regional reports are structured according to the following two interrelated dimensions of regional techno-economic systems:

- **Regional knowledge base**, including the research, technological development and innovation (RTDI) infrastructure, human resources, RTDI efforts and outcomes and knowledge-transmission mechanisms in the region.

- **Regional economic structure**, including the productive structure, regional clusters and networks, international position and financial capacities and instruments.

Each report examines these dimensions from two points of view: their current state, as reflected in a selected set of regional indicators, and their policy context (i.e. policy framework, actors, objectives and instruments).

In addition to the regional case study reports, a **synthesis report** will be produced that combines and interprets the information contained in the case study reports. This will present the strengths and weaknesses of the regions covered and the factors that determined the trajectories of development of their R&D and innovation capacities. It will also discuss the main R&D and innovation challenges identified.
The JRC-IPTS launched the second phase of the activity in December 2006 with the contribution of the ERAWATCH Network. The work was undertaken between December 2006 and May 2007 by a project team led by LOGOTECH S.A. (EL) with the participation of Advansis Ltd. (FI), Faugert & Co Utvärdering AB (SE), Fraunhofer Institute for Systems and Innovation Research (ISI) (DE), Institute for Policy and Practice of Centre on Knowledge, Innovation, Technology and Enterprise (KITE) of University of Newcastle (UK), PREST – Manchester Institute of Innovation Research (UK), and Technopolis France (FR).

The regional case study reports produced in the study are now available on the ERAWATCH web-site at http://cordis.europa.eu/erawatch/index.cfm?fuseaction=intService.home

The synthesis report will also be available on the ERAWATCH web-site.
Table of Contents

1 Introduction ...........................................................................................................................6

2 Regional Knowledge Base .....................................................................................................7
   2.1 Description of the regional knowledge base .................................................................7
       2.1.1 Knowledge creation capacity .............................................................................7
       2.1.2 Knowledge diffusion capacity of the region ......................................................10
       2.1.3 Knowledge absorption capacity of the region ..................................................11
   2.2 Policy context ..................................................................................................................12
       2.2.1 Governance structure and actors .......................................................................12
       2.2.2 Policy Objectives ...............................................................................................13
       2.2.3 Policy instruments ..............................................................................................15
   2.3 Conclusions .....................................................................................................................21

3 Regional economic structure ..............................................................................................24
   3.1 Description of the economic structure .........................................................................24
       3.1.1 The characteristics of the productive structure of the region’s economy ..............24
       3.1.2 Systemic characteristics of the region .................................................................25
       3.1.3 The regional economy in the international context ............................................26
       3.1.4 The local financial market ...................................................................................26
   3.2 Policy context ..................................................................................................................27
       3.2.1 Policy objectives ..................................................................................................27
       3.2.2 Policy instruments ..............................................................................................27
   3.3 Conclusions .....................................................................................................................30

4 Conclusions ..........................................................................................................................31
   4.1 Assessment of the RIS ...................................................................................................31
   4.2 Assessment of policies ....................................................................................................34
   4.3 Policy challenges .............................................................................................................37

References ...............................................................................................................................39

Annex 1: Definition of policy mix typology ............................................................................40
Annex 2: Description of key indicators used in Summary Graphs 1 and 2 ............................42
Annex 3: Tables and Figures ...................................................................................................44
Annex 4: RTD policies .............................................................................................................51

Exhibits & Graphs

Exhibit 1: RTDI policy mix affecting the region .................................................................20
Exhibit 2: Effects of policies complementary to RTDI instruments on R&D capacity of the region .................................................................29
Exhibit 3: Strengths and weaknesses of the regional innovation system .................................................................33
Exhibit 4: Public Policy vs. Strengths and Weaknesses of RIS ........................................35

Graph 1: Comparison of Etelä-Suomi knowledge base with that of Finland ..................22
Graph 2: Comparison of Etelä-Suomi region’s economic structure with the economic structure of Finland .................................................................30
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>MC</td>
<td>Management Committee</td>
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<td>PM</td>
<td>Project Management</td>
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<td>ToR</td>
<td>Terms of Reference</td>
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<td>ANBERD</td>
<td>Analytical Business Enterprise Research and Development Database</td>
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<td>BERD</td>
<td>Expenditure on R&amp;D in the business enterprise sector</td>
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<td>EPO</td>
<td>European Patent Office</td>
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<td>GBAORD</td>
<td>Government budget appropriations or outlays for R&amp;D</td>
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<td>GDP</td>
<td>Gross domestic product</td>
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<td>GERD</td>
<td>Gross Domestic Expenditure on R&amp;D</td>
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<td>GUF</td>
<td>General university funds</td>
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<td>HEI</td>
<td>Higher education institute</td>
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<td>HERD</td>
<td>Expenditure on R&amp;D in the higher education sector</td>
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<td>ISIC</td>
<td>International standard industrial classification</td>
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<td>IPTS</td>
<td>Institute for Prospective Technological Studies, Seville, Spain</td>
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<tr>
<td>NACE</td>
<td>Nomenclature générale des Activités économiques dans les Communautés Européennes</td>
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<td>N.E.C</td>
<td>Not elsewhere classified</td>
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<tr>
<td>ISCED</td>
<td>International Standard Classification of Education</td>
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<td>HEI</td>
<td>Higher Education Institute</td>
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<td>PRI</td>
<td>Public Research Institute</td>
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<td>MTI</td>
<td>Ministry of Trade and Industry</td>
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<td>MoE</td>
<td>Ministry of Education</td>
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1 Introduction

The Etelä-Suomi major region covers the southern part of Finland. It is one of the five provinces in Finland and covers the seven regions of Uusimaa, Itä-Uusimaa, Varsinais-Suomi (Southwest Finland), Kanta-Häme, Päijät-Häme, Kymenlaakso, Etelä-Karjala (South Karelia). The region is situated by the Baltic Sea and has good connections to Northern Europe, particularly northern Russia. Approximately one fifth of the population and much of the economic activity of Finland are concentrated in the Helsinki region, located in the larger Etelä-Suomi region.

Figure 1: Map of Finnish provinces (NUTS 2) and regions (NUTS 3)

The region covers 40,797 km$^2$, which represents a little more than 13% of the country's total area. With a population about 2.58 million it is the most populous region in the country, being home to approximately half of the country's total population. It is relatively densely populated by Finnish standards with a population density of 63 inhabitants per km$^2$. Approximately 38% of the population of Etelä-Suomi live in the metropolitan area around Helsinki (the capital).

In 2003, regional GDP was €82.5 billion, which accounts for about 56.6% of Finnish national GDP. Regional GDP per capita came to €32,198, which is 115% of the Finnish average and 148.1% of the EU average (Eurostat, 2007). The average annual growth rate of GDP in Etelä-Suomi between 1999 and 2003 was 3.8% p.a., which is slightly below the GDP growth in Finland as a whole. However, growth rates have slowed down considerably since the turn of the millennium both in Etelä-Suomi and nationally. While the region achieved a growth rate of 6.9% in 2000, growth slowed to a mere 0.1% in 2003 (Eurostat, 2007).

Unemployment in Finland is average by European standards: the unemployment rate of 8.4 in 2005 was slightly below the EU-25 average (9.0%) but slightly above that of the EU-15 (8.2%). Etelä-Suomi is doing better in this respect with an unemployment rate of 6.9% (Eurostat, 2007). The services sector is very much concentrated in Etelä-Suomi with 73.1% of employees working in services, compared to 69.2% for the country as a whole. Financial and business services, in particular, are concentrated in Etelä-Suomi. The share of industry jobs (24.2%) is slightly lower than the national average 25.7%. The share of jobs agriculture (2.5%), however, is considerably lower than in national economy (4.8%). Etelä-Suomi has a very high expenditure on R&D as a percentage of GDP (GERD) relative to Europe. With a GERD of 3.6% of GDP (2003) investment in R&D is slightly above the national (3.4%), and well above the EU-25 (1.9%) and the EU-15 (2.0%) levels. In absolute terms the region achieved a GERD of €3.03 billion (2004), which accounts for 57.7% of the Finnish GERD (Eurostat, 2007).
2 Regional Knowledge Base

Until the late 1980s, the forestry industry was the key driver of the Finnish economy and it similarly played an important role in the Etelä-Suomi region. From the late 1950s to the late 1970s the Finnish forestry industry made massive investments and transformed itself gradually into a global technology leader with the most modern and efficient production capacity in the world. The ratio of R&D expenditures to GDP in Finland had been one of the lowest in the OECD countries at the end of the 1970s.

During 1980s and 1990s the Etelä-Suomi region developed significant R&D capacity, which is reflected by a very high R&D intensity and a well educated workforce. The real growth rate of R&D expenditure in the 1980s was about 10 percent annually, which was the highest among the OECD countries. This has been mainly a result of strong growth in private R&D activity which began in the 1980s and a series of national policy measures over a longer period. These worked in the same direction and began to take effect partially in the 1990s.

One of the key drivers of the rise of R&D capacity was the recession in the early 1990s, which hit the economy severely. Recovery from the recession was very strong and ushered in an era of both re-industrialisation and rapid structural transformation into a knowledge-driven economy. In 1990 wood, pulp and paper accounted for 40% of Finnish exports, slightly above the share of metal and machinery products (which were close to one third). During the 1990s Finland became a major exporter of electronics and other high-tech products, which by the year 2000 accounted for over 30% of exports. Despite a slight drop in the early 2000s the share of electronics and electrical engineering products was still 25% in 2004 (National Board of Customs). This transition was also evident in Etelä-Suomi, where the ICT industry\(^1\) has developed into what is today the most significant, although not dominant, industry sector.

2.1 Description of the regional knowledge base

2.1.1 Knowledge creation capacity

The academic infrastructure in Etelä-Suomi has its roots in the 17\(^{th}\) century and the first Finnish universities were located in the Etelä-Suomi region. Even though several universities have been established in other regions, especially between the late 1950s and late 1970s, Etelä-Suomi has maintained a strong position. Etelä-Suomi hosts a total of 12 universities and 15 polytechnics\(^2\) (Ammattikorkeakoulu). All the universities are government-owned public institutions. Polytechnics have a more mixed ownership. In most cases they are owned by municipalities or group of municipalities but there are also private polytechnics. (See table 1 – all tables are in the annex), in which 152,287 ISCED 5 and 6 students were enrolled in 2004, which was 50.8% of all students in Finland (Eurostat, 2006).

The biggest universities in the region are the University of Helsinki with 38,233 students, the University of Turku with 15,848 students and Helsinki University of Technology (HUT) with 14,585 students (Ministry of Education, 2005). HUT is the most important source of engineering graduates but Lappeenranta university of Technology and Åbo Akademi also train engineering students. Helsinki and Turku Universities have a strong position in science education and research.

University sources recorded about 94,000 students at the beginning of the 2005/2006 academic year in Etelä-Suomi. This is a significant increase from 1990, when the number of university students was 64,000. About 35.5% of students studied science or engineering related

\(^1\) The gross value of Manufacturing of radio, television and communications equipment and apparatus grew by over 200% between 1995 and 2005 in Etelä-Suomi (Source: Statistics Finland).

\(^2\) Many of the polytechnics are nowadays called “Universities of applied sciences”.
subjects in 2005 (table 1). The number of doctoral students has increased even more rapidly. A total of 12,647 (13.5% of all students) are postgraduate (ISCED 6) students, which is almost double the number of 6,200 in 1990 (KOTA Database, 2007). The number of students that graduated from these universities with a doctorate (PhD) was 837 in 2005 (Table 1). Altogether, these universities employ an academic staff of about 8,483, of whom 1,240 are professors. Total external research funding for universities in 2005 was €414 million, which was 36.3% of all university funding. There are no exact figures for income from R&D and contractual work, but external research funding in 2005 was €248 million in 2005.

There is a scarcity of public statistics available on polytechnics. These institutions do not provide PhD education and are more concentrated on tertiary programmes with a vocational focus. In 2005 there were around 65,000 students in the polytechnics, whose main operational region is Etelä-Suomi\(^3\). The number of full-time teachers in that year was 2,908 (Table 2).

Etelä-Suomi is also home to many public and private research institutes. Finland has 20 government R&D institutes in eight policy sectors (See Table 3). Although many of these institutes have branch units in other regions, the bulk of their activities are concentrated in Etelä-Suomi. The biggest of these institutes is VTT Technical Research Centre of Finland. It is the biggest contract research organisation in Northern Europe and provides technology solutions and innovation services in various fields. In 2004 VTT had a workforce of 2661, of which 1999 employees were located in Etelä-Suomi (1,869 in the main office in Espoo in the Helsinki metropolitan area). In 2005 the turnover of VTT was €225.1 million, of which 65% was external income. Private sector funding came to €67.1 million, 30% of total income. Foreign funding accounted for 14% of VTT’s total income. VTT has a special task of continuously developing its competitiveness and basic competence in selected areas important for Finland. When looking at the volume of research activities the most significant sectoral research institutes are the Forest Research Institute (Metla), the MTT Agrifood Research Institute, the National Public Health Institute and the Institute of Occupational Health, and the Environment Institute. The role of the state research institutes is particularly strong in specific fields. For example, public research institutes have a strong position in the fields of agriculture, forestry, energy, building and the built environment, energy, biotechnology and food engineering and national health.

One of the most notable private research institutes is KCL. It is owned by a number of Finnish forestry giants (UPM Kymmene, Stora Enso, Myllykoski, Metsälitto), has a staff of 290 (2006) and carries out research in pulping and papermaking. Moreover, there are some outstanding private R&D units of individual companies (most notably the Nokia Corporation) located in Etelä-Suomi and particularly in the Helsinki metropolitan area. However, no information is available on the size of these research units.

In 2005 the universities implemented the 2004-2006 regional development programme, which was geared to enhancing the impact of universities on society. A number of projects were launched in accordance with the universities’ and polytechnics’ joint regional strategies, which were devised in 2002. Within the scope of their social service mission, universities also participate in the centre of expertise programme, in the regional centres programme and in projects forming a part of regional strategies.

The regional impact of the universities has been further enhanced with the development of the six university centres in Finland. These are located in a number of small and medium sized towns which lack a university. These universities provide educational programmes in specific fields and have small research units from several universities. One of these centres is located in the city of Lahti in the Etelä-Suomi Region.

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\(^3\) Many universities and polytechnics have branch offices in cities that are located in other regions. There are also some polytechnics that are national in the sense that they have campuses located in several regions.
According to research by Statistics Finland, the national statistical office, between 2002 and 2004, 49% of manufacturing companies and 40% of service firms had some form of innovation activity. This figure was very similar to the figures for the country as a whole except that the number of innovating service companies was slightly higher than in other regions.

In total, these actors in Etelä-Suomi spent 3.66% of GDP on R&D in 2005 (Statistics Finland, 2007). With this GERD Etelä-Suomi ranks among the top 15 EU regions and has already achieved the Lisbon target of 3%. The growth of R&D activities was particularly strong between 1995 and 2000, when intramural R&D expenditure (measured at current prices) in Etelä-Suomi grew 85% from €1,453 million to €2,692 million. Between 2000 and 2005 growth was more modest, totalling 18%. However, R&D expenditure relative to GDP has remained fairly constant and actually decreased slightly in 2003, mainly as a result of the general downturn in economy.

In terms of R&D expenditure by sector of activity, of the total amount of €3.03 billion (2004) in Etelä-Suomi, 68.5% is spent by the business sector, 18.5% by the higher education institutes and 12.9% by the government sector (Eurostat, 2007). Similar to the pattern of R&D personnel, Etelä-Suomi also shows higher R&D expenditure in the government sector. This is also true in comparison to the EU-25 (Eurostat, 2007). The growth rates between 2000 and 2004 were highest in higher education (23.6%) followed by business (10.9%) and government (8.2%). Compared to the national growth rate (18.5%), the growth of R&D expenditure in Etelä-Suomi (12.7%) was clearly lower.

No regional statistics are available for R&D expenditure in various industries. However, according to the Finnish national figures, in 2003 a total of 55.7% of R&D expenditure was concentrated in the electronics industry, 10.1% in the metal and mechanical engineering industries and 8.1% in the chemical industries (Statistics Finland, 2006). These figures demonstrate the dominant role of electronics and particularly information and communication technologies in R&D activity.

A significant amount of public funding is directed towards R&D activities. Public support for RTDI has been growing steadily as a result of a deliberate strategy since the early 1990s and has continued to grow even during recession. One example of this strategy was the increasing privatisation of state-owned companies, of which a large share of the proceeds were channelled into R&D. However, the increase in public R&D funding has not been able to keep up with the increase in private sector funding (Tables 6 and 7). The most important public institution providing public R&D funding is Tekes, which provided R&D funding in Etelä-Suomi of €237.4 Million in 2005, which was 55% of its total funding that year.

The resources devoted to R&D (2004) included 43,882 people working in R&D. This was 3.53% of the total workforce, slightly more than the Finnish average (3.24%) and clearly above the EU25 average of 1.49%. A total of 23,149 people (53.0%) work in the business sector R&D, 12,890 (29.4%) in higher education and 7843 (17.9%) in the government sector. In comparison to the national level, R&D-personnel in Etelä-Suomi are more concentrated in the government sector (+3.9% in headcount terms) with fewer in the university sector (-3.6%). This reflects the strong concentration of public sectoral research institutes in the Helsinki region. In comparison with the EU-25, in Etelä-Suomi more R&D staff are employed in business (+ 8.7%) and government R&D (+5.6%) while there are fewer in the university sector (-13.3%) (Eurostat, 2007).

Overall the number of R&D personnel in Etelä-Suomi grew from 2000 to 2004 by 6.4%, which is a clearly smaller increase than in Finland as a whole (11.4%) and slightly lower than in the EU25 (6.9%). In particular, the growth rate in the business sector (2.2%) was below the Finnish (6.6%) and EU25 (9.2%) rates. In higher education the growth rate was significant (14.3%) and clearly above the EU25 growth rate of 7.6%. However, this was still below the national average (23.1%). Government was the only sector where the growth of R&D personnel in Etelä-Suomi was above the national average (6.9% vs. 6.4%).
There are no specific regional statistics regarding publications, but since Etelä-Suomi covers a significant part of university and PRI research activity, national figures give a good indication of the level of publication. The Finnish publishing profile leans towards the natural sciences and the medical sciences, as is the case in the OECD countries on average. Relative to population numbers, the number of publications produced in Finland in 2005 was 1,600 per one million inhabitants. In a comparison of 30 OECD countries Finland ranked fourth after Switzerland, Sweden and Denmark. In 1995 Finland ranked fifth. The total number of publications in the EU 25 countries has more than doubled over the past 20 years. In Finland there has been a 2.5 fold increase over the same period (Leivo & Nuutinen, 2006). The three top universities in Finland in terms of publications are located in Etelä-Suomi.

Organisations in Etelä-Suomi submitted 976.3 European Patent Office (EPO) patent applications per million inhabitants in 2002, accounting for 61.3% of all EPO patent applications in Finland. By far the most important field of patent applications is electricity; (International Patent Classification section H), which accounted for 41.2% of all applications, followed by physics (G; 14.0%), performing operations; transport (B; 12.6%), human necessities (A; 9.7%) and Chemistry; metallurgy (C; 9.0%). In terms of relative specialisation in relation to Finland, Etelä-Suomi shows an above average share of applications relating to Human necessities (+12.8%) and Electricity (+5.7%). The single most important detailed categories are electric communication techniques (35.7%), along with computing; calculating; counting (7.2%) and paper-making; production of cellulose (6.8%). These patent figures also partly reflect the vital role of the ICTs industry and of the mobile phone industry in the region. Also patenting activity by the paper industry (the second big industry sector in Finland) is also strong in Etelä-Suomi.

2.1.2 Knowledge diffusion capacity of the region

The first Innovation Centre at the University of Technology in Helsinki was established in 1998. After that other universities have established Innovation Centres and Service Units in order to help commercialisation and patenting. Today, around 70 people are employed in technology transfer in Etelä-Suomi universities. In 2005 there were 243 commercialisation projects in Etelä-Suomi universities according to the Foundation of Finnish Inventions. During the same year there were around 20 patent applications at the universities with another 50 applications in VTT.

The budget to support innovation activities in universities varies from €100,000 to €600,000 depending on the University. There are around 500 to 600 reports of inventions by university staff to university innovation offices per year in all Finnish universities. In practice this covers the 11 universities that actively participate in innovation activities (i.e. excluding universities concentrated in the humanities and arts). University technology transfer services handle around 5,000 R&D contracts between university researchers and external actors each year. There are no precise figures for the Etelä-Suomi region but it may be estimated from the volume of research that Etelä-Suomi universities cover around one half of the above activities. There are also no extensive figures available on university spin-off activity. In the two biggest universities in the capital region (Helsinki university of Technology and University of Helsinki) a total of 57 new university spin-offs were created between 2000 and 2006. Another 15 new spin-offs were created by VTT.

University Technology Transfer activities have developed significantly during the past five years. In addition to universities, polytechnics have also strengthened their technology transfer organisations. Moreover, there are dedicated technology transfer companies such as Licentia in Helsinki.

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4 University employees are required to report all inventions with commercialisation potential. This reporting does not transfer IPR to the University.
Various Science and technology parks and incubators assist with knowledge diffusion. The most notable science parks are Innopoli and Helsinki Business and Science Park in the Helsinki region, Turku Science Park in South West region, Lahti Science and Business Park in the Lahti Region, and Technology Centre Kareltex in Lappeenranta (South East region). Also almost all of the smaller regional centres include some incubator activity in their technology parks. Examples of these are TechVilla in the Helsinki region, Innopark in the Häme region and Agropolis in Forssa. There are also several smaller incubators located in Etelä-Suomi, owned by universities, polytechnics, municipalities, foundations and various local and regional development organisations. In the Uusimaa region around Helsinki alone there are a total of 16 business incubators (2005). In addition, many science and technology parks host regional centres of expertise in specific key technology areas (see 2.2).

Intra-industry links are particularly strong in the information and communication technologies where many key enterprises are concentrated in the Helsinki region. These networks also have links with public initiatives, such as Forum Virium Helsinki, a cooperation cluster focusing on the development of new customer-driven digital services and content. Fifteen major corporate players and four public partners have committed themselves to carrying out joint R&D. Another joint initiative in the ICT sector is DIMES (Digital Media Service Innovation – Finland), an association founded in 2005 by the major Finnish players in the field (namely, Nokia, TietoEnator, TeliaSonera, Elisa, Finnet and YLE, the national public service broadcasting company). The mission of DIMES is to offer an open innovation environment for the Finnish ICT Cluster, benefiting business and society. Most of the activity of these organisations is located in the Etelä-Suomi region. In addition to Dimes there are other similar arrangements in Finland (called test beds or technology platforms) which are being run in the Helsinki region and other larger city regions.

2.1.3 Knowledge absorption capacity of the region

In terms of the education statistics, the ability of the labour force to absorb new knowledge is relatively high. A total of 64.1% of the age-group aged 15 years and older have attained upper secondary, post secondary or tertiary (ISCED 3-6) education (2005). This is slightly higher than the average in Finland. However, the share of members of the labour force with tertiary education (ISCED 5-6) in Etelä-Suomi is 28.3%, which is substantially higher than in Finland as a whole (25.4%).

The willingness and ability to absorb new knowledge is also underlined by the high participation rate of adults (aged 25-64) in education and training (life-long learning) in 2003. The participation rate in further education was 22.1% in Etelä-Suomi and 21.0% in Finland in 2003, which is substantially higher than the EU-25 average (8.7%).

The share of human resources in science and technology by occupation (HRSTO) as a share of the labour force in Etelä-Suomi (36.3% in 2005) is slightly above that in both Finland as a whole (31.3%), and the EU-25 (27.7%) (Eurostat, 2007). The proportion of HRSTO with third level education (HRST core) in Etelä-Suomi was 69.0% of all HRSTO, which was substantially higher than the EU25 average of 57.5%. In the last few years, the growth of HRST as a percentage of the labour force has been modest, rising from 54.9% in 2000 to 55.5% in 2005.
2.2 Policy context

2.2.1 Governance structure and actors

2.2.1.1 National level

Finland has a nationally centred RTDI and governance system. The RTDI policy objectives have been considered within the context of the national innovation system (NIS) approach since the early 1990s. Evaluations, benchmarking activities and other means of policy intelligence are used extensively by policy makers to steer policy. STI policies are formulated by the Science and Technology Policy Council, chaired by the Prime minister. RTDI action is placed under line agencies: the government organisations and the ministries.

The bodies primarily responsible for science and technology policy are the Ministry of Education (MoE) and the Ministry of Trade and Industry (MTI). The MoE is responsible for Education, Training, Science policy, Higher Education Institutions and the Academy of Finland. It is therefore in charge of Universities and polytechnics. The MTI is responsible for industrial and technology policies, supervises Tekes and the VTT Technical Research Centre of Finland. MTI is responsible for technology policy support to industrial RTDI and EU research, leading a number of organisations which are part of the national innovation environment (research institutes, agencies and state-owned companies). Almost 80% of government research funding is channelled through these two ministries, especially through the Academy of Finland and TEKES. Over the past few years cooperation between these two ministries on issues related to science and innovation has increased significantly. This is partially due to their similar/shared objectives in promoting research funding in government budget.

The primary public actors supporting and directing RTDI activities, including both the interaction of university and industry, as well as the commercialisation of research results, are the National Technology Agency, (Tekes), the Finnish National Fund for Research and Development (Sitra) and the regional Employment and the Economic Development Centres (TE-centres) (Kutinlahti, 2006).

The Academy of Finland is the main body funding basic research by individual researchers and university research units and other research organisations on a competitive basis. When it comes to applied, technological research and development work, TEKES has a central position for planning and financing of technical R&D. TEKES finances industrial R&D projects as well as projects in research institutes. TEKES has a regionally comprehensive domestic organisation that acts in coordination with employment and economic development centres. Until recently funding was allocated through a system of national selection, but in the future regional aspects will also increasingly be taken into account. Another important actor is Sitra. Sitra mainly provides venture capital and supports companies conducting experimental research and explores new areas through various research programmes. Sitra directs R&D activities by focusing competencies in selected programme areas.

In terms of the evolution of the governance structure, the relative position of Tekes has grown over the last two decades, as is clearly visible both in policy documents and in the financial resources allocated to it. As a result of increasing pressure of internationalisation, the Finnish Foreign Trade Association (today Finpro) was also reorganised in the late 1990s, and in part inspired by that, it began to look for a stronger position as part of the innovation system.

There is also quite a strong culture of collaboration, both at the national level between the main actors (TEKES, Academy of Finland and SITRA in particular), and also—although to a lesser extent—at the regional level. There is no specific regional innovation policy in Finland as the regions have a very limited role as independent bodies. Instead, the role of national innovation
policy is very strong and is supported by local activities of the municipalities. On many aspects national policy has a regional dimension, however.

2.2.1.2 Regional and local level

The Finnish governance system is a strong mix of national and local level administration. The municipalities in Finland are relatively strong actors compared to many other countries and the bigger cities and towns in particular have had a very active role in local economic development and RTDI policy, often in the form of support to help build up local science and technology.

The regional administration in Finland is mainly organised at the NUTS3 level. There are a total of 19 regions in Finland of which seven are in Etelä-Suomi. At this level there are regional councils that are responsible for the preparation of regional programmes. This task was given to the regional councils in the early 1990s and this has strengthened the role of local authorities in regional level innovation policy, particularly with EU membership in 1995 and the introduction of structural funds (SF). However, compared to other major Finnish regions the role of SF has been fairly small. The regional programmes draw together various other planning instruments like regional and local innovation strategies and regional strategies of individual organisations. The programme is prepared together with the municipalities and government, the business sector, universities and research institutions as well as civic organisations. So far, there has not been any specific RTDI focus in these programmes, although almost every programme has expertise as a dedicated objective. Typical measures are targeted on the development of key industry clusters and the commercialisation of RTDI, innovation services and various coordination measures to improve the functioning of the innovation system. Developing RTDI activity or the regional RTDI base has not been a specific priority, but various measures (e.g. creating new research units and RTDI infrastructure) have been supported by these programmes.

There are no formal organisations covering the whole Etelä-Suomi Province. There is a state provincial office which is responsible for various government tasks at the regional level. However, this office does not cover the South-West region. The South Finland Regional Alliance is a co-operative organisation for the Regional Councils in Etelä-Suomi but it has relatively little power and is mainly responsible for co-operative development projects and lobbying.

At the regional level the network of universities and polytechnics, technology centres, centres of expertise and regional Employment and Economic Development Centres (TE-Centres), along with other similar institutions, have promoted innovation in the regions. The establishment of regional TE-centres to co-ordinate the activities of several ministries in the regions has been an important change in the regional governance structure. Many national level innovation services are provided by TE-centres. They are also responsible for regional foresight activities and participate in many local and regional planning processes.

2.2.2 Policy Objectives

The R&D policy agenda in Etelä-Suomi has been mainly dominated by the national policies and the rise of R&D-oriented local economic development policies in cities and towns. A key aspect of the national context at the beginning of the 1980s was to make technology policy increasingly goal-oriented and systematic. Tekes was established in 1983 to put more emphasis on directing and financing R&D activities. The focus of Tekes’ operations in the 1980s was on information technology, which has had an important impact on Etelä-Suomi, where much of the ICT R&D activity was concentrated at the time. Another trend in the 1980s was technology transfer and the commercialisation of research results. A number of mechanisms for technology transfer, diffusion and commercialisation, such as nation-wide networks of science parks, were created.

A closer look at national Science & Technology policy reveals a gradual change in policy thinking towards the more complex notion of innovation and a broader view of policies. Since the
1980s there has been a move from the linear innovation model to an interactive and integrative model. In 1990 the concept of national innovation system was introduced as a basic framework for policy considerations. The important point is, however, that the principle of the innovation system approach has been very pragmatic and formulated at a fairly general level. The same is true of industrial clusters and cluster-based policies – adopted in industrial policy making in the early 1990s – although the policy reasoning relied heavily on the arguments provided by research. These national policy approaches have also had an influence on the development of the Etelä-Suomi region in the way that the development of various sectoral policies dealing with RTDI issues has been co-ordinated more effectively.

One of the most important aspects affecting the success of efforts to build up a strong R&D base in Etelä-Suomi has been national policy co-ordination. This has been based on the systemic approach to policymaking at the national level since the early 1990s, which has emphasised the importance of interdependencies among research organisations, universities, firms, and industries due to the increasing importance of knowledge as a competitive asset.

Today, the main policy document guiding the strategic decision making related to RTDI in Finland is the triennial review by the Science and Technology Policy Council of Finland. The latest report is from 2006. The latest report states that the education, science, technology, and innovation policies of the coming years may be judged successful if “they contribute to the development of the whole society and the innovation system in the intended manner”. The main policy objectives identified in the strategy are to:

- promote the overall functionality of the innovation system and the system’s ability to renew itself
- enhance the knowledge base,
- improve the quality and targeting of research
- promote the adaptation and commercialisation of research results, and
- secure adequate economic prerequisites for research activities.

There are a number of activities related to the Lisbon-strategy that are currently shaping Finnish policy. The actions of the National Reform Programme (The Lisbon Strategy for Growth and Jobs - the Finnish National Reform Programme 2005-2008) are the main instruments in which these activities are grouped. The objectives mainly relate to universities, which are expected to increase the impact and quality of their activities. Universities will strengthen their international competitiveness by specialising in areas of comparative advantage and by investing in the quality of research, promoting a multidisciplinary orientation and recruiting high level research personnel. In the latest annual progress report (2006) of the National Reform Programme it was concluded that Finland has already reached a number of the goals in the original Lisbon agenda. Resources for R&D as well as employment rates among women and older workers have clearly exceeded the targets set for 2010. Finland also ranks high in terms of Internal Market implementation.

The main change in policy orientation has been the shift in the focus of technology policy, replacing an approach promoting Finnish industry by means of technology with a more comprehensive approach. In science policy the main trend is towards increasing pressure on the RTDI institutions (universities, polytechnics and research institutes) to more open interaction with society. The new University Act (2004) emphasises the so called ‘third mission’ of universities whereby they take on (regional) economic development mandates in addition to their existing roles in education and research. This is further boosted by competitive funding mechanisms that often require collaboration with firms and other organisations. There are also various new instruments related to RTDI under discussion. Examples of these are R&D tax incentives and pre-seed financing.

The role of RTDI as part of the regional development policy has been growing since the early nineties, when the first Regional Centre of Expertise programme was formed. The first pro-
programme was started in 1994 and since then the programme has grown to be the most impor-
tant instrument through which regional innovation policy is implemented (see 2.2.3.4.). Another
key instrument is the regional centre programme (RCP), which has focused on improving the
competitiveness of regional centres in various parts of the country and securing a balanced re-
gional structure at the same time. In the new period (2007-2010) RCP has refocused more and
more on issues relating to competitiveness, RTDI and innovation environments. Today, large
urban regions in Finland are also drawing up innovation strategies for themselves.

Since the Etelä-Suomi region is more of a statistical unit than a functional region, there are no
RTDI policy documents in the regional level which directly influence the development of the re-
gion. The main policy documents are either national or sub-regional documents. In research
and education policy the most important guidelines are the “Regional Strategy for Research
and Education policy 2013” by the Ministry of Education (2003) and the regional strategies of
the universities and polytechnics.

The overall policy mix that influences the region is described below.

2.2.3 Policy instruments

2.2.3.1 Improving R&D governance

Almost all R&D policy changes reflect the general policy recommendations for RTDI govern-
ance given by the Science and Technology Policy Council in its triennial reports. These guide-
lines are further elaborated by other plans and instruments at the national and regional level.

Regional TE-centres in Etelä-Suomi are undertaking regional foresight activities. These fore-
sight activities were started in 1998 with ESF funding but are now part of their normal functions.
This foresight mainly concentrates on the labour market and economic activities. Another set of
efforts to co-ordinate technology policy at the regional level are the Regional Technology
Strategies (Alueellinen teknologiastrategia) drawn up with the guidance of TE-centres and Te-
kes in various regions. At the national level there have also been foresight activities. One of the
most important in terms of RTDI activities was FinnSight 2015 - a joint foresight project of the
Academy of Finland and Tekes.

2.2.3.2 Creation of an innovation friendly environment

National R&D policy places considerable emphasis on improving framework conditions for in-
novation. There are various national instruments and services, which help to create a working
innovation environment for enterprises in Etelä-Suomi region. One of them is Yrke, a project to
foster entrepreneurship in Finland. The idea is to strengthen the resources of science and busi-
ness parks.

There are no specific regional programmes for the creation of an innovation friendly environ-
ment. However, for various cities and city-regions there are a small number of dedicated meas-
ures. One national programme with increasing significance for regional innovation policy is the
Regional Centre Programme (RCP), established in 2001. In the period of 2007-2010 there are
35 city regions participating in the programme. The new period is more concentrated on the is-
sues of urban competitiveness and innovation activity and innovation environment. Especially
in the smaller cities the RCP has taken on a role as an umbrella under which various develop-
ment activities related to economic development and innovation are evaluated and organised
(Lemola, 2006). For the 2007 budget a total of €9.2 Million was issued to the programme from
the national budget, with complementary funding from other sources.

Municipalities also play an important role in supporting innovative environments in their own
development strategies and initiatives. For example the city of Turku has invested heavily in
biotechnology R&D infrastructure and similar activities have also been undertaken in other
smaller city-regions. These local investments should not be underestimated in the regional context.

2.2.3.3 Development of human capital

The development of human capital has been affected by various national and regional initiatives, although these vary widely in significance.

On the national level, there are also a number of programmes that address this policy area. The Finland Distinguished Professor Programme (FiDiPro) has been helping to recruit top foreign researchers at the professor level and attract Finnish researchers abroad back to Finland. Another national instrument is Noste, a programme for raising the level of qualification of adults in Finland.

At the regional level the most important policy has been the support for Polytechnics by the local governments. The establishment of polytechnics alongside universities in the early 1990s has arguably been the most important structural reform in higher education for a long time. Polytechnic reform has also helped higher education break down its isolation from working life, as it has given graduates a stronger practical orientation. Unlike the universities, which are state-owned institutions, polytechnics are mainly owned by municipalities and significant resources have been devoted to their development. The role of Polytechnics is also more related to the needs of the local labour market and economy. In addition to education and research functions (typically applied research), polytechnics have a strong regional role in technology transfer and R&D services. As a result, various R&D laboratories, testing facilities and incubators have been established in polytechnics with joint funding from local and national governments, EU structural funds and sometimes also with private support.

2.2.3.4 Networking, co-location and clustering measures

The most important instrument in the diffusion of technology at the regional level has been the National Centres of Expertise programme (CEP), managed by the Ministry of the Interior. The objective of the programme has been to create a strong network of centres of expertise supporting specialisation and cooperation between regions, and by so doing, to increase regional competitiveness. First CEP was initiated in 1994. In the period 2000-2006 the estimated impact associated with CEP was 12,800 new jobs, 3,700 new products, and 1,300 new enterprises. On average 5,100 enterprises have been participating annually in projects and operations associated with CEP (Kanninen et al., 2007).

In the period from 2003–2006 there were 22 centres of expertise covering 45 fields. The total funding for the centres of expertise between 1999 and 2006 was estimated to be €577 Million, of which only 6.3% was basic funding. Of the total estimated funding related to CEP activities, 23% was targeted on the Etelä-Suomi region. However, this is quite a bit lower than the relative size of the regional economy. The regional centres of expertise and their fields of expertise in Etelä-Suomi 2000-2006 were:

- Helsinki Region Centre Of Expertise: Active Materials and Microsystems, Gene Technology and Molecular Biology, Cultural Industry, Software Product Business and New Media
- South-West Finland Centre of Expertise (Turku): Biomaterials, Diagnostics and Pharmaceutical Development, Surface Technology of Materials and Cultural Content Production
- South-East Finland Centre of Expertise (Lappeenranta and Kouvola regions): High Technology Metal Structures, Key Systems for the Forest Industry and Logistics and Expertise on Russia
- Lahti Region Centre of Expertise; Design, Quality and Ecology
- Häme Centre of Expertise (Hämeenlinna): Professional expertise and learning as well as e-learning
Centre of Expertise for the Lifting, Moving and Logistics Industries (Hyvinkää region)

In the new programming period, from 2007 to 2013, the centre of expertise programme has been renewed in order to form national clusters of expertise to enhance networking between the regional centres of expertise and to function as the new platform for development of inter-regional co-operation. The new cluster-based operational model is expected to enable a more efficient utilisation of resources scattered across different regions, and is also intended to increase the "critical mass" of R&D activities in these fields. For the new programming period, a total of 13 clusters with national significance was selected with a total of 21 regional Centres of Expertise participating in them.

From the total of 62 members in various clusters, 23 were in the regional Centres of Expertise located in Etelä-Suomi region. Only one cluster (Future Energy Technologies) did not have any partners from Etelä-Suomi. A total of €8.7 million has been put forward for the basic funding of the Centres of Expertise in the Budget for 2007 and the regions are providing a corresponding amount of provide regional funding. In addition, a total of €2.6 million has been separately put forward for the Ministry of Trade and Industry for the purpose of funding cluster co-ordination.

An additional national level programme, TRIO, has been set up to support technology intensive industries. This is aimed at enhancing cooperation across the technology sector to better respond to the challenges it is facing, and has been the platform for launching a number of growth and development projects designed to improve business networking, especially among suppliers and to support the creation of new system suppliers.

Local governments, particularly in the bigger cities, have been active in establishing cluster specific development organisations as part of their innovation and economic development policies. A good example is Turku Bio Valley Ltd in South-West Finland. Turku Bio Valley is in charge of the development of the BioTurku cluster and offers various services (such as a bioincubator and biolaboratory) for the business community and premises for national and international life science companies.

2.2.3.5 Knowledge and technology transfer to enterprises

There is a long-term initiative running for the development of technology transfer services at universities and to co-ordinate their activities. Since the late 1990s, various universities have set up dedicated technology transfer and commercialisation units. This policy measure also introduced innovation representatives to Finnish universities.

At the national level, the Research into Business Programme (TULI) has been one of the key instruments for research commercialisation and new business creation. Between 2002 and 2005, over 2,000 business ideas were assessed in the TULI programme, and 112 new businesses were created nationwide. TULI has been operated by regional operators mostly located in local science parks.

For the international technology transfer, Tekes is hosting the Innovation Relay Centre Finland. There are also some Tekes services related to technology transfer, like the TUPAS service for SMEs to use research services and VARA funding scheme for Feasibility Studies, targeted at SMEs, universities and research institutes.

Municipal support for the establishment and development of technology parks and other support infrastructure. Examples of these include Culminatum in the Helsinki Region, the Turku Science Park, and the Lahti Science and Business Park, in all of which the local public sector has a substantial share of ownership.
2.2.3.6 Research collaboration between public research organisations and the private sector

The implementation of Finnish research policy over the past two decades, and especially after the recession, has been marked by a distinct tendency to move towards competitive funding mechanisms. The criteria for funding from extra-budgetary sources have also increasingly presupposed cooperation (between firms and universities or different university groups) as a condition for funding. As a result, a significant part of publicly supported R&D is carried out through different multi-actor collaborative R&D projects, mainly between firms and research organisations. Also, applied research focusing on problem solving for companies is playing a bigger role in university research.

The most noteworthy national instrument in the regional context is the set of Tekes Technology Programmes. A technology programme usually consists of multiple projects in a selected technology sector and is implemented on a cooperative basis by companies and research units and results of the projects are partially public. R&D cooperation between SMEs, large companies and universities/research institutes is also one of the funding criteria of the projects. In 2006 there were 24 technology programmes running and 11 in preparation. In 2005, companies completed around 900 R&D projects, while universities and research institutes completed more than 600 research projects partly funded by Tekes. These projects generated over 800 new or improved products or services, about 190 industrial processes, nearly 700 patent applications, more than 1,100 academic theses and almost 2,700 publications. Annually, companies participate in about 2,500 projects and research units in about 1,500 in different projects under these programmes, each of which typically lasts from three to five years.

The importance of technology programmes for the Etelä-Suomi region is considerable, with funding of around €110 Million in 2005. Over 60% of the total funding in technology programmes was channelled to organisations in Etelä-Suomi and almost 48% to Uusimaa region alone during that year (Tekes, 2006).

2.2.3.7 Support for public research

Universities and public research organisations in Etelä-Suomi have also a very strong position in the Centre of Excellence (CoE) programmes funded by the Academy of Finland. These support selected research units and research consortia in basic research. There are several overlapping CoE programmes. Currently, a total of 39 CoEs receive funding through two national CoE programmes; 16 units in the 2002-2007 programme, of which 13 were based in universities or public research institutes in Etelä-Suomi and 23 units in the 2006-2011 programme, of which 18 were based in Etelä-Suomi universities. From the 18 centres of excellence appointed to the period 2008 to 2013 in 16 there was a university from Etelä-Suomi region as a partner. One CoE is from VTT. The total funding of 2002-2007 programme is €33.1 million from the Academy of Finland and €5.2 million from Tekes which is backed up with other public funding. In the 2006-2011 programme the total funding will be €30.8 Million. A substantial share of this funding is channelled to research groups in the Etelä-Suomi region.

The Academy of Finland is the most important source of competitive research funding for the universities. In 2005, the Academy research funding was €218.7 Million of which roughly half was aimed at universities in Etelä-Suomi. Funding is provided through dedicated research programmes in specific fields. In 2007 there were a total of 15 research programmes in progress. The academy of Finland also funds other research projects.

The Fifth and Sixth European Framework Programmes (FP5 and FP6) have played a significant role, and they represent the most important initiative in the area of R&D. Even though organisations in Finland have been relatively active in the FP6 projects, they have been less dependent on it than organisations in some other countries. For example, the Funding for Finnish organisations is estimated to have been €345 million since the beginning of the FP6 (late 2002) to December 2006 (Finnish Secretariat for EU R&D). At the same time the combined resources
from Tekes and the Academy of Finland are almost twice as much annually. Although there are no regional statistics on framework programme activities, Etelä-Suomi has been in a strong position to use these instruments.

There is a substantial upcoming initiative to establish new Strategic Centres of Excellence in Science, Technology and Innovation (SHOK) in five key research areas: Energy and environment; Metal products and mechanical engineering; Forestry industry cluster; Health and welfare and Information and communication industry and services. Between 2007 and 2011 Science and Technology Policy Council has suggested an increase of €400 Million to public R&D funding, of which €130 Million is expected to be channelled through SHOKs.

Although not having dedicated instruments or funding, legislation can be viewed as an important instrument as it has changed the R&D policy at the national and regional level. The new University Act (2004) has promoted the third role of universities by stating that “Universities should, as part of their operation, interact with surrounding society and promote the positive impacts of research activities”. In order to achieve this, the Ministry of Education also requires polytechnics to prepare joint regional strategies with Universities.

On the regional level one of the strongest trends to support RTDI-based development, besides supporting innovation infrastructure (such as Science Parks), is the application of the research professorship model. In 2005 there were 189 professorships in Finnish Universities paid for by external funding, of which 110 were ‘grant professorships’. Of these ‘grant professorships’ 60 were in the Etelä-Suomi Universities (Vilhula et al., 2006). Many of the professors are working in cities and regions away from their home university campuses and bringing academic research to new regions. Municipalities are the most important source of funding for these professorships.

2.2.3.8 Financial R&D measures for the private sector

There are various financial instruments for R&D activities. Tekes is financing R&D in enterprises with grants, capital loans and industrial loans. Tekes funding for enterprises in 2006 totalled €271 Million, of which 61.1% was channelled to Etelä-Suomi and a total of 42.1% of the funding was channelled to the Helsinki area and its surrounding region (Uusimaa).

The Foundation for Finnish Inventions supports and helps individual inventors and small entrepreneurs to develop and exploit invention proposals. The regional TE-centres are also providing incubator and start-up aid.
### Exhibit 1: RTDI policy mix affecting the region

<table>
<thead>
<tr>
<th>Policy Areas</th>
<th>Policy objectives and instruments at National* level affecting the region</th>
<th>Policy objectives and instruments at Regional* level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve R&amp;D governance</td>
<td>Science and Technology Policy Council has defined the core strategies to improve RTDI governance</td>
<td>Regional development strategies and programmes prepared by Regional Councils directing the development of RTDI support activities, particularly those financed from EU Structural Funds</td>
</tr>
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<td></td>
<td>Ministries prepare their regional strategies for RTDI policies. The Ministry of Education and Ministry of Trade and Industry’s strategies are the most important</td>
<td>Local and regional innovation strategies guiding investments in RTDI infrastructure and indirect support activities</td>
</tr>
<tr>
<td></td>
<td>Tekes regional strategy and Regional Technology Strategies</td>
<td>Regional foresight activities by TE-centres affecting long term RTDI policy priorities</td>
</tr>
<tr>
<td>Creation of an innovation friendly environment</td>
<td>Sitra package for various pre-seed instruments</td>
<td>Regional Centre Programme developing environments for innovative activity</td>
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<td></td>
<td>National development instruments, such as YRKE for developing business incubators</td>
<td>Policy mix for large urban regions developing expertise base and internationalisation</td>
</tr>
<tr>
<td></td>
<td>Regional Centre Programme developing environments for innovative activity</td>
<td>Local and regional innovation strategies and initiatives of cities, city-regions directing local RTDI policy activities</td>
</tr>
<tr>
<td>Development of human capital</td>
<td>An instrument to recruit foreign professor-level top researchers to Finland (FidiPro)</td>
<td>Financial support for polytechnics by local governments</td>
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<td>Noste programme to improve poorly trained adults’ career prospects</td>
<td>Financial support for polytechnics by local governments</td>
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<tr>
<td>Networking, co-location and clustering measures</td>
<td>Centre of Expertise Programme developing local excellence and growth potential</td>
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</tbody>
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<tr>
<th>Knowledge and technology transfer to enterprises</th>
<th>TULI-programme for enhancing the commercial exploitation of research results</th>
<th>Municipal support for creation and operation of technology parks and regional development companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local government managed cluster specific instruments</td>
<td>Helping companies with the transfer of international technology and co-operation (IRC Finland)</td>
<td></td>
</tr>
<tr>
<td>Research collaboration of public research organisations with the private sector</td>
<td>Tekes technology programmes providing financing for multi partner collaborative R&amp;D</td>
<td>Establishment of joint research structures by local governments</td>
</tr>
<tr>
<td>Support of public research</td>
<td>Tekes technology programmes providing funding</td>
<td>Local public and private support for Research Professorships</td>
</tr>
<tr>
<td></td>
<td>Academy of Finland Research programmes to coordinate research efforts</td>
<td>Joint regional strategies by universities and polytechnics directing their activities</td>
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<td></td>
<td>Fixed time Centres of Excellence at universities with increasing research funding</td>
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<td></td>
<td>University legislation directing universities to undertake a third role</td>
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<tr>
<td></td>
<td>Strategic Centres of Excellence will focus research resources on key RTDI areas</td>
<td></td>
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<tr>
<td>Financial R&amp;D measures for the private sector</td>
<td>Tekes R&amp;D financing through grants and loans</td>
<td>TE-Centre development, incubator and start-up aid</td>
</tr>
<tr>
<td></td>
<td>Funding for development of inventions by Foundation for Finnish Inventions</td>
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</table>

[* Policies at national level are those formulated and implemented by national actors even if they have a regional dimension, while policies at the regional level are those under the complete and exclusive control of the regional authorities. Shared policies planned and/or implemented jointly by national and regional authorities e.g. co-funding, will be regarded as regional.]

### 2.3 Conclusions

The Etelä-Suomi region has experienced rapid growth as one of the most competitive regions in Europe. At the same time the regional RTDI base has grown to be relatively strong. This has been, at least in part, due to a number of factors: an increase in private R&D funding lead by the ICT sector; the expansion of the higher education system, with the increase in numbers of students at universities, and the creation of polytechnics from vocational colleges; an increase in competitive funding mechanisms for both the private sector and universities; and a systemic approach to the RTDI policy mix, which has successfully been able to support RTDI in various
stages from basic research to commercialisation in co-ordinated way. The role of public policies and instruments is mirrored by the investment decisions of the cluster leaders and their constituent companies, particularly the core R&D and innovation leaders.

The presence of two major multidisciplinary universities, one bigger and one smaller technical university and several other specialised HEIs, several polytechnics and the bulk of State research institutes makes the region the economic powerhouse of Finland and a hotspot for RTDI. With total of 58% of university students and 57.7% of R&D expenditure, it is clearly the biggest knowledge base in Finland. Government R&D is especially concentrated in Etelä-Suomi. All these institutes also bring in an above average number of patents.

As graph 1 shows, Etelä-Suomi stands out in all aspects of RTDI performance. Even in higher education R&D the region performs relatively well when it is borne in mind that in absolute terms the region hosts over half of higher education activity. However, as can be seen from the Graph 1, the recent development of RTDI activities in the region has been negative. Many reasons can be found to explain this development. First of all, the relatively strong role of technology intensive industries, particularly ICT has a big impact on the development of the region as there was a slump in economic development in the early 2000s. Secondly, the number of R&D personnel is already relatively high, which means that growth will be slower than in some other less developed regions. However, the negative turn in RTDI activities can also be a sign of the weakening position of the region and should be monitored carefully.

Graph 1: Comparison of Etelä-Suomi knowledge base with that of Finland

Etelä-Suomi receives the majority of its public research funding from the Academy of Finland and a substantial part of national R&D funding (55%) from Tekes. Etelä-Suomi has also fared well in competitive research programmes like the Centre of Excellence in Research and the national Centre of Expertise programme.
When looking at the policy objectives and instruments, Exhibit 1 shows that there are several planning instruments for co-ordinating RTDI governance and numerous programmes and instruments available, in particular, provided by the national government. Finland has a very strong public RTDI support system, which provides plenty of resources for research and development in Etelä-Suomi region.

It can be argued that, despite increasing public R&D investments, the development of the regional knowledge base has been predominantly private-sector driven. Private sector R&D expenditure has more than doubled since 1995 and accounts for around 70% of all R&D expenditure. This increase has also been reflected in the increased employment in Science and Technology. However, this growth would not have been possible without additional substantial investments in higher education, with strong emphasis on science and engineering (specifically the ICT sector). Even though the relative role of public R&D investments has been smaller than in many other regions, public investments have nonetheless been able to catalyse the development of RTDI activities in the private sector and also direct R&D investments towards specific fields of strategic importance at the regional and the national level.

Various national level policy measures and policies have also affected the development of the knowledge base in higher education and public research institutes in terms of quantity, quality and relevance to the economy and society as a whole. The main mechanism for this development has basically been the relative increase in competitive funding mechanisms (public and private) as a source of R&D funding, support for collaborative RTDI by national RTDI funding instruments such as the Tekes Technology programmes and Centre of Expertise programme, and the legislative changes in the education system such as the creation of the polytechnic system and the introduction of the so-called ‘third mission’ of the universities.

At the policy level the region has very little influence on innovation and R&D policies. The Finnish innovation system is very much state centred and the main role of most of the regional organisations is to channel resources. This also applies to universities, which have relatively little autonomy. Exceptions to the rule are the local municipalities, which have a lot of autonomy to use their own funding for innovation and R&D policies. This has been the case particularly with some medium-sized cities such as Turku that have put a significant amount of their own resources in establishing innovation support infrastructure and services.
3 Regional economic structure

3.1 Description of the economic structure

3.1.1 The characteristics of the productive structure of the region’s economy

Over the period 1995-2004 the growth of the regional economy in Etelä-Suomi followed similar trends to those of Finland as a whole. It accounted for 54.7% of the country’s GDP in 1995 and 56.9% in 2004 (Table 8). The Gross Domestic Product per capita in the region amounted was approximately 115% of the national average and 156% of the EU25 average and GDP grew at an average annual rate of 5.3% from 1995-2004, which was slightly higher than in Finland as a whole. In 2004 GDP per capita was €33,567. During the same period the population in Etelä-Suomi grew at a much faster rate than that of the country as a whole (with the average annual rate of 0.7% compared to 0.3%) reaching approximately 2.57 million inhabitants. This represents 49.2% of the population of Finland (Table 9).

One of the factors behind the successful growth of the Finnish economy has been the rise in productivity. Between 1976 and 2000 the average annual productivity growth rate of manufacturing industries in Finland was 5.7% and that of the economy as a whole was 3.0%. In Etelä-Suomi productivity was and presumably remains well above the national average. In terms of labour productivity Etelä-Suomi is the most productive of the Finnish regions with output of around €65,000 per person employed. In their study Bäckerman and Maliranta (2003) found the biggest reason for higher productivity in Uusimaa region to be that enterprises in the Uusimaa region are more exposed to national and international competition.

The unemployment rate remained considerably lower than the general national level at around 6.9%. The unemployment rate has fallen rapidly since the serious recession in the early nineties (15.3% in 1994). The decline has also been more rapid than in other Finnish regions. Long term unemployment has also fallen since 1995 and is around the same as the average in Finland. However, long-term unemployment is still a problem.

Etelä-Suomi’s relative share of employment in high tech industries has declined rapidly between 1999 and 2003 (See Graph 2). This reflects the change in the economic structure of the region and a shift from manufacturing to services. The share of high-tech and knowledge intensive services relative to Finland has also decreased but in absolute numbers employment in services has risen (See Annex 2: Graph 1). Specific services are concentrated in the Helsinki region, as is typical of many countries in the EU, and Finland is no exception. The growth of the service sector affects the whole regional economy and increases polarisation. Around half of the population of Etelä-Suomi lives in the Helsinki region on the South coast, and there is a tendency for urban migration to further increase this percentage. Other urban centres have also grown at the same time as the rural population has declined.

In terms of value-added in 2004, the primary sector in Etelä-Suomi accounted for 1.5% (3.1% in Finland), the secondary sector for 29.3% (31.5% in Finland) and the tertiary sector for 69.2% (Finland 65.5%). The service sector is dominant in Etelä-Suomi and especially many specialised services are located in the region. Main differences are in the services mainly provided by the private sector, such as wholesale and retail trade (+1.9% compared to Finland), real estate, renting and business activities (+1.6%), transport, storage and communication (+1.2%) and financial intermediation (+0.7%) (See table 5).

In terms of average annual growth rates between 1995 and 2004 (based on value-added at current prices) the primary sector (NACE A+B) displayed slow growth (0.5%), whereas real estate, renting and business activities (K; +7.7%) , Transport, storage and communication (I; +6.6%), construction (F; +6.5%), activities of households (P; 6.5%), financial intermediation and
wholesale and retail trade (G; +6.2%), and Hotels and restaurants (H; +5.5%) were the most dynamic sectors (own calculations based on Eurostat data).

Six sectors concentrate 81.6% of the Gross Fix Capital Formation (GFCF) in Etelä-Suomi. The biggest sector is clearly ‘Real estate, renting and business activities’ with a 41.5% share of total GFCF. The other significant sectors are ‘Manufacturing, Transport, storage and communication’, ‘Wholesale and retail trade’, ‘repair of motor vehicles’, ‘motorcycles and personal and household goods’, ‘Other community, social, personal service activities’ and ‘Public administration and defence’. Significant changes in the composition of gross fixed capital formation were observed during the period 1995-2003 (Table 10). The biggest decline in capitalisation was experienced in manufacturing. Its share of total gross fixed capital formation was reduced from 20.5% to 12.4%. Real estate, renting and business activities underwent a gradual increase in their share from 32.4% in 1995 to 41.5% in 2003. Transport was the second most important sector experiencing a significant decline (from 16.3% to 11.9%). Also ‘Electricity, gas and water supply’ and ‘Hotel and restaurant’ sectors experienced a decline in GFCF. However, at the same time capitalisation especially in the ‘Financial intermediation’ but also in Trade, ‘Public administration and defence’ and ‘Health and social work’ sectors grew rapidly, although their absolute share is still relatively modest.

EU policies have had a fairly limited impact on the development of the Etelä-Suomi region. In terms of SF, the funding for RTDI activities in Etelä-Suomi has been the smallest of the Finnish regions, which explains the relatively low impact of SF on the development of the regional economy. Because of the well performing economy the bulk of the region has not been eligible for SF funding. In relative terms, the framework programmes have had a bigger impact on R&D activities as many of the universities, sectoral R&D organisations and larger enterprises are located in the Etelä-Suomi region.

3.1.2 Systemic characteristics of the region

Efforts to strengthen the collaboration between private and public research –particularly between HEIs and the private sector– have been fairly successful. In the 1970s collaboration between universities and industry was not encouraged. This situation changed in the 1980s and has been strengthened since the early 1990s. With the advent of the national innovation system concept, the economic and societal value of research was given higher priority. The funding mechanisms that support collaboration have also had good results.

There has been also a strong cluster focus in Finland at both the national and regional levels. At the national level the innovation system approach has led to increasing emphasis also being given to industrial clusters and networks. In the 1990s, industrial clusters were a major focus in the debate about national technology policy, and as a result various studies took place. Later, from 1997 to 1999, eight specific cluster programmes were run, channelling funds from privatisation into R&D. Another example of the cluster approach was the heavy investments in biotechnology by Sitra starting in the mid 90s, which sought to build a new cluster of successful firms in Finland. Despite mixed results these measures have had a big impact on funding and co-operative behaviour in Finland and Etelä-Suomi. In Etelä-Suomi biotechnology, in particular, has benefited from national support as the majority of the industry is concentrated in the region.

National and regional cluster policies have partly strengthened interactions. The national centre of expertise programme, started in 1994, has vastly increased the regional dimension of cluster-oriented thinking in Etelä-Suomi. Besides a strong national cluster policy both the national government and the local governments have put more emphasis on strong regional (or local) clusters and have been building activities around them. Some of the most notable include electronics in Uusimaa and the South West regions, Life sciences in Helsinki and Turku city-regions, a forestry industry and paper industry cluster in the South-East and Kymi regions and a chemistry cluster in the Itä-Uusimaa region.
The strongest clusters have been developing in the region for a long time and it is still too early to say much about the impact of recent regional cluster policies. The development of the region also strongly reflects the development of the Helsinki region, which enjoys the typical advantages of capitals in terms of attracting most of the company headquarters, public services, and knowledge intensive business services in the region.

3.1.3 The regional economy in the international context

No precise figures are available, but according to estimates, the Etelä-Suomi region has been able to attract most of the FDI obtained in Finland. However, the total amount of FDI is still quite low in relative terms. In 2004, the investment stock of FDI to Finland was €40 billion. At the same time the Finnish investment stock abroad was €59 billion. In 2003, the amount of FDI to Finland was around €3 billion.

Etelä-Suomi has a strong position in terms of exports as its manufacturing is very much export driven. In 2005, 47.6% (42.1% in 1995) of the production of manufactured goods went to exports. Etelä-Suomi region’s international orientation regarding exports is quite significant. In 2005 the provincial state exported manufactured goods worth €27.3 billion, which is about 49% of total Finnish exports. A large share of exported products was in the radio, television and communication devices sector (31% compared with 25% for Finland as a whole). Total exports in this sector have more than tripled since 1995, rising from €2.5 billion to €8.7 billion. Etelä-Suomi also has a strong export base in the paper industry, although total exports in this sector have decreased slightly (-9% between 1995 and 2005). The relative share of all paper industry exports was 13.1% in Etelä-Suomi compared to 16.1% in Finland. The strong share of exports is also a source of fluctuations in the regional economy as the stronger export sectors, such as electronics, paper, machinery and ship building industries, are all exposed to fluctuations in international markets.

3.1.4 The local financial market

The financial markets in Etelä-Suomi are highly developed. Most of the private financial activity in Finland is concentrated in the Helsinki region in particular. Since a crisis in the early 1990s the banking sector has undergone significant restructuring. This has altered the traditional banking system and has led to a more open financial system. The development of the venture capital market has been positive during the past decade, although there is still a lack of venture capital for enterprises in their early stages.

Governmental agencies pioneered Finnish private equity investing. In the mid-1990s, the public sector still accounted for 50-60 percent of investments made each year at national level. Today, the role of the public sector is limited to Finnish Industry Investment Ltd (TeSi) and Sitra, which, together, account for less than 10 percent of the total capital under management. Today, the public sector focuses mainly on seed finance and rescue or turnaround operations. In 2005 Finnish Private Equity firms invested a total of €313 million. 54% of venture capital invested in Finland was in companies located in the Etelä-Suomi region. Moreover, the average size of investments is larger in Etelä-Suomi than in other regions of Finland, which means that the geographical distribution by number of investments differs from the distribution by amount invested. In terms of investment numbers, the share accounted for by Southern Finland has dropped to 44%. Although the supply of venture capital has increased during the last ten years, when compared to others, Finland only achieves the average in Europe, measured by the size of the venture capital market per capita.

Of the public sector financial instruments, Finnvera plc is a specialised finance company offering financing services to promote the domestic operations of Finnish businesses, and to further exports and internationalisation of enterprises. In 2006, Finnvera had credits and guarantees
worth €2.3 billion and export credit guarantees and special guarantees worth €5.1 billion. At the regional level a Finnvera subsidiary, Veraventure, and TeSi are participating in regional capital investment funds. For example in 2005, TeSi had €61 Million in regional funds, approximately one fifth of all funds. The investments by TESI in regional capital funds have corresponded to their needs in recent years. There have also been plans for further activation of regional investment funds with financing coming partly from central government and partly from regional public and private bodies. Seed Fund Vera Ltd is a nation-wide seed fund for enterprises in their early stages. Finnvera provides small/micro credit to promote the creation of new enterprises and jobs.

There are also other sets of financial instruments in operation at national level. Sitra has a dedicated package of instruments as a part of its pre-seed activities. These include funding for business idea development and a marketplace for early-stage enterprises available to venture capital investors to offer them potential investment targets and a risk-sharing instrument.

The ability of public financial instruments has been important in Etelä-Suomi as there has been a shortage of private investments for new companies in the region. This has been particularly important for SMEs and strong high technology fields like ICTs and the life sciences. Even though the availability of private sector venture capital has increased, the role of public financial instruments is still important for start ups and SMEs in general.

3.2 Policy context

3.2.1 Policy objectives

Policymaking in Finland is fairly centralised and the decisions and planning of interventions are taken mainly at the level of the Central Government and the Ministries. However, unlike many other European countries, municipal authorities have relative autonomy and are able to levy their own taxes. As a result municipalities, and their regional groupings, are active in economic development policies, which often cover RTDI issues. Regional Councils are appointed by the municipalities and are therefore represent local governments politically. Furthermore, they also have relatively little (although some) own resources. Their main instruments for funding their policies so far have been the Regional Operational Programmes co-funded by the Structural Funds, national government and local governments. Within the framework of Regional Operational Programmes and the general policy guidelines of the Central Government, Regional Councils can set their policy objectives and plan their interventions. However as is the case for RTDI policy, their main policy interventions are planned at national level by the Science and Technology Policy Council and the relevant ministries, mainly the Ministry of Trade and Industry and the Ministry of Education.

3.2.2 Policy instruments

In Finland, coordination of RTDI activities with various other policies, such as industrial, education, environmental, regional, labour market, economic, fiscal, energy, health and welfare policies has been fairly successful. This coordination has led to specific concerted efforts such as cluster programmes, the Centre of Expertise Programme, the education programme for IT workers, and new arrangements for venture capital. The high profile of the Science and Technology Policy Council has had a big impact in this regard.

Finland has a long history of regional policy activities, going back to the mid 1960s. However, until lately regional policy efforts have been mainly directed towards Northern and Eastern parts of Finland. Since joining the EU in 1995, regional policy has also had an effect on various sub-regions in Etelä-Suomi. Structural funds have had a relatively big impact on regional RTDI pol-
icy outside the biggest city regions with universities, such that many RTDI activities and the development of RTDI infrastructure has been partly financed from the Structural Funds.

Financial liberalisation in the early 1990s had a big effect on opening up the economy and thus also had an indirect influence on the RTDI policies. The liberalisation of capital accounts and removing restrictions on foreign investment only took place in 1993, when Finland joined the European Economic Area. Stable macroeconomic and labour market policies have also had an influence on making Finland and Etelä-Suomi a stable business environment for the past decade.

National education policy has had a considerable effect on RTDI policy. Expansion of publicly provided education started soon after WWII with the main goal being to provide education to all children regardless of their socio-economic status or place of birth. In the 1960s and 70s the priority became improving higher education and the research system. Education was the prime motor for development of RTDI capacity during that time and it was only in the late 1970s and early 1980s when the S&T policies were embraced as immediate policy instruments. Today, the higher education system is well developed, offering a place to about one third of the relevant age group. Education policy has also been quite responsive to industry needs. The increase in the supply of science and engineering graduates has been an important factor in explaining the success of the Finnish innovation system and, for example, with the rise of the ICT industry, there were some specific policy responses in the 1990s with a special programme to increase education in ICTs. The results of big education investments during the 1990s are also evident in the almost doubling of the number of doctorates awarded each year. Finnish students have also ranked on top in the OECD Programme for International Student Assessment (PISA) in 2003.

The focus on retraining people and linking unemployment benefits to acquiring additional education have had some effect in helping restructure the economy. However, the long-term unemployment rate remains fairly high.

One significant aspect of the growth of the ICT industry has been the regulatory policy in telecommunications. The liberalisation of telecommunications and ICTs started in the late 1980s and early 1990s with data communications, liberalisation of local and long-distance telephony and later privatisation. Finland was thus one of the first European countries to create a competitive environment in telecommunications.

Efforts to boost innovation through tax-related mechanisms are relatively new in Finland and there have not been any significant policies affecting RTDI policies in Etelä-Suomi region.
### Exhibit 2: Effects of policies complementary to RTDI instruments on R&D capacity of the region

<table>
<thead>
<tr>
<th>Policy Areas</th>
<th>Policies complementary to RTDI instruments affecting policy area*</th>
<th>Effects on R&amp;D capacity of the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve R&amp;D governance</td>
<td></td>
<td>The introduction of EU regional policy and Structural Funds programmes has made development work more systematic and reinforced the role of RTDI policy</td>
</tr>
</tbody>
</table>
| Creation of an innovation friendly environment | Regulatory liberalisation of given sectors such as telecommunications  
Creation of various intermediaries (science parks and development companies) by municipalities | Opening up markets for competition and new innovations  
Very comprehensive set of innovation support instruments focused on local industrial structure |
| Development of human capital  | Creation of a polytechnic system  
Enlargement of tertiary education  
Retraining activities for the unemployed | New vocationally oriented highly educated workforce. New problem solving innovation services.  
A large pool of highly educated workers  
Important in order to avoid more structural employment problems |
| Networking, co-location and clustering measures | Local economic development policies active in setting up cluster activities | Building up local networks and mobilising local resources in more peripheral sub-regions |
| Knowledge and technology transfer to enterprises |                                                                  |                                      |
| Research collaboration of public research organisations with private sector |                                                                  |                                      |
| Support of public research    |                                                                  |                                      |
| Financial R&D measures for the private sector | Financial liberalisation  
Public venture capital instruments | A boost for financing RTDI and growth  
Helping to fill the gap in private instruments |

[*Examples of such policies are the fiscal, industrial, regional, educational, labour, trade and competition policies.*]
3.3 Conclusions

Etelä-Suomi is the wealthiest region in Finland with a GDP per capita well above the national average. Unemployment rate has been under the national average for the entire period from 1995 to 2003. However, long-term unemployment has been slightly higher than the national average. Even though there are strong industrial sectors in Etelä-Suomi, the region is still dominated by the service sector, which accounts for a slightly higher share of the economy than the national average. The region is still relatively strong in high technology manufacturing, although the gap with other regions in Finland has narrowed since 1995. Employment in high technology services is very high and Etelä-Suomi is one of the top regions in Europe in this respect.

Although the role of ICT sector is not that strong as it was in the late 1990s, Etelä-Suomi has benefited greatly from the growth of the ICT sector and also the related policy activities in education and research to support that growth. High technology industries present in the region have benefited in general from the strong national policy to support science and technology even during recession. The liberalisation of financial markets and the regulatory liberalisation of certain sectors such as telecommunications, has also affected growth. This has not only been about supporting industry R&D but also basic research.

Graph 2: Comparison of Etelä-Suomi region's economic structure with the economic structure of Finland

![Graph showing comparison of economic structure](image)

Note: long-term unemployment, unemployment rate, employment in high tech, in medium tech, in medium low, in low, in knowledge intensive services, in high tech services 1999, 2003

Education policy has also influenced the economic growth of the region. Not only is a large share of higher education located in the region, which has meant that a lot of investments in higher education have been channelled into Etelä-Suomi, but it has also increased the supply of highly educated workforce to support growth industries. The creation of the polytechnic sys-
tem has further strengthened the development of human resources, as has the gradual enlargement of the university system.

The main effect of regional policy has been the development of RTDI capacity in the more rural areas and smaller towns in Etelä-Suomi, where local funding and funding from the Structural Funds has helped build an innovation-friendly environment and make RTDI development more systematic. Creation of various intermediaries such as science parks and development companies has been an important factor in improving innovation services in the region and local government has had an important role in this development in particular. However, as a whole the role of regional policy has been modest at least compared to other regions in Finland and the development of RTDI capacity in Etelä-Suomi has been much more dependent on national macroeconomic and sectoral policies.

4 Conclusions

4.1 Assessment of the RIS

In conclusion, Etelä-Suomi’s regional innovation system (RIS) possesses a very strong and well established knowledge base: it hosts an extensive network of universities, polytechnics and public research institutes and the majority of the private sector’s R&D units. The concentration of many national public RTDI organisations and the existence of specialised services in the Helsinki region also strengthen the RIS.

In terms of R&D expenditure Etelä-Suomi ranks among the Top 15 European regions and achieves an above average number of patents (relative to the average for Finland). Etelä-Suomi also ranks 4th in the 2006 European Regional Innovation Scoreboard of European regions. Due to strong traditions in the forestry and paper industry, and in manufacturing machinery, certain scientific fields such as materials technology and mechanical engineering are strong. During the last two decades, electronics and information and communication technologies in particular (with the lead from Nokia) have become the leading technology fields. Food and agricultural sciences are also traditionally strong fields, although the food industry and agriculture are not very significant fields of activity in Etelä-Suomi. In addition, some modern fields such as medicine, biotechnology, environmental research & technology and nanotechnology, have recently become strengths. The knowledge creation system not only matches the needs of the region quite well, but also serves the whole country in many fields because of the national orientation of many universities and state research institutes. Because of the same “national” orientation of many knowledge producers there are also some fields of research and development activities for which demand does not come from within the region but which are mainly targeted on other regions or international markets. There are many fields, however, where international connections are needed to complement the regional knowledge production system.

In terms of knowledge diffusion, one of the strengths of the Etelä-Suomi RIS is the large number intermediaries operating at the interface between the public and private sector on national, regional and local levels. Alongside science parks, technology centres, and business incubators, there are various public and private innovation services and municipal arrangements. The other side of the coin is that some resources are somewhat dispersed across many organisations and instruments and therefore there is some overlap in activities and confusion among enterprises about the role of each intermediary. Collaboration between higher education institutes, public research institutes and the private sector is also very well developed. However, collaboration and the various mechanisms to support it (e.g. technology programmes) have so far tended to favour larger enterprises.
The level of education in Etelä-Suomi is the highest in Finland and the region also enjoys positive inward flows of educated workers from other parts of the country. The number of mathematics, engineering and science students is also high in international terms. However, in many enterprises, particularly SMEs, the absorptive capacity is still relatively low. The national policy to strengthen the role of higher education has benefited Etelä-Suomi greatly. The educational system responds well to the needs of the region with all respective fields covered. The universities in Etelä-Suomi are the oldest in Finland and have been developed to cover the needs of the whole country. There is also a traditionally high participation rate in life-long learning.

Open business-to-business co-operation has a very long tradition. This has been developed by industrial organisations over several decades. As a result Finland, is one of the top countries in Europe when it comes to collaborations between innovative SMEs. The collaborative culture has been enhanced by various national and local innovation policy instruments, which have emphasised co-operation.

From the governance standpoint, RTDI policy in Etelä-Suomi has mainly been based on a mix of national and local governance. Being the most important region in the Finnish economy and given that much of both public and private RTDI activities are concentrated in the Helsinki region has emphasised the role of national instruments. The national RTDI governance has been complemented by local activities run by municipalities and sub-regions, which have been able to introduce region-specific initiatives. There has not been much need for governance at the level of the Etelä-Suomi region. It may be argued that in reality there is no regional innovation system in Etelä-Suomi. Rather, the region's knowledge base is integrated within the national innovation system and supported by some sub-regional and local elements.

One weakness of the region has been relatively light RTDI governance in the capital's metropolitan region, which has delayed the formulation of a coordinated approach to developing a strong RTDI and industry base around Helsinki. There are several organisations dealing with RTDI-related governance issues but co-ordination has been lacking despite recent efforts to produce a joint vision.

The economic structure is relatively diverse and Etelä-Suomi is not so highly dependent on a few key sectors as some of Finland's other regions. Particularly national, but also EU, RTDI funding has had a considerable impact in the region since it is home to many innovative enterprises. Nevertheless, the biggest factor for the regional knowledge base and economic growth has been the substantial amount of private R&D, which public R&D expenditure and various instruments have mainly catalysed, supported and directed.

Some of the region's weaker points are the international dimension, in terms of human resources and the capacity of more traditional sectors to undertake knowledge creation. It is a challenge for the education system to adapt to shrinking age groups and to avoid a shortage of knowledge creation capacity, meaning that more and more students and researchers need to be attracted from abroad. However, international mobility among researchers has so far been low both at universities and at government research institutes, although Etelä-Suomi has done better in this respect than most Finnish regions. Another challenge for the RIS is to reach the more tradition sectors and SMEs, which are still not doing very well in terms of productivity and innovation. The performance across various sectors is still somewhat uneven and the success of a few internationally competitive industrial clusters masks the fact that in many industries development have been somewhat weak.
### Exhibit 3: Strengths and weaknesses of the regional innovation system

<table>
<thead>
<tr>
<th>Category</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
</table>
| Knowledge creation capacity     | • Strong knowledge creation capacity provided by several universities and public research institutes  
                                | • Strong private research in the form of several private research centres in enterprises | • Knowledge creation capacity in SMEs, traditional sectors and services could be better  
                                |                                                                                   | • Underdeveloped international dimension in human resources and knowledge creation |
| Knowledge diffusion capacity     | • Multitude of intermediaries in the region with several bridging mechanisms and instruments  
                                | • Well developed interaction between HEIs, research institutes and enterprises | • Dispersed resources - potentially too many organisations with too few human and financial resources  
                                |                                                                                   | • Many mechanisms work better with bigger enterprises |
| Knowledge absorption capacity    | • High average level of education especially among the younger population  
                                | • High participation rate in life-long learning  
                                | • Human resources in science and technology high | • Absorption capacity low in many SMEs |
| Interactions of main actors      | • Well developed interactions at national and international level  
                                | • Strong national support mechanisms have increased interaction | • Due to sheer number of organisations connections between numerous actors are not very well developed |
| RTDI governance capacity        | • Strong national R&D governance also takes care of regional needs  
                                | • Strong local R&D governance culture has been developed in medium sized cities | • Capital region has so far been slow to adopt sub-regional RTDI governance |
| Knowledge vs. economic specialisation | • Wide knowledge base and economic specialisation match well | • Some human resources needed from other regions to meet demand |
| Economic Structure               | • Diversified economic structure  
                                | • Services have strong position |
To conclude, evidence on long-term development suggests that the good economic performance of Etelä-Suomi can be attributed to the same factors as the national economic performance of Finland as a whole. The main factors are strong private and increasing public R&D investments, rapid restructuring of the economy in the 1990s, the international success of the ICT industry and a successful education policy. In Etelä-Suomi these factors have been reinforced by the fact that more and more economic activity has been concentrated in the capital region and that the public knowledge base is also very much concentrated in the region.

4.2 Assessment of policies

As a region Etelä-Suomi has not had an RTDI policy of its own. Except for a few cooperative organisations, Etelä-Suomi as an entity has mainly been used as a means of co-ordinating Structural Funds and for statistical purposes. However, the strong role of national policies has also made regional RTDI policy less relevant in Etelä-Suomi than in some regions.

On the national level, there has been no ‘master plan’ to restructure the economy and industry in the 1990s; rather an array of policy measures were working to the same end over an extended period of time. The necessary policy changes had already been made in the 1980s, with some having come as early as the 1970s. In the 1980s, long before the rise and fall of the ‘new economy’, Finnish technology policy began to give high priority to ICTs. These policies were continued in the following decade and undoubtedly contributed to the success story of the 1990s. Finnish R&D investment increased continually and networking between public and private actors was enhanced by both national and local RTDI policy instruments.

However, policies pursued since the early 1990s have had their role as well. There have been considerable investments in research activities together with an increase in the volume of national research and development funding instruments, particularly those managed by Tekes and the Academy of Finland. Tekes funding in particular has assisted private research activity, but it has also facilitated university-industry partnerships in R&D projects.

There has also been a major shift in priorities as a consequence of European integration and changes in the comparative advantages of the economy. This has meant that the focus has shifted from short-term macroeconomic policies to long-term microeconomic ones, and in particular RTDI policies, which has proven to be a successful choice. A good example of these policies is the Centre of Expertise programme, which increased interaction between HEIs, research institutes and enterprises and facilitated R&D activities in selected key industrial clusters. These national policies have concentrated on rectifying market failures, promoting competition and improving framework conditions.

National policy has been especially strong in the Helsinki region and, as a result, more local perspectives to RTDI policy have recently been developed. In other sub-regions national innovation policy instruments have been complemented by local economic development policies. City governments in particular, but also other municipal authorities, have supported the creation of local innovation environments. At the local level the main emphasis of RTDI policy has been support for local polytechnics and the creation of a favourable innovation environment in the form of technology parks and regional development organisations. On the regional (NUTS3) level, county councils and other relevant stakeholders have recently addressed RTDI issues in more detail. However, the weak position of regional actors compared to those on the national level has slowed down the development of regional RTDI policy.

Local cluster policy has also been developed so that almost every city region, large or small, has defined its key industries and has directed local, national and EU funding to support the development of these key areas of the local economy. Structural funds have had a relatively big impact on regional RTDI policy as they have been able to support RTDI infrastructure and activities in various regional organisations such as polytechnics. This has been an important addi-
tion to R&D infrastructure, especially in those regions which do not have universities or government R&D laboratories.

EU structural fund activities have also been important in complementing national instruments and local economic development activities. Various activities relating to regional Structural Fund programmes have particularly helped innovation activities in SMEs.

One of the weaknesses of the RIS has been the relatively undeveloped innovation policy in the Helsinki metropolitan area compared to the metropolitan areas of other cities in the Etelä-Suomi region. This situation gradually improved when new dedicated regional innovation strategies for Helsinki metropolitan area and the Uusimaa region brought a more focused view on future development activities.

There have also been some challenges for the public policies in the region. The strong support for high technology fields appears to have been very successful, but there is still room for improvement in the more traditional industry sectors and in services. Also, attempts to re-educate the long-term unemployed have not been entirely successful.

### Exhibit 4: Public Policy vs. Strengths and Weaknesses of RIS

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Effective approaches</th>
<th>Failures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Strong knowledge creation capacity provided by several universities and public research institutes</td>
<td>• Investments in research</td>
<td></td>
</tr>
<tr>
<td>• Strong private research in the form of several private research centres in enterprises</td>
<td>• National R&amp;D funding schemes</td>
<td></td>
</tr>
<tr>
<td>• Multitude of intermediaries in the region with several bridging mechanisms and instruments</td>
<td>• Centre of expertise programme</td>
<td>• Expansion of the education system</td>
</tr>
<tr>
<td>• Well developed interaction between HEIs, research institutes and enterprises</td>
<td>• Technology parks and regional development companies</td>
<td>• Local support for polytechnics</td>
</tr>
<tr>
<td>• High average level of education especially among younger population</td>
<td>• RTDI financing instruments such as technology programmes</td>
<td>• Attempts to re-educate long-term unemployed have been something of a disappointment</td>
</tr>
<tr>
<td>• High participation rate in life-long learning</td>
<td>• Support for life-long training</td>
<td></td>
</tr>
<tr>
<td>• Human resources in science and technology high</td>
<td>• Policy emphasis on educating S&amp;E students</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Special programme to in-</td>
<td></td>
</tr>
</tbody>
</table>
crease ICT education in
the 1990s

- Well developed interactions at national and international level
- Strong national support mechanisms have increased interaction
  • Instruments such as Te-kes technology programmes have promoted interaction
- Strong national R&D governance takes care of the regional needs also
- Strong local R&D governance culture has been developed in medium sized cities
- Wide knowledge base and economic specialisation match well
- Diversified economic structure
- Services have strong position

**Weaknesses**

- Knowledge creation capacity in SMEs, traditional sectors and services could be better
- The instruments have not been able to approach SMEs and some traditional sectors as well as expected
- Underdeveloped international dimension in human resources and knowledge creation
- Dispersed resources - potentially too many organisations with too little human and financial resources
  • Centre of Expertise programme not successful in generating collaboration between local innovation poles
- Many mechanisms work better with bigger enterprises
  • Specific programmes for SMEs
- Absorption capacity in many SMEs is low
  • Projects related to regional Structural Funds programmes have added to technology activity of SMEs
- Due to sheer number of organisations, connections between numerous actors are not very well developed
- Helsinki region has so far been slow to adopt sub-
4.3 Policy challenges

As the most populous region in Finland and home to the capital city Helsinki, Etelä-Suomi has been substantially affected by national innovation policy in Finland. This has had an important impact on the resources and instruments available for enterprises, HEIs and public sector RTDI activities.

With respect to the objectives of the Lisbon Strategy, Etelä-Suomi has already achieved some important targets which were set for 2010: For example, in 2000 GERD was as high as 3.59% and BERD accounted for more than two thirds of GERD. Having said this, the BERD figures are seriously affected by the high volume of R&D in the ICT sector with phone manufacturer Nokia in the lead. The high level of R&D in high tech sectors somewhat overshadows the fact that there are still many challenges to promoting R&D activities in more traditional sectors and SMEs. Despite public sector R&D being well above the EU25 average, it is still behind private R&D levels.

In terms of patents, traditional industries and SMEs lag behind the high tech industries. The service sector supporting industries in Etelä-Suomi, and in Finland in general, is still relatively underdeveloped, especially when looking at the knowledge intensive business services. Also the R&D intensity of the service sector could be improved, as the labour productivity in most service sectors is relatively low.

However, one of the main problems with Etelä-Suomi, despite its international connections and high level innovation system, is that the region is still excessively reliant on domestic activities. The amount of foreign investment in Etelä-Suomi, the numbers of foreign students and researchers, the skilled workforce, and the number of foreign enterprises, are all relatively low compared to many other leading regions in Europe. This further highlighted by the fact that Finnish enterprises are investing outside the country and people in science and technology are actively moving abroad.

On the research side there is a wide-ranging discussion in Etelä-Suomi and in Finland in general at the moment about the level of science and R&D activities. At least three main challenges have been identified. Firstly, despite world class education and a strong science base, there is a lack of top class research. Building up high concentrations of scientific research and industrial R&D has been addressed in innovation policy. Secondly, knowledge resources are relatively dispersed both sectorally and regionally. In many cases it may be a good thing to produce variety and more regionally diverse development, but at the same time this can be an obstacle to the productivity of RTDI spending. To respond to this there are discussions about
renewing the structure of Higher Education and the role and structure of public research institutes. Thirdly, there is an ongoing discussion about the structural problems in the innovation activities in a way that Etelä-Suomi is strong in research and technological development but still needs to promote more innovation in other fields and in other forms and to support enterprises in making better commercial use of their R&D.

On a more general level, an ageing population is a problem in terms of human resources, although the situation is not as bad as in other Finnish regions.

The three most important challenges for Etelä-Suomi knowledge economy are:

- To broaden the basis of innovative companies outside of ICTs and other high-tech sectors. More attention needs to be paid to more traditional sectors and SMEs.
- To raise the number of business services (especially knowledge intensive business services) and increase their quality in order to compete internationally.

Further, but less prominent, challenges include the need:

- To promote entrepreneurship and growth in new science based technology fields, which have so far seen quite modest growth.
- To facilitate the transformation of high RTDI spending and high patent rates into the commercial application of knowledge, new industrial activity and higher productivity.
- To overcome problems of congestion in the Helsinki metropolitan area, which are hampering growth and making the region less attractive both to people and enterprises.
- To increase the number of foreign students and researchers and to increase world class research in HEIS in order to remain competitive in innovation activities.
- To attract more foreign investment and foreign high-tech companies so as to make better use of the knowledge pool and public RTDI spending.
- To make the regional innovation environment better known and more attractive to foreign people and companies.

Overall, Etelä-Suomi region is well positioned for the future. The region has a strong position in the national context and both population and economic activity in Finland is expected to become more and more concentrated in the region. National RTDI policy is focusing increasingly on national competencies, broadening the competence base, attracting more investments and enhancing internationalisation of the innovation system. These policy issues are also highly relevant for Etelä-Suomi. The strong position of RTDI issues in regional development programmes and innovation strategies helps to produce local instruments and activities to support national policy in the future as well.
References


Hallituksen aluepoliittinen selonteko 2004 (Government review on regional policy).


Annex 1: Definition of policy mix typology

- **Improve R&D governance capacity**: Technical assistance type funding used by public authorities, regional agencies and public-private partnerships in developing and improving policies and strategies in support of R&D investments. This could include changes in the organisation of decision making, national and regional foresight, measures for improvement of evaluation etc.

- **Creation of an innovation friendly environment**: This category covers a wide range of actions which seek to improve the overall environment in which enterprises, universities and research organisations innovate. In this category the following measures are included:
  - Regulation and initiatives addressing the intellectual property rights either by improving legislation in cases of commercialisation of public or collaborative research or by covering protection costs
  - Direct or indirect support of spin-offs and New Technology Based Firms (NTBFs). Direct support includes public financial schemes such as pre-seed and first stage capital, while indirect measures include funding of incubators, training related to entrepreneurship, etc.

- **Development of human capital**: This category includes measures aiming at the upgrading of human resources in R&D and innovation related activities, such as supporting science and technology graduates to follow research and innovation-oriented careers; training of researchers in enterprises or research centres; intra- and international mobility of scientists; curriculum development in higher education aimed at developing science and technology; orientated under- and post-graduate courses etc.

- **Networking, co-location and clustering measures**: Policies under this category focus on promoting R&D cooperation, networking and interaction. Measures promoting co-location of industrial and scientific organisations (e.g. innovation poles), funding for clusters infrastructure and activities with technological and R&D orientation are some of possible interventions under this category.

- **Knowledge and technology transfer to industry**: This category includes policies supporting directly or indirectly knowledge and technology transfer from universities and public research organisations and commercialisation of public research results. Direct support includes aid schemes for utilising technology-related services or for implementing technology transfer projects from public or private sector to the private sector. Indirect policies include development of infrastructures facilitating technology transfer such as technology parks, innovation centres, university liaison and transfer offices, etc.

- **Research collaboration of public research organisations with private sector**: Measures supporting collaborative research projects and development of common (for use by private and public sector) research infrastructures are included.

- **Support of public research**: Measures under this category include:
  - Public investments in research infrastructure and direct funding of public R&D e.g. setting up new infrastructures, or supporting centres of excellence
- Grants for R&D projects implemented in Universities and other Public Research Organisations
- Regulatory changes and incentives for universities and other public research organisations which encourage the commercialisation of research results and collaboration with industry

**Financial R&D measures for the private sector:** Two main categories of measures are included:

- **Direct and indirect financial R&D measures for the private sector:** Direct measures include direct public funding of R&D in the private sector e.g. grants, conditional loans etc. Indirect measures include tax incentives for firms to undertake R&D activities.

- **Catalytic Financial R&D Measures for the private sector:** Includes instruments facilitating the access of R&D performers to external private sector sources of finance. Typical measures of this type are measures encouraging the use of *risk capital* (e.g. venture capital funds) for both R&D and innovation related activities and the *loan and equity guarantee measures*. 
Annex 2: Description of key indicators used in Summary Graphs 1 and 2

Summary Graph 1: Key indicators of region’s knowledge base development in comparison to country

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2000</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total intramural R&amp;D expenditure by sector of performance (Mio. EUR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GERD</td>
<td>2,691.4</td>
<td>3,033.3</td>
</tr>
<tr>
<td>BERD</td>
<td>1,874.4</td>
<td>2,078.8</td>
</tr>
<tr>
<td>GOVERD</td>
<td>362.21</td>
<td>392.09</td>
</tr>
<tr>
<td>HERD</td>
<td>454.85</td>
<td>562.38</td>
</tr>
<tr>
<td>PNPERD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: Eurostat 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total intramural R&amp;D expenditure per capita by sector of performance (Index; EU-25 = 100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GERD</td>
<td>286</td>
<td>279</td>
</tr>
<tr>
<td>BERD</td>
<td>307</td>
<td>298</td>
</tr>
<tr>
<td>GOVERD</td>
<td>280</td>
<td>282</td>
</tr>
<tr>
<td>HERD</td>
<td>235</td>
<td>236</td>
</tr>
<tr>
<td>PNPERD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: Eurostat 2007, calculation by Advansis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D personnel (headcount)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41,254</td>
<td>43,882</td>
</tr>
<tr>
<td>Business</td>
<td>22,640</td>
<td>23,149</td>
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<tr>
<td>Government</td>
<td>7,337</td>
<td>7,843</td>
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<tr>
<td>Higher education</td>
<td>11,277</td>
<td>12,890</td>
</tr>
<tr>
<td>Private non-profit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: Eurostat 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D personnel as a percentage of total employment (Index, EU-25 = 100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>233</td>
<td>237</td>
</tr>
<tr>
<td>Business</td>
<td>297</td>
<td>282</td>
</tr>
<tr>
<td>Government</td>
<td>316</td>
<td>350</td>
</tr>
<tr>
<td>Higher education</td>
<td>151</td>
<td>163</td>
</tr>
<tr>
<td>Private non-profit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: Eurostat 2007, calculation by Advansis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patent application at the EPO per million inhabitants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etelä-Suomi</td>
<td>436.66</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>347.21</td>
<td></td>
</tr>
<tr>
<td>Source: Eurostat 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Resources in Science and Technology (Index: EU25=100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etelä-Suomi</td>
<td>174</td>
<td>157</td>
</tr>
<tr>
<td>Finland</td>
<td>152</td>
<td>136</td>
</tr>
<tr>
<td>Source: Eurostat 2007, calculation by Advansis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation in life-long learning (Index: EU25=100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etelä-Suomi</td>
<td>262</td>
<td>251</td>
</tr>
<tr>
<td>Finland</td>
<td>253</td>
<td>233</td>
</tr>
<tr>
<td>Source: CIS 2006</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Summary Graph 2: Key indicators on Region’s economic structure and development

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regional GDP (at Current prices)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etelä-Suomi</td>
<td>29,746.4</td>
<td>33,567.4</td>
</tr>
<tr>
<td>Finland</td>
<td>25,554.9</td>
<td>29,065.7</td>
</tr>
<tr>
<td><strong>Long-term unemployment rate (on total unemployment)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etelä-Suomi</td>
<td>29.9</td>
<td>25.9</td>
</tr>
<tr>
<td>Finland</td>
<td>28.6</td>
<td>24.0</td>
</tr>
<tr>
<td><strong>Unemployment rate (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etelä-Suomi</td>
<td>7.7</td>
<td>7.3</td>
</tr>
<tr>
<td>Finland</td>
<td>9.8</td>
<td>8.8</td>
</tr>
<tr>
<td><strong>Value-added at basic prices (EUR Million): Share (%) of sectors to total.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture/ fishing</td>
<td>1.7</td>
<td>1.5</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>24.1</td>
<td>21.7</td>
</tr>
<tr>
<td>Electricity, gas and water supply</td>
<td>1.7</td>
<td>2.3</td>
</tr>
<tr>
<td>Construction</td>
<td>5.4</td>
<td>5.2</td>
</tr>
<tr>
<td>Services (excl. extra-territorial organizations and bodies)</td>
<td>66.9</td>
<td>69.2</td>
</tr>
<tr>
<td><strong>Annual data on employment in technology and knowledge-intensive sectors at the regional level:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of total employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High technology manufacturing</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Medium high technology manufacturing</td>
<td>5.0</td>
<td>4.9</td>
</tr>
<tr>
<td>Medium low technology manufacturing</td>
<td>3.8</td>
<td>3.3</td>
</tr>
<tr>
<td>Low-technology manufacturing</td>
<td>7.6</td>
<td>6.8</td>
</tr>
<tr>
<td>Total knowledge-intensive services</td>
<td>40.1</td>
<td>42.8</td>
</tr>
<tr>
<td>Knowledge-intensive high-technology services</td>
<td>5.5</td>
<td>5.9</td>
</tr>
<tr>
<td>Total less-knowledge-intensive services</td>
<td>30.3</td>
<td>29.7</td>
</tr>
</tbody>
</table>
 Annex 3: Tables and Figures

Table 1. Universities in Etelä-Suomi

<table>
<thead>
<tr>
<th>University</th>
<th>Students 2005</th>
<th>S&amp;E Fields</th>
<th>PhD degrees 2005</th>
<th>Academic staff 2005</th>
<th>Professors 2005</th>
<th>Budget funding 1,000 €</th>
<th>External funding 1,000 €</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Helsinki</td>
<td>38233</td>
<td>8745</td>
<td>378</td>
<td>3289</td>
<td>475</td>
<td>304010</td>
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<tr>
<td>University of Turku</td>
<td>15848</td>
<td>3986</td>
<td>137</td>
<td>1345</td>
<td>228</td>
<td>107130</td>
<td>52194</td>
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<tr>
<td>Åbo Akademi University</td>
<td>6878</td>
<td>1839</td>
<td>70</td>
<td>612</td>
<td>99</td>
<td>47621</td>
<td>28474</td>
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<tr>
<td>Lappeenranta University of Technology</td>
<td>5524</td>
<td>4252</td>
<td>35</td>
<td>547</td>
<td>60</td>
<td>35063</td>
<td>21543</td>
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<tr>
<td>Helsinki University of Technology</td>
<td>14585</td>
<td>14585</td>
<td>150</td>
<td>1621</td>
<td>186</td>
<td>116020</td>
<td>91134</td>
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<tr>
<td>Helsinki School of Economics</td>
<td>4252</td>
<td>19</td>
<td>233</td>
<td>51</td>
<td>24835</td>
<td>11138</td>
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<tr>
<td>Swedish School of Economics and Business Administration</td>
<td>2412</td>
<td>15</td>
<td>121</td>
<td>32</td>
<td>12782</td>
<td>2788</td>
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<tr>
<td>Turku School of Economics and Business Administration</td>
<td>2279</td>
<td>8</td>
<td>192</td>
<td>27</td>
<td>15020</td>
<td>6236</td>
<td></td>
</tr>
<tr>
<td>Academy of Fine Arts</td>
<td>243</td>
<td>2</td>
<td>31</td>
<td>8</td>
<td>3758</td>
<td>169</td>
<td></td>
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<tr>
<td>Sibelius Academy</td>
<td>1531</td>
<td>11</td>
<td>229</td>
<td>26</td>
<td>23357</td>
<td>2457</td>
<td></td>
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<tr>
<td>University of Art and Design Helsinki</td>
<td>1816</td>
<td>10</td>
<td>204</td>
<td>37</td>
<td>27053</td>
<td>6339</td>
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<tr>
<td>Theatre Academy</td>
<td>407</td>
<td>2</td>
<td>59</td>
<td>11</td>
<td>10673</td>
<td>648</td>
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Table 2. Universities of applied sciences / Polytechnics in Etelä-Suomi

<table>
<thead>
<tr>
<th>Polytechnic</th>
<th>Students 2005</th>
<th>S&amp;E studies</th>
<th>Teaching staff (FTE) 2005</th>
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<tbody>
<tr>
<td>Arcada Polytechnic</td>
<td>1985</td>
<td>yes</td>
<td>92</td>
</tr>
<tr>
<td>Diaconia Polytechnic</td>
<td>2902</td>
<td>no</td>
<td>166</td>
</tr>
<tr>
<td>South Karelia Polytechnic</td>
<td>2842</td>
<td>yes</td>
<td>143</td>
</tr>
<tr>
<td>Espoo-Vantaa Institute of Technology</td>
<td>5226</td>
<td>yes</td>
<td>168</td>
</tr>
<tr>
<td>Haaga Institute Polytechnic</td>
<td>3872</td>
<td>yes</td>
<td>102</td>
</tr>
<tr>
<td>Helsinki Polytechnic</td>
<td>8660</td>
<td>yes</td>
<td>423</td>
</tr>
<tr>
<td>Helsinki Business Polytechnic</td>
<td>5206</td>
<td>yes</td>
<td>223</td>
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<tr>
<td>Hänema Polytechnic</td>
<td>5900</td>
<td>yes</td>
<td>348</td>
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<tr>
<td>Kymenlaakso Polytechnic</td>
<td>4449</td>
<td>yes</td>
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<tr>
<td>Lahti Polytechnic</td>
<td>5115</td>
<td>yes</td>
<td>238</td>
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<tr>
<td>Laurea Polytechnic</td>
<td>7629</td>
<td>yes</td>
<td>257</td>
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<tr>
<td>Turku Polytechnic</td>
<td>9482</td>
<td>yes</td>
<td>455</td>
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<tr>
<td>Sydväst Polytechnic</td>
<td>1908</td>
<td>yes</td>
<td>101</td>
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</table>

Source: Ministry of Education, Polytechnics 2005
Table 3. Finnish government research institutes and their funding 2006 (Source: Statistics Finland)

<table>
<thead>
<tr>
<th>Institute</th>
<th>Budget Funding Million €</th>
<th>External funding Million €</th>
<th>%</th>
<th>Of which EU funding Million €</th>
<th>Total Million €</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Research Institute of Legal Policy</td>
<td>1,3</td>
<td>0,2</td>
<td>11,0</td>
<td>-</td>
<td>1,4</td>
</tr>
<tr>
<td>VTT Technical Research Centre of Finland</td>
<td>3,8</td>
<td>1,1</td>
<td>22,4</td>
<td>0,1</td>
<td>4,8</td>
</tr>
<tr>
<td>Research Institute for the Languages of Finland</td>
<td>5,0</td>
<td>0,7</td>
<td>12,0</td>
<td>-</td>
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**Total** 272,6 214,1 44,0 32,9 486,7
### Table 4. Prevalence of innovation activity by major region, 2002-2004, share of enterprises (Source: Statistics Finland)

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<th>Number of enterprises</th>
<th>Product innovations %</th>
<th>Process innovations %</th>
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<th>Innovation projects %</th>
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<td>16.2</td>
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<tr>
<td>* incl. mining and quarrying</td>
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### Table 5. Sectoral profile of Etelä-Suomi in comparison to Finland in 2004 (Source: Statistics Finland)

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<thead>
<tr>
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<th>Value Added/Employment (€)</th>
<th>Employment in %</th>
<th>Gross value added at basic prices</th>
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<td>Etelä-Suomi</td>
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* incl. mining and quarrying
### Table 6. The development R&D expenditure in Etelä-Suomi (Source: Statistics Finland)

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### Table 7. The development R&D expenditure as percentage of GDP in Finland (Source: Eurostat)

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### Table 8. Share of total intramural R&D expenditure per capita by sector of performance in the NUTS3 regions in Etelä-Suomi.

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47
Table 9. Share of total intramural R&D expenditure per capita by industry in 2001 and 2003 (Source: Statistics Finland)

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<td></td>
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<td>79.2</td>
</tr>
<tr>
<td>Food industry (SIC 15-16)</td>
<td>60.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Textile, clothing and leather industry (SIC 17-19)</td>
<td>14.7</td>
<td>0.4</td>
</tr>
<tr>
<td>Wood processing industry (SIC 20-21)</td>
<td>92.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Chemical industry (SIC 23-25)</td>
<td>288</td>
<td>8.8</td>
</tr>
<tr>
<td>Metal and mechanical industry (SIC 27-29,34-35)</td>
<td>400.3</td>
<td>12.2</td>
</tr>
<tr>
<td>Electronics industry (SIC 30-33)</td>
<td>1,700.6</td>
<td>51.8</td>
</tr>
<tr>
<td>Other manufacturing</td>
<td>44.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Electricity, gas and water supply (SIC 40-41)</td>
<td>28.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Construction (SIC 45)</td>
<td>24.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Wholesale and commission trade (SIC 51)</td>
<td>53.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Transport, storage and communication (SIC 60-64)</td>
<td>132.6</td>
<td>4</td>
</tr>
<tr>
<td>Computer and related activities (SIC 72)</td>
<td>189.2</td>
<td>5.8</td>
</tr>
<tr>
<td>Research and development (SIC 73)</td>
<td>125</td>
<td>3.8</td>
</tr>
<tr>
<td>Other business activities (SIC 74)</td>
<td>112</td>
<td>3.4</td>
</tr>
<tr>
<td>Other industries</td>
<td>16.8</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Table 10. Shares of regional GDP and average annual growth rate 1995-2004

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Itä-Suomi</td>
<td>10.8%</td>
<td>10.4%</td>
<td>10.3%</td>
<td>9.9%</td>
<td>9.7%</td>
<td>9.5%</td>
<td>9.5%</td>
<td>9.4%</td>
<td>9.5%</td>
<td>9.4%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Etelä-Suomi</td>
<td>54.7%</td>
<td>55.2%</td>
<td>55.6%</td>
<td>56.7%</td>
<td>57.2%</td>
<td>57.4%</td>
<td>57.4%</td>
<td>56.7%</td>
<td>56.9%</td>
<td>5.3%</td>
<td></td>
</tr>
<tr>
<td>Länsi-Suomi</td>
<td>22.9%</td>
<td>23.2%</td>
<td>23.0%</td>
<td>22.6%</td>
<td>22.5%</td>
<td>22.2%</td>
<td>22.8%</td>
<td>22.4%</td>
<td>22.6%</td>
<td>22.4%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Pohjois-Suomi</td>
<td>11.0%</td>
<td>10.5%</td>
<td>10.5%</td>
<td>10.2%</td>
<td>9.9%</td>
<td>10.3%</td>
<td>9.7%</td>
<td>10.2%</td>
<td>10.5%</td>
<td>10.6%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Åland</td>
<td>0.6%</td>
<td>0.6%</td>
<td>0.6%</td>
<td>0.7%</td>
<td>0.7%</td>
<td>0.6%</td>
<td>0.7%</td>
<td>0.7%</td>
<td>0.7%</td>
<td>0.6%</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

Table 11. Population in the Finnish regions 2004

<table>
<thead>
<tr>
<th>Region</th>
<th>Population 2004</th>
<th>Share in total</th>
<th>Average annual growth rate 1995-2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>5,219,732</td>
<td>100.0%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Itä-Suomi</td>
<td>669,354</td>
<td>12.8%</td>
<td>-0.6%</td>
</tr>
<tr>
<td>Etelä-Suomi</td>
<td>2,569,358</td>
<td>49.2%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Länsi-Suomi</td>
<td>1,325,241</td>
<td>25.4%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Pohjois-Suomi</td>
<td>629,432</td>
<td>12.1%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Åland</td>
<td>26,347</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
</tbody>
</table>
# Table 12. Gross fixed capital formation by sector of activity in Etelä-Suomi

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A-B</td>
<td>14256.5</td>
<td>100.0 %</td>
<td>100.0 %</td>
<td>64.58 %</td>
</tr>
<tr>
<td>C-F</td>
<td>2484.8</td>
<td>27.6 %</td>
<td>17.4 %</td>
<td>4.09 %</td>
</tr>
<tr>
<td>C</td>
<td>22.6</td>
<td>0.1 %</td>
<td>0.2 %</td>
<td>103.60 %</td>
</tr>
<tr>
<td>D</td>
<td>1774.1</td>
<td>20.5 %</td>
<td>12.4 %</td>
<td>-0.25 %</td>
</tr>
<tr>
<td>E</td>
<td>438.9</td>
<td>5.2 %</td>
<td>3.1 %</td>
<td>-2.90 %</td>
</tr>
<tr>
<td>F</td>
<td>249.1</td>
<td>1.7 %</td>
<td>1.7 %</td>
<td>71.20 %</td>
</tr>
<tr>
<td>G-P</td>
<td>11379.4</td>
<td>69.6 %</td>
<td>79.8 %</td>
<td>88.73 %</td>
</tr>
<tr>
<td>G</td>
<td>825</td>
<td>4.5 %</td>
<td>5.8 %</td>
<td>111.43 %</td>
</tr>
<tr>
<td>H</td>
<td>60.1</td>
<td>0.7 %</td>
<td>0.4 %</td>
<td>-3.53 %</td>
</tr>
<tr>
<td>I</td>
<td>1695.5</td>
<td>16.3 %</td>
<td>11.9 %</td>
<td>19.83 %</td>
</tr>
<tr>
<td>J</td>
<td>440.5</td>
<td>0.9 %</td>
<td>3.1 %</td>
<td>481.13 %</td>
</tr>
<tr>
<td>K</td>
<td>5912.8</td>
<td>32.4 %</td>
<td>41.5 %</td>
<td>110.58 %</td>
</tr>
<tr>
<td>L</td>
<td>666.3</td>
<td>3.1 %</td>
<td>4.7 %</td>
<td>149.46 %</td>
</tr>
<tr>
<td>M</td>
<td>500.1</td>
<td>3.2 %</td>
<td>3.5 %</td>
<td>82.25 %</td>
</tr>
<tr>
<td>N</td>
<td>526.1</td>
<td>3.0 %</td>
<td>3.7 %</td>
<td>101.73 %</td>
</tr>
<tr>
<td>O</td>
<td>753.1</td>
<td>5.5 %</td>
<td>5.3 %</td>
<td>58.25 %</td>
</tr>
</tbody>
</table>

# Table 13. Ongoing Tekes Technology Programmes

- ClimBus - Business Opportunities in the Mitigation of Climate Change 2004-2008
- COMBIO - Commercialisation of Biomaterials 2003-2007
- FinNano - Nanotechnology Programme 2005-2010
- FinnWell - Future Healthcare 2004-2009
- Fuel Cell 2007-2013
- GIGA - Converging Networks 2005-2010
- Liito - Innovative Business Competence and Management 2006-2010
- MASINA - Technology Programme for Mechanical Engineering 2002-2007
- MASI - Modelling and Simulation 2005-2009
- NORDITE 2005-2010
- Sara - Value Networks in Construction 2003-2007
- Serve - Innovative Services 2006-2010
- SymBio - Industrial Biotechnology 2006-2011
- Tourism and Leisure Services 2006-2009
- Ubicom - Embedded Systems 2007-2013
- VAMOS - Value Added Mobile Solutions 2005-2010
- Verso - Vertical Software Solutions 2006-2010

# Table 14. Tekes cooperative initiatives

- Industrial Design *
- KITARA - The Application of Information Technology in Mechanical, Civil and Automation Engineering Research Programme * 2005-2009
- LEARN - Life as Learning Research Programme * 2002-2006

49
Table 15. Ongoing Academy of Finland Research Programmes

<table>
<thead>
<tr>
<th>Programme</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental, Societal and Health Effects of Genetically Modified Organisms, ESGEMO</td>
<td>(2004-2007)</td>
</tr>
<tr>
<td>Health Services Research, TERTTU</td>
<td>(2004-2007)</td>
</tr>
<tr>
<td>Industrial Design</td>
<td>(2004-2007)</td>
</tr>
<tr>
<td>Russia in Flux, RUSSIA</td>
<td>(2004-2007)</td>
</tr>
<tr>
<td>Social Capital and Networks of Trust, SOCA</td>
<td>(2004-2007)</td>
</tr>
<tr>
<td>Systems Biology and Bioinformatics, SYSBIO</td>
<td>(2004-2007)</td>
</tr>
<tr>
<td>Information Technology in Mechanical and Automation Engineering Research Programme, KITARA</td>
<td>(2005-2009)</td>
</tr>
<tr>
<td>Business Know-how, LIIKE2</td>
<td>(2006-2009)</td>
</tr>
<tr>
<td>Neuroscience, NEURO</td>
<td>(2006-2009)</td>
</tr>
<tr>
<td>Nanoscience, FinNano</td>
<td>(2006-2010)</td>
</tr>
<tr>
<td>Sustainable Production and Products, KETJU</td>
<td>(2006-2010)</td>
</tr>
<tr>
<td>Nutrition, Food and Health, ELVIRA</td>
<td>(2006-2010)</td>
</tr>
<tr>
<td>Power in Finland, VALTA</td>
<td>(2007-2010)</td>
</tr>
<tr>
<td>Substance Abuse and Addictions, ADDIKTIO</td>
<td>(2007-2010)</td>
</tr>
</tbody>
</table>

Table 16. Centre of expertise programme Clusters 2007-2013, in which centres in Etelä-Suomi region are participating (Centres of Expertise in Etelä-Suomi marked in italics)

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>HealthBio – Health cluster</td>
<td>Kuopio, Oulu, Helsinki Metropolitan Area, Tampere, Turku</td>
</tr>
<tr>
<td>Well-being cluster</td>
<td>Kuopio, Oulu, Helsinki Metropolitan Area, Tampere</td>
</tr>
<tr>
<td>Food Processing Development cluster</td>
<td>Kuopio, Helsinki Metropolitan Area, Seinäjoki, Turku</td>
</tr>
<tr>
<td>Ubiquitous Computing</td>
<td>Jyväskylä, Oulu, Pori, Helsinki Metropolitan Area, Tampere</td>
</tr>
<tr>
<td>Digital Content Business</td>
<td>Hämeenlinna, Helsinki Metropolitan Area, Kouvola</td>
</tr>
<tr>
<td>Tourism and Experience Industry</td>
<td>Helsinki Metropolitan Area, Rovaniemi, Savonlinna, Turku</td>
</tr>
<tr>
<td>Maritime cluster</td>
<td>Lappeenranta, Pori, Turku, Vaasa, Raahel</td>
</tr>
<tr>
<td>Nano and Micro Systems and Adaptive Materials</td>
<td>Joensuu, Jyväskylä, Kokkola, Mikkeli, Oulu, Helsinki Metropolitan Area, Tampere</td>
</tr>
<tr>
<td>Intelligent Machines</td>
<td>Hyvinkää, Hämeenlinna, Lappeenranta, Seinäjoki, Tampere</td>
</tr>
<tr>
<td>Forest Industry Future</td>
<td>Joensuu, Jyväskylä, Kajaani, Kokkola, Mikkeli, Lappeenranta (South-East Finland), Turku</td>
</tr>
<tr>
<td>Living cluster</td>
<td>Joensuu, Hämeenlinna, Lahti, Helsinki Metropolitan Area</td>
</tr>
<tr>
<td>Environmental Technology cluster</td>
<td>Kuopio, Lahti, Oulu, Helsinki Metropolitan Area</td>
</tr>
</tbody>
</table>
### Annex 4: RTD policies

<table>
<thead>
<tr>
<th>Title of the measure or initiative: Science and Technology Policy Council Reviews</th>
</tr>
</thead>
</table>
| **Objectives:**  
  - To set the national objectives for Science and Technology policy  
  - To co-ordinate and guide various other sector policies and related organisations related to science and technology |
| **Policy Area:** Improve R&D governance |
| **Main instruments and structure:**  
  - Triennial reviews |
| **Main beneficiaries /target group:**  
  - All public organisations related to science and technology issues |
| **Achievements or failures:**  
  - Forming national consensus, co-ordination and commitment to science and technology policy |

<table>
<thead>
<tr>
<th>Title of the measure or initiative: Centre of Expertise Programme</th>
</tr>
</thead>
</table>
| **Objectives:**  
  - create a long-term strategy for the full utilisation of the top-level expertise in the regions  
  - support the specialisation and cooperation between the regions  
  - create new products, services, companies and jobs related to top-level expertise  
  - increase the appeal of the region especially in order to attract investments and professionals to the region  
  - continuously strengthen and modernise special expertise within the region  
  - improve the ability of the regions to benefit from the R&D funding that is available through national and international competition  
  - gather up local, regional and national resources to develop selected top fields  
  - promote the regional, national and international networking of the centres of expertise and the fields of expertise  
  - improve the coherence of regional and national development activities |
| **Policy Area:** Networking, co-location and clustering measures |
| **Main instruments and structure:**  
  - Basic funding for regional centres for co-ordinating cluster specific activities and to prepare various cluster specific projects. The majority of funding for projects comes from other sources such as national R&D funding (e.g. Tekes) and funding from EU Structural Funds.  
  - The national Committee for the Centre of Expertise Programme consists of experts in the fields of economy, research and education as well as professionals working in regional and local administration. The committee evaluates the operations of the centres of expertise annually and, based on this evaluation, drafts a proposal to the Government regarding basic funding. |
| Main beneficiaries /target group: | • Regional intermediaries such as technology parks that are co-ordinate the regional centres |
| Achievements or failures: | • The programme has been able to bring together and mobilise regional actor around particular fields of expertise  
• The regional centres have been able to amass funding for joint projects and direct it to specific objectives in the regional key clusters  
• The programme has been able to strengthen regional specialistiaon  
• The programme has not been able sufficiently help regional centres to collaborate nationally and internationally |

| Title of the measure or initiative: | Tekes technology programmes |
| Objectives: | • To strengthen the national competence base,  
• To promote business regeneration and competitiveness,  
• To promote research activity,  
• To increase cooperation among companies, research organisations and the public sector |
| Policy Area: | Research collaboration of public research organisations with private sector |
| Main instruments and structure: | • Support for development projects aimed at specified areas and provides programme services that support a programme’s objectives |
| Main beneficiaries /target group: | • Universities and PRIs  
• Enterprises |
| Achievements or failures: | • Technology programmes have increased goal orientation of RTDI funding  
• Funding has been directed to fields that have been considered important by experts and enterprises  
• Technology programmes have increased networking, interaction and pooling of resources between universities and industry and the public sector |

| Title of the measure or initiative: | Establishment of polytechnics |
| Objectives: | • upgrade vocational system, with the aim of putting all innovation oriented education and catering for the changing needs of the regions and the labour market |
| Policy Area: | Development of human capital |
| Main instruments and structure: |
- Establishment of polytechnics with local and regional support

**Main beneficiaries /target group:**
- Vocational schools, local governments

**Achievements or failures:**
- Increase in practice oriented tertiary education
- Support for regional labour market in the regions that do not have universities
- Creation of new RTDI services for smaller towns, SMEs and enterprises in more traditional sectors