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**Work Package 4  
“Structural Change and Globalisation”**

## **CASE STUDY**

### **BASQUE COUNTRY (ES)**

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## Acronyms

BERD	Business Expenditure on R&D
BGGB	Basque Government General Budgets
BSTIN	Basque science, technology and innovation network
CDTI	Spanish Centre for Technological Industrial Development
CEEC	Central and Eastern Europe Countries
CEO	Chief Executive Officer
CIC	Spanish acronym Cooperative Research Centre
CRC	Cooperative Research Centres
DG REGIO	Directorate General for Regional Policy
EAGGF	European Agricultural Guidance and Guarantee Fund
EC	European Commission
EMAITEK	New Basque program to support Public and Technological Research Centres
EPO	European Patent Office
ERDF	European Regional Development Fund
ESF	European Social Fund
ETORTEK	Basque government program for Strategic R&D investment
EU	European Union
Eurostat	Statistical Office of the European Communities
EUSTAT	Basque Statistical Institute
FDI	Foreign Direct Investment
FIFG	Financial Instrument for Fisheries Guidance
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GVA	Gross Value Added
ICT	Information and Communication Technology
INE	Spanish National Statistical Institute
LFS	Labour Force Survey
NACE	National Classification of Economic Activities
NDP	National Development Programme
NGO	Non-governmental Organisation
NTI	New Technologies of Information
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
PCTI	Basque Country Science, Technology and Innovation Plan
PPBS	Planning - Programming -Budgeting System

PPS	Purchasing Power Standard
R&D	Research and Development
RTDI	Research, Technological Development and Innovation
SAIOTEK	Basque program to support Public and Technological Research Centres
SARETEK	Acronym in Basque language of Science, Technology and Innovation Network
SME	Small and Medium Enterprise
SPD	Single Programming Document
SPRI	Society for Promotion and Industrial Restructuring
TCs	Technological Centres
TOR	Terms of Reference
UETI	Innovation and Technology Strategic Unit of SPRI
USPTO	United States Patent and Trade -market Office
WP	Work Package

## Table of contents

<b>Executive Summary</b>	<b>7</b>
<b>Introduction</b>	<b>11</b>
<b>1. Structural change and globalisation in perspective</b>	<b>13</b>
1.1 The region at a glance	13
1.2 Searching the roots of change: socio-economic history of the region	16
1.3 Regional structural change and globalisation issues in 2000-2006	17
1.3.1 Dimensions of structural change	18
1.3.2 Understanding the geography of structural change	35
<b>2. Regional policy 2000-2006: strategy and objectives</b>	<b>39</b>
2.1 Regional policy mix for structural change and globalisation	39
2.2 Overall strategy of the 2000-2006 Objective 2 programme	40
2.3 Selected fields of intervention and measures	41
<b>3. Effects of the selected ERDF measures on the process of structural change and adaptation to globalisation</b>	<b>49</b>
3.1 Assessment of the structural and socio-economic effects	49
3.2 Assessment of the effects on institutional capacity and policy learning	62
<b>4. Conclusions: key findings and main message</b>	<b>65</b>
<b>5. Annexes</b>	<b>67</b>
5.1 References	67
5.2 List of persons interviewed	69

## List of tables

Table 1.1 - Taxonomy of Objective 2 eligible areas (NUTS3)	14
Table 1.2 - Regional performance in comparative perspective (NUTS2) -Basic data	15
Table 1.3 - ERDF and ESF Basque Country Operational Programmes 1994-1996 and 1997-1999	17
Table 1.4 - Socio-economic change and human capital (NUTS2)	18
Table 1.5 - Regional specialisation (NUTS2)	21
Table 1.6 - Main industrial Clusters in the Basque Country	22
Table 1.7 - Recent Trends in the main Basque Industrial Clusters	23
Table 1.8 - Innovation potential (NUTS2)	25
Table 1.9 - R&D Expenditure Delivered by Firms and Technological Centres in the Basque country	26
Table 1.10 - Full Time Equivalent Personnel in R&D Activities in the Basque Country	27
Table 1.11 - Patent and design applications in R&D leading Spanish regions (2006)	29
Table 1.12 - Geography of structural change (NUTS3)	36
Table 1.13 - Geography of structural change (NUTS3)	37
Table 2.1 - Synoptic view of the Objective 2 programme	40
Table 2.2 - Measures relevant to structural change and globalisation: main features	44
Table 3.1 - Implementation of Measure 3.1 “Reinforcement of human resources in research, science and technology”	49
Table 3.2 - Implementation of Measure 3.2, Research ,innovation and technological development projects	49
Table 3.3 - Reimbursable Aids Granted by the Spanish Centre for Industrial Technological Development (CDTI)	50
Table 3.4 - CDTI Aids Broken down by Activities	51
Table 3.5 - Main Indicators of Measure 3.2 “Research, innovation and technological development projects”	51
Table 3.6 - Implementation of Measure 3.5 “Public Research Centres and Technological Centres”	55
Table 3.7 - Distribution of Aids to Public Research and Technological Centres given by the Basque Government	55
Table 3.8 - Main Indicators of Measure 3.5 “Public Research Centres and Technological Centres”	56
Table 3.9 - Main R&D Magnitudes in Basque Technological Centres (2006)	58
Table 3.10 - Basque Firms with R&D Activities broken down by their R&D launching periods	58

## List of figures

Figure 1.1 - Basque Country positioning in the European and Spanish Spatial Structure	13
Figure 1.2 - Basque Country Eligible Areas	14
Figure 1.3 - Main industrial Basque cluster according to their size and recent trends in turnover and employment	24
Figure 1.4 - R&D Expenditure in the Basque Country 1996-2006 (€ million)	26
Figure 1.5 - R&D Expenditures by Firms and Technological Centre (Basque country 1997-2006, € thousand)	27
Figure 1.6 - Full time personnel in R&D activities	28
Figure 1.7 - Applications for registered inventions 2006	29
Figure 1.8 - R&D expenditures by discipline (Basque country 2006)	30
Figure 1.9 - Positioning Matrix referring to the Real Delocalization Risks taking into account Sectorial Globalization Levels (Basque Country)	34
Figure 1.10 - Positioning Matrix referring to Real Delocalization Risks taking into account the Presence of International Subsidiary Firms (Basque Country)	35
Figure 1.11 - Basque Country Economic Geography	36
Figure 2.1 - Key building blocks of the Science, Technology and Innovation Policy in the Basque Country	43
Figure 3.1 - Basque Firms with R&D Activities broken down by their R&D launching periods	59

## Basque case study

### Executive Summary

#### Scope and research methods

This report has been prepared in the framework of the ex post evaluation of cohesion policy programmes 2000-2006 co-financed by the European Regional Development Fund (Objectives 1 and 2). It is part of the Work Package 4: Structural Change and Globalisation.

This case study focuses on analysing the results and outcomes of a set of specific measures implemented in the Objective 2 Single Programming Document 2000-2006 for the Basque Country (Spain) and considered particularly relevant in the context of structural change and globalisation: the measure 3.1 to reinforce technicians and researcher capabilities in the fields of Science and Technology, the measure 3.2 dealing with research, technological development and innovation projects by firms including partnerships between businesses and/or research institutes, and the measure 3.5 to foster research in public centres and technological centres in the key areas of Basque Country entrepreneurial system.

The study is based on various information sources: an in-depth analysis of available documents (programming documents, programme complement, annual implementation reports, mid-term and final evaluations, regional studies); monitoring data of the programme; on-site interviews with regional authorities and representatives of the state bodies in the region; phone interviews with final beneficiaries of the specific measures under review, including companies; as well as data from EUROSTAT, the Spanish Statistical Office (INE) and the Basque Country statistical office (EUSTAT).

The methodological approach was based on a combination of in desk analysis, in site visits, interviews and internet, e-mail and telephonic interviews to a subset of the main players. An in depth analysis has been carried out by contrasting the results of the program with the statistical evidence collected on the subject and by a micro-analysis of selected beneficiary firms and technological centres (TCs) and the opinions gathered from the interviewed experts.

#### Key research question and hypothesis tested in the case study

The main research question addressed by this case study is the extent to which regional policy measures, co-financed by the ERDF (European Regional Development Fund), supporting structural change and globalisation have helped to reinforce the innovation potential in the Basque Country. According to the conceptual model<sup>1</sup> provided by the core team, the hypothesis to be tested is the one referring to “Innovation potential” (number 4), which fits in a very convenient way with the Basque country productive features and the strategic policy measures developed by the Basque government along the lines of the 2000-2006 SPD. The general hypothesis states that *“apart from significant differences among Objective 2 regions in terms of institutional thickness, the innovation system may suffer from missing innovation drivers on the demand side. Barriers to*

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<sup>1</sup> See the First Intermediate Report.

*innovation are determined by a lack of absorptive capacity by local firms. Especially in old-industrial areas, path-dependence from existing technological trajectories constrains product and process innovation”.*

In particular, based on the innovation potential hypothesis we will focus our case study research on the following questions: which measures are important to address path dependence problems in traditional industrial sectors? Which measures can be important to build Research, Technological Development and Innovation (RTDI) capabilities in traditional industrial regions? Which measures can be important to effectively smooth firms’ innovation barriers, especially in SMEs? Is it possible to boost RTDI demand drivers?

### **Regional context and key findings**

The Basque Country is an Atlantic peripheral region located in the North Coast of Spain in the Biscay Gulf. The Basque region ranks among the richest ones in Spain. Its economy was specialized in traditional industries such as iron and steel related sectors. The crisis of seventies has made Spanish industry in general and the Basque Country in particular to undergone an important restructuring process along the eighties. This process has been reinforced by measures to foster technological upgrade and innovation both by the Spanish central government and the regional governments according to their constitutional attributions in the subject. Among other measures it is worth remark the setting up of the centre to foster industrial technological development (the so called CDTI according to its acronym) by the Spanish central government and the deployment of a complementary RTDI regional policy implemented by the Basque government<sup>2</sup>. The awareness among most Basque economic and institutional players of carrying out an strategy focused on RTDI in order to improve its competitive positioning and to face the globalization process has led to the setting up of an important number of technological centres (TCs). TCs are market oriented non-profit organizations which perform RTDI activities in partnership with their associates and other firms through venture projects. They are structured around local actors and entrepreneurs to fill the technological gap and to enhance the capabilities of Basque industrial sectors. The role played by TCs in the Basque regional innovation system has made possible to reach a relatively important share of entrepreneurial RTDI expenditure as a percentage of GDP in 2006 (1.1% in the Basque Country versus 0.7% in Spain as a whole and 1.3% in EU15).

The key findings of this case study are the following ones:

*The programme and the ERDF funds has allowed a kind of alignment effects with European guidelines and benchmarks*

The former ERDF Basque Country operational programs in which very important actions aimed to face structural change and globalization by means of fostering RTDI were already undertaken. The priorities of the Basque 2000-2006 SPD go deeper in this field. ERDF interventions fit very well in the Basque country policy and economic context. The measures selected in our case study (covering 29.6% of total budget) were relevant to face R&D policy challenges and foster innovation potential. The priorities set up in the

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<sup>2</sup> Spanish regional governments (Autonomous Communities) have very important attributions in industrial policy and the promotion of economic development.

programming documents square with the national and regional policy mix and are linked to the policy priorities gathered in the compulsory expenditure framework of public budgeting.

Most of the interviewed experts (public officers, politicians and managers of beneficiary TCs and firms) have confirmed the important role played by Lisbon strategy priorities and European guidelines. It is worth remark that the influence of European priorities has been channelled not only by a general awareness and sensitization among politicians and stakeholders, but also through the following channels: a) public officers in charge of technological issues have been supported by Lisbon strategy targets and Structural Funds Guidelines in the backstage of the budgetary discussions to increase RDTI policy measures, b) in the entrepreneurial system (even SMEs) awareness of the need to reach European and international markets to succeed in business by means of RDTI investments.

*Small and medium size enterprise innovative actions have been supported by ERDF*

In the Basque Country 2000-2006 SPD the measure 3.2 takes in grants for research, technological development and innovation projects by firms including partnerships between businesses and/or research institutes. This is a “demand side” policy measure being its main aim to foster innovation drivers across the productive and entrepreneurial fabric. Within this measure ERDF funding has applied by the Spanish Centre for Industrial Technological Development (CDTI, an autonomous agency of Spanish central administration) to grant reimbursable aids to support the launching of technological projects by firms. Aids are 50% co-financed by the ERDF and the paybacks of the instalments are reinvested by CDTI on new grants.

A total of 143 projects submitted (most of them by SMEs) were supported. The average grant given by project was quite significant amounting €364,787. The micro-analysis of interviews and questionnaires to beneficiaries focused on the reimbursable aids from CDTI shows that these kinds of aids have been effective to foster RTDI investment and to improve the competitive position of the firms.

*ERDF supported the supply side measures of building scientific and technological knowledge and capabilities in TCs and public research centres.*

With regard to building scientific and technological capabilities the measure 3.5 in the Basque Country 2000-2006 SPD is made of grants to foster knowledge acquisition and research in public centres and technological centres in key areas of interest for the Basque country entrepreneurial fabric. To a great extent this is a “supply side” policy measure aimed to build scientific and technological knowledge and capabilities in TCs and public research centres, but it also includes some “supply-demand actions” aimed to get scientific and technological capabilities to meet specific needs in some clusters or enterprises.

The main action under this measure corresponds to ERDF aids granted by the Basque government to TCs in order to build scientific and technological knowledge and capabilities. The number of beneficiary centres supported was very important, covering almost the entire set of TCs: 43 TCs were granted with financial support. The first 25% of TCs got a significant amount of funding, being €3.5 million the average funding per TC. The second and third quartile of TCs also got important amounts of funding being respectively €653 thousand and €225 thousand the average funding per TC.

The projects granted 50% ERDF aid were of three main types: 1) Technological specialization projects aimed to specific fields of knowledge taking into account the specialization profile of the centre. 2) Supply-Demand

projects, which main goal was to develop TCs scientific and technological capabilities in the short and medium run to meet specific needs of some clusters of firms. 3) Strategic research projects aimed to high priority new technological fields such as biotechnology, biomaterials, micro and nano-technologies, intelligent processes and materials and others. The evidence gathered from the interviews with the most important beneficiaries (4 of the top 11 aid receivers) suggest that these aids have been important to consolidate the TCs positioning.

### **Main message**

The evidence from the Basque Country case study tends to validate the hypothesis of the conceptual model. The main messages to be drawn from our case study are the following ones:

- Measures to support public and technological research centres were very important to tackle the path dependence problems in the traditional industrial sector of the Basque country. Moreover they have also contributed to a diffusion process on the key role played by R&D and innovation as a power tool to build sustainable competitive advantages throughout the entrepreneurial fabric.
- Measures addressed to SMEs and micro-firms to soften financial barriers to innovation combined with building absorptive capacities and knowledge and technological exploration are very effective to boost R&D drivers on the demand side. This is specially the case with reimbursable aids to fund R&D projects granted by specialized industrial and technological agencies, such as the Spanish CDTI.

## Introduction

The main purpose of this case study is to analyze how the Basque economy, highly specialized in traditional industrial sectors and seriously affected by the economic crisis in the seventies and early eighties was able to undertake measures to promote structural change and meet the challenges posed by increasing globalization, tough competition arising from Central and Eastern European Countries and the competitive disadvantage of high euro exchange rates.

The main research questions are focused on the way the Basque economic policy and more specifically the Basque 2000-2006 SPD tackled the problems posed by the lack of R&D demand drivers, innovation barriers and technological path dependence in old traditional industrial sectors (working hypothesis 4, innovation potential according to the conceptual model elaborated in the First Intermediate Report).

In order to provide answers to these questions our methodological approach was based on a combination of desk analysis, in site visits, interviews and internet, e-mail and telephonic interviews to some of the main players. In desk analysis consisted in full revision of the SPD and associated documents as well as a search of relevant reports and literature review on the topic. A database was built with the main indicators of the program and several computations based on it were carried out and also an in depth search for statistical evidence was performed on documents and databases such as Eurostat, Ine (Spanish National Statistical Institute) and Eustat (Basque Statistical Institute). The field work carried out through written questionnaires (11) and interviews (7 in site and 13 telephonic) was addressed mainly to three types of players: public officers in charge of regional and R&D policy, CEOs and managers of technological centres and CEOs and managers of beneficiary private firms.

After an overall revision of the measures relevant for structural change and globalizations in the Basque 2000-2006 SPD, we have selected the measures addressing reinforcement of human resources in research, science and technology; research, innovation and technological development projects and public and technological research centres as the most relevant measures in the SPD to tackle innovation potential and R&D, accordingly with our working hypothesis. We have carried out an in depth analysis of the effectiveness of these measures by contrasting the results of the program with the statistical evidence collected on the subject and by a micro-analysis of some beneficiary firms, technological centres (TCs) and the opinions gathered from the interviewed experts. The selection was made upon the following basis: 1) In the case of beneficiary firms we have chosen 7 combining their size and their manufacturing vs. engineering services orientation. 2) In the case of TCs we have chosen 4 among the 11 top aid receivers and 1 Research Cooperative Centre (CIC).

The report is structured as follows: section 1 provides an overview of the main features of the Basque country, section 2 offers an overall analysis and evaluation of the SPD, section 3 carried out an in depth analysis of selected measures and finally section 4 presents the main findings and message.

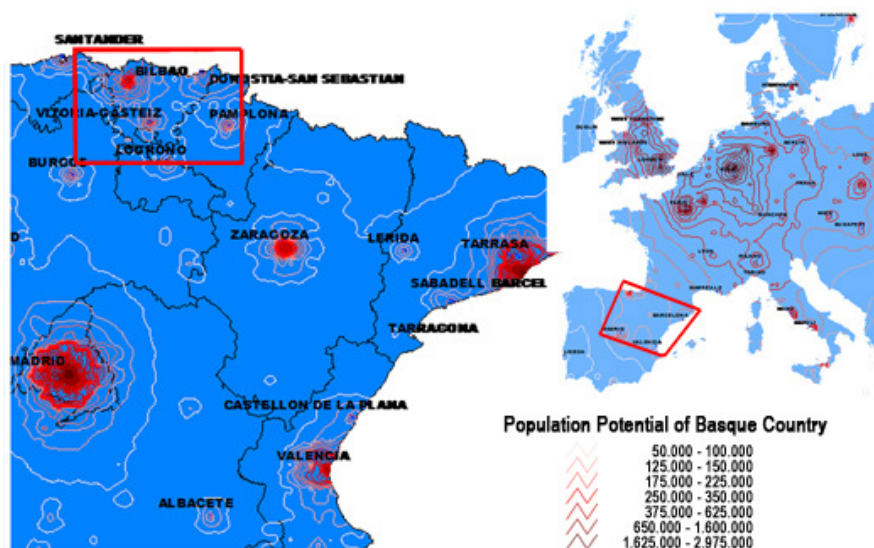


## 1. Structural change and globalisation in perspective

### 1.1 The region at a glance

The Basque country is an Atlantic peripheral region in the South of Europe located in the North coast of Spain in the Biscay gulf. It is very close to Southwest France (Aquitania region and the French Basque country) and it is well positioned in the Spanish context belonging to the wealthiest part of the country (North-eastern area). The following population potential map (Figure 1.1) captures the position of the Basque country in the context of the Spanish and European spatial structure. The blue shades represent the most peripheral areas. The red ones correspond to places with good market access and the most intense red ones are the cores of the big agglomeration areas.

Figure 1.1 - Basque Country positioning in the European and Spanish Spatial Structure



Source: Faña and López-Rodríguez (2006)

The Basque Country has an area of 7,235 Km<sup>2</sup> with a population of 2,099,200 inhabitants which represents a 5.1% of total Spanish population.

The Basque Country is an autonomous region (“Comunidad Autónoma” in Spanish) with a wide range of powers attributed to the regional Government and its provinces. The Basque provinces, “Diputaciones”, are considered as “historical territories” and enjoy very important competences (including tax collection). The provinces correspond to the Eurostat NUTS3 classification and Table 1.1 breaks down the population of the Basque country into its “Diputaciones” along with its typology as predominantly urban or intermediate rural.

Table 1.1 - Taxonomy of Objective 2 eligible areas (NUTS3)

	Population, 2004, thousands	% of regional population, within Objective 2 areas	Population in Obj 2 areas, thousands	Urban/rural category*
Es211 Álava	293.9	77.7	228.4	21
Es212 Guipúzcoa	679.7	92.0	625.2	1
Es213 Vizcaya	1,125.6	94.1	1,059.7	1

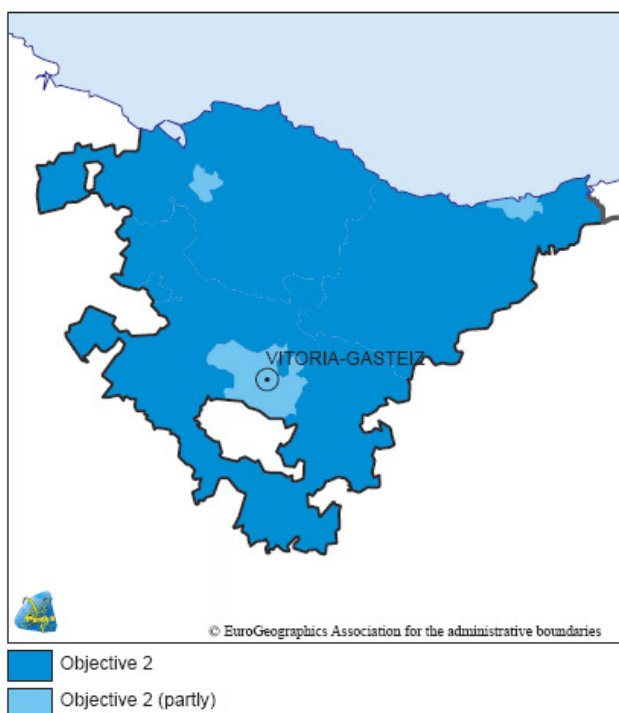
\* 1 = predominantly urban; 21 = intermediate rural, close to a city; 22 = intermediate rural, remote; 31 = predominantly rural, close to a city; 32 = predominantly rural, remote regions.

Source: Applica – Ismeri – wiiw. Ex Post Evaluation of Cohesion Policy Programmes 2000-2006 financed by the European Regional Development Fund in Objective 1 and 2 Regions. WP1, Task5 Final report.

Note: Please note that Table does not include Objective 2 phasing-out regions.

Most of the Basque country population, especially in Vizcaya and Guipúzcoa, is eligible under Objective 2 and the remaining parts of the country are considered Objective 2 phasing-out areas.

Figure 1.2 - Basque Country Eligible Areas



Source: DG Regio website

Figure 1.2 highlights the Basque Country eligible areas. The figures for the Basque country population show a small increase in the period 2000-2006. This increase has been lower than the Spanish one due to a lesser influence of immigration in the region. However in the period there is a positive trend that breaks the tendency of a continuous decrease in population initiated in the first half of the eighties.

Along the 1995-2006 period the Basque country Gross Domestic Product has grown considerably. Per capita GDP has grown slightly above the Spanish average. Both Spain as whole and the Basque country have

grown considerably more than the EU-15 average. As a result Spain has almost catch-up with the EU-15 average and the Basque country has surpassed the EU-15 per capita GDP average.

The Spanish growth model has been very successful in terms of jobs generation but on the other hand has exhibited some flaws in terms of productivity. The Basque country economy shares the former features although its productivity shows a better performance than the Spanish average.

Table 1.2 figures square the core issues mentioned above. Focusing on the labour market, employment rates have shown a very favourable evolution in a context of important increases in active population. Unemployment rates in the Basque country have decrease substantially along the 2000-2006 period accordingly with a remarkable increase in employed population (reaching record figures in 2006) and a decrease in unemployed people. The same trends apply to the Spanish economy as a whole. At the end of the period employment rates have became similar to the EU-15 average while unemployment rates starting from considerably higher values in Spain and the Basque country have shown a very good performance reaching in case of the Basque country (7.0%) a ratio below the EU-15 average (7.8%) and also below the Spanish average (8.5%).

The tendency of high growth and strong job creation continued in Spain up to the burst of the expenditure and real-state bubble which has unleashed the current economic crisis. Nowadays the economic downturn has dramatically changed the situation. The Spanish economy has entered in recession and GDP growth rates have slumped down to -3% in the first quarter of 2009. Unemployment rates have gone back to figures close to the second half of the nineties in the case of the Basque country (11.01%) and even higher in the case of Spain as whole (18.01%), though unemployment increases seem to be slowing down at present time, current economic foresights do not support any hope of substantial improvements in the next future.

*Table 1.2 - Regional performance in comparative perspective (NUTS2) -Basic data*

Indicator	Unit	Regional			
		1995	2000	2006	$\Delta(\%)$ 2000-2006
Population	Thousand	2,085	2,070	2,113	2.1
GDP per capita	€ PPP	16,028	22,716	29,305*	29.0
Gross Value Added	€ million basic prices	26,515	35,974	50,166*	39.5
Employment rate	% employed on number of people aged 15 and over	n.a.	46.8	53.4	14.1
Unemployment rate	% unemployed persons on number of people aged 15 and over	n.a.	12.1	7.0	-42.1
Indicator	Unit	National			
		1995	2000	2006	$\Delta(\%)$ 2000-2006
Population	Thousand	39,343	40,050	43,758	9.3
GDP per capita	€ PPP	13,436	18,537	23,069	24.4
Gross Value Added	€ million basic prices	420,912.6	570,560	813,434*	42.6
Employment rate	% employed on number of people aged 15 and over	n.a.	45.6	52.7	15.6
Unemployment rate	% unemployed persons on number of people aged 15 and over	n.a.	13.9	8.5	-38.8
Indicator	Unit	EU-15			
		1995	2000	2006	$\Delta(\%)$ 2000-2006

Indicator	Unit	Regional			
		1995	2000	2006	$\Delta(\%)$ 2000-2006
Population	Thousand	371,167	378,076	388,779	2.8
GDP per capita	€ PPP	16,958	21,890	26,500	21.1
Gross Value Added	€ million basic prices	6,058,125	7,822,555	9,735,114	24.4
Employment rate	% employed on number of people aged 15 and over	n.a.	44.4**	52.9*	19.1
Unemployment rate	% unemployed persons on number of people aged 15 and over	n.a.	8.3	7.8	-6.0

\* Data for 2005; \*\* Data for 2001

Source: Core team processing of Eurostat data

## 1.2 Searching the roots of change: socio-economic history of the region

Traditional sectors in the Basque country (iron and steel related industries) were seriously affected by the crisis of 70s and they had to pass through an important restructuring process. During the first half of the 80s the Basque country economy was almost stagnated. After this period the Basque country economy has registered a deep socio-economic transformation based on industrial reconversion and economic modernization. That led to a sustained growth path (with the only exception during the 92-94 crisis) up to recent economic and financial crisis.

The accession to the European Community in 1986 meant a progressive involvement in the European market and an increase of the openness to international trade and financial and investment flows. In the case of the Basque country economy this has been reflected in strong increases in export and import trade volumes showing some capacity to face the challenges posed in the last decades by the increase in international markets interrelations and globalization.

The undergone changes in the Basque economy have reinforced those features characterising most advanced economies. The relative shares in GDP and employment of big sectors have changes substantially. Service sectors had clearly increased their weight, real-state sector had experienced a more moderate increase, primary and industrial sectors had decreased their relative weight in the Basque economy. Industrial activities have shrunk during the 1985-1995 period (industrial restructuring process) but they managed to keep a very relevant role in the Basque economy, being reinforced by a growing sector of advanced services to enterprises and the setting up of a relatively dynamic regional innovation system.

However this growth model started to lose boost after the beginning of the present century. Some of the main drivers of regional growth (high employment in areas of relatively low productivity and a real-state bubble) were not much strong and on the other hand the competition from world emerging economies and CEECs with lower labour costs and location advantages became more intense. These facts have been recognized by the main economic and institutional players in the Basque country and a new strategy has been launched to promote a new economic transformation: the so-called “second economic transformation”. During the 1994-1999 period the Basque country entitled to European Cohesion Policy under the Objective 2, 3, 4 and 5B. The main interventions were the two ERDF Basque Country Operational Programmes in the (1994-1996 and 1997-1999), and the two ESF Basque Country Operational Programmes (also for 1994-1996 and 1997-1999). To a lesser extent the Basque country also benefited from the Objective 2 Spanish multiregional programmes. Table 1.3 shows the amount of European aid from ERDF and ESF regional programmes and their break down by priority Axis.

Table 1.3 - ERDF and ESF Basque Country Operational Programmes 1994-1996 and 1997-1999

Axis	ERDF millions of ECUs	% ERDF	FSE millions of ECUs	% ESF	ERDF + ESF millions of ECUs	%
1. Support to Employment and Firms Competitiveness	228	40.2	80	60.8	307	44.1
2. Environmental Protection	72	12.7	0	0.2	72	10.3
3. Development of Technological Research and Innovation	66	11.6	29	21.7	94	13.5
4. Development of Transport Networks	131	23.1	0	0.0	131	18.7
5. Urban and Local Development	66	11.6	18	14.0	84	12.1
6. Technical Assistance	4	0.8	4	3.3	9	1.2
Total	566	100.0	131	100.0	697.1	100.0

Source: own elaboration based on Basque Country Operational Programmes

The overall performance of both programmes was quite good and helped to face the main strategic priorities of the Basque economy. The main lines of expenditure were support to employment and firms' competitiveness and the development of transport networks. It is worth mentioning that besides actions to foster entrepreneurial capabilities and firms' internationalization, very important actions aimed to face structural change and globalizations were undertaken in the field of R&D and innovation.

The main measures fostering technological research and innovation were carried out with the support of ERDF funding. Investment support to innovative technologies in the productive fabric was provided by other programmes under the Axis 1 and specially through the CDTI (Spanish acronym for Centre for Technological Industrial Development) programme under Axis 3. The 1997-2000 Science and Technology Plan was the fundamental framework for the Basque country scientific and technological policy, giving support on the supply side to build capabilities (Technological Centres) and on the demand side to foster entrepreneurial innovative projects. To build technological capabilities and reach institutional thickness in the regional innovation system during the first part of the period the set up of Guided Technological Centres (“Centros Tutelados”) was supported by EU funding delivered under Axis 3 (Development of Technological Research and Innovation). In the second part of the period to foster creation, development and diffusion of technology the project addressed to technological centres was framed under the Basque Technology Network (Red Vasca de Tecnología). This approach was aimed to favour the interplay among agents in the regional innovation system and reached important synergies with other programmes supporting entrepreneurial investment.

### 1.3 Regional structural change and globalisation issues in 2000-2006

Since early eighties the Basque economy growth has lied to an important extent in labour cost advantages, but these advantages have been narrowing and approaching to many other regions in the EU-15 like French or German regions where firms are located in friendly economic environments that boost entrepreneurial performance and firm's competitiveness. On the other hand the EU enlargement to CEECs (started May, 1<sup>st</sup>, 2004) meant for the Basque economy a tougher competition from economies better located to supply central

European markets, with a strong industrial tradition, a skilled labour force and considerably lower labour costs.

The features mentioned above and the increasing trend of current globalization led to an increasing awareness among most Basque economic and institutional players of the need to reinforce structural changes to tackle the new economic scenario and the competition from emerging economies (BRICs -Brazil, Russia, India, China- and others). In this section structural change in the Basque country is going to be explored along the main dimension driving structural change.

### 1.3.1 Dimensions of structural change

#### 1.3.1.1 Socio-economic change and human capital

Basque country population is older than the Spanish average. Population over 65 accounts for 18.3% of total population while in Spain as a whole it accounts for 16.9% (a figure quite similar to EU-27 average). As it can be seen in Table 1.4, migration flows in the Basque country are in the range of the EU average which considerably lower than the Spanish average.

Educational attainments in the Basque country show a high percentage of population with tertiary education quite above the Spanish and EU-27 averages. Table 1.4 shows that Basque country tertiary education levels were already higher at the beginning of the period and their gap with Spanish and EU-27 averages have been enlarging since then. Medium educational attainment levels of persons aged 25-64 are comparable in the Basque country and Spain (around 20% of population), but this figure is far below the EU-27 average (around 49%).

With respect to long life learning, Spain had at the beginning of the 2000-2006 period much lower levels than EU-15 average. Over the period the share of people aged 25-64 participating in education and training has experienced an important increase in the EU-15 being even more important in the cases of Spain and the Basque country. This process has led to an important catch-up for Spain as a whole and a clear surpass in the case of the Basque country.

Table 1.4 - Socio-economic change and human capital (NUTS2)

Indicator	Regional			National			EU-15		
	2000	2006	Δ(%) 2000- 2006	2000	2006	Δ(%) 2000- 2006	2000	2006	Δ(%) 2000- 2006
% share of people aged 25-64 participating in education and training	4.4	12.4	181.8	4.1	10.3	151.2	8.0	11.4*	42.5
% share of population aged 25-64 with tertiary education	31.8	41.6	30.8	22.6	28.4	25.7	20.3	25.1*	23.6
% share of students at tertiary level	5.3	4.6	-13.2	-	-	-	-	-	
Crude rate of net migration (%)	3.3	4.4	33.3	9.7	13.9	43.3	3.2	4.2	31.3
Long-term unemployment rate (%)	47.5	27.8	-41.5	41.7	21.7	-48.0	n.a	42.3	
% share of population aged 25-34 employed on total employment	30.4	28.2	-7.1	30.1	29.9	-1.0	n.a	23.6	

\* Data for 2005

Source: Core team processing of Eurostat data

In accordance with the good performance in terms of the job creation during the 2000-2006 period, youth and long-term unemployment rates have decreased rapidly both in Spain and the Basque country. As it is shown in Table 1.4 long-term unemployment at the end of the period has fallen considerably below EU-15 average both in Spain and in the Basque country, however in the Basque country long-term unemployment rates kept above the Spanish ones. The shares of population aged 25-34 employed on total employment decreased in the Basque country more than in Spain on account of lower immigration rates and a more ageing population.

Long life learning in the Basque country (proxy provided by the share of people aged 25-64 participating in education and training) reaches 12.4%, a figure which is higher than Spanish (10.3%) and EU-15 average (11%). These figures are far behind from the benchmark of leading EU countries such as Sweden (34.7%) and UK (29.1%). It is needed to give a high priority to human capital and training activities inside firms in order to face the challenges posed by structural change and globalization.

An important feature in the Basque country education system is the high share of bachelor degrees in science and technology (26.1%) which places the region in the top of EU ranking considerably above the EU average (12.7%). To some extent this feature fits in the patterns of Basque country regional specialization and will be an important human resources supply to feed the regional innovation system.

The share of R&D personnel in the Basque country active population is 13.1% and the share of researchers is 8.1% figures above Spanish and EU average. The distribution of researchers by disciplines shows again a strong concentration in the engineering and technological field. The ratio of researchers in this field reaches 65% of the total, while the other scientific disciplines amounts the remaining 35%.

As it is mentioned in the Basque country 2010 science, technology and innovation plan (PCTI 2010), a weakness in the Basque country regional innovation system is the shortage of PhDs and PhD students. The Basque science, technology and innovation network needs to improve the qualification of its personnel by increasing the share of PhDs. As a remark only one technological centre among the 13 included in the Basque network concentrated 30% of researchers with a PhD degree (Saretek survey 2004) in 2004. The Basque university system has a PhD student ratio (4.5%) which is quite below the Spanish benchmarks in Madrid Autonomous University (11.7%) and Barcelona Autonomous University (9.1%). Another point to be reinforced refers to the low research personnel mobility a feature extremely relevant for scientific and technological research centres.

### **1.3.1.2 Regional specialisation**

Table 1.5 offers the key figures of productive specialization in the Basque country whose most remarkable features are commented below.

Services sector accounts for the largest share of total employment in Spain and in the Basque country however their shares are much lower than the EU-15 average. In the Basque country the services share on total employment was lower than the Spanish average at the beginning of the period; however it has grown faster reaching the Spanish share by 2006 and considerably reducing the gap with the EU-15 average.

The process of conversion to the tertiary sector for the Basque economy has been intense but it keeps a strong industrial specialization. The share of employment in industrial sectors have diminished by 11% between 2000 and 2006, a ratio slightly above the EU-15 average (10%) and considerably higher than the

Spanish one (4.2%). However industrial employment in the Basque country still amounts to 33.7% in 2005 a figure quite above the Spanish one (29.7%) and especially the EU-15 (25.1%).

Having a look at the Gross Value Added (GVA) by broad economic sectors it must be highlighted the effects of the real-state bubble on the construction GVA shares which has increased from levels comparable to the EU-15 ones in 2000 (6.5% Basque country, 5.4% EU-15) to 8.6% in 2005. This implies a 32.3% increase in the five year period under consideration while the EU-15 average only increase by 5.6% over the same period. This process has been even sharper in Spain.

Manufacturing GVA both in Spain and in the Basque country have kept the path and over the period have increased their shares in total GVA by 8.3% in the case of the Basque country and 10.5% in the case of Spain as a whole. At the end of the period they represent a similar percentage on total GVA (around 10.5%) slightly below the EU-15 average manufacturing share on total GVA (11.5%) which has kept relatively stable over the period.

Going deeper in the analysis of GVA by economic sectors it is worth to remark that one key sectors in the Basque economy is the business services (including financial intermediation, real-state and renting) whose relative weight in terms of GVA generation is among the highest ones. Manufacturing and business services are the branches that experience the fastest growth (with the exception of the particular features construction had in Spain over this period) and their rankings are robust to thinner classifications. Electricity, gas and water supply (mining and quarrying have very little weight in the Basque country) have the biggest GVA share on total Basque economy GVA though their relative importance have decreased a bit over the period, it is worth mentioning that the sector takes in some very dynamic firms with important internationalization processes (Iberdrola). The former comments square with the idea of a new reindustrialization based not only on traditional industries but also on new fields of businesses and renewed production and managerial systems.

The rest of the market services (wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods, hotels and restaurants; transport, storage and communication) have grown slower than the average and their GVA shares have slightly shrunk both in Spain and in the Basque country. At the end of the period the share of market services in Spain remain higher (22.4%) than EU-15 average (19.8%) and Basque country (19.4%). An important role in this evolution has been played by tourism. In the Basque country the GVA share of market services has slow down its decreasing tendency over the 2000-2005 period and has reached a level comparable to the EU-15 (19.8%).

The evolution of most of non market services (Public administration and defence, compulsory social security; education; health and social work; other community, social and personal service activities; private households with employed persons) over the period shows a slower growth than the average, as a consequence its GVA share decrease slightly (2.7%) over the period. Both in Spain and in the Basque country non market services have slowed down their convergence with the EU-15 standards.

Basque country exports are mostly equipment goods with a share of 46.3% of total. Within this group sales are more or less equally divided between machinery and appliances on the one hand and transport material on the other. The remaining export sales are made of mainly by metallic manufactures amounting 26% of total. The biggest shares in imports are made of by energetic and mineral products (30.7%) followed by metallic manufactures (23.3%) and machinery and appliances (14.9%).

Regarding to the geographical destination of Basque exports the non-energetic ones are mostly for the EU-15 markets concentrating 68.4% of total exports a share that increases to 83.3% if we refer to industrialized countries belonging to OECD.

It is worth mentioning that the good trends in Basque exports are linked to goods with a higher technological content (aeronautics, telecommunications) and due to the innovation carried out in traditional industries such as automobile and tool-machinery. High technology export goods have drastically increased its share in total Basque exports moving from 0.8% in early nineties to 4.3% in 2006. However it is still far from EU average (18.4%) and countries such as Ireland and Luxemburg (around 30%).

Table 1.5 - Regional specialisation (NUTS2)

<b>Employment by sector</b> (% on total employment)										
	Regional			National			EU-15			
	2000	2005	Δ(%)2000-2005	2000	2005	Δ(%)2000-2005	2000	2005	Δ(%)2000-2005	
Agriculture	1.6	1.6	-0.6	6.6	5.3	-19.7	5.6	4.6	-17.9	
Industry	37.8	33.7	-11.0	31.0	29.7	-4.2	27.9	25.1	-10.0	
Services	60.6	64.7	6.9	62.4	65	4.2	66.5	70.3	5.7	
<b>Gross Value Added by broad economic sectors</b> (% on total GVA)										
	Regional				National			EU-15		
	1995	2000	2005	Δ(%)2000-2005	2000	2005	Δ(%)2000-2005	2000	2005	Δ(%)2000-2005
GVA in Agriculture, hunting, forestry and fishing	2.1	1.7	1.2	-29.4	4.0	2.8	-30.0	2.5	1.8	-28.0
GVA in Construction	6.1	6.5	8.6	32.3	7.5	10.4	38.7	5.4	5.7	5.6
GVA in Financial intermediation; real estate, renting and business activities	17.1	14.8	15.9	7.4	17.6	18.7	6.2	22.3	23.4	4.9
GVA in Manufacturing	n.a	9.6	10.4	8.3	9.5	10.5	10.5	11.4	11.5	0.9
GVA in Mining and quarrying; electricity, gas and water supply	31.2	28.6	26.8	-6.3	18.9	16.5	-12.7	19.5	17.5	-10.3
GVA in Public administration and defence, compulsory social security; education; health and social work; other community, social and personal service activities; private households with employed persons	20.8	18.2	17.7	-2.7	18.8	18.7	-0.5	19.2	20.3	5.7
GVA in wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods, hotels and restaurants; transport, storage and communication	22.8	20.6	19.4	-5.8	23.7	22.4	-5.5	19.7	19.8	0.5

Source: Core team processing of Eurostat data

### 1.3.1.3 Production system

The content in the previous section on regional specialization to some extent can be misleading when one tries to draw policy oriented conclusions. Usual aggregation of activities by sectors such as the one provided by (NACE) lacks from the ability to capture the links among the value chain lying at the core of entrepreneurial clustering. This is the reason why in order to show a better approach to the productive structure in the Basque country we have employed the classification provided by the recent report to the Basque Parliament (Estudio sobre la deslocalización productiva: Riesgos para la Economía Vasca y estrategias de respuesta, June 2008). This report breaks down industrial activities by the main industrial clusters in the Basque country and allows getting the magnitudes associated with them using the statistical information provided by EUSTAT (Input-output Table), NACE and firms databases (Amadeus, One Source, Sabi).

Table 1.6 shows the 12 most important Basque industrial clusters. These clusters amount 31.5% of Basque total turnover and 13.4% of Basque total employment. They take in 1,603 firms (12.4% of Basque total manufacturing units) representing 66.7% of total Basque industrial turnover and 50.1% of Basque total industrial employment.

Table 1.6 - Main industrial Clusters in the Basque Country

CLUSTER	N. Firms	Basque Total Turnover (€ million)	Basque Total Employment	Turnover share		Employment share	
				% Basque Industrial Turnover	% Basque Total Turnover	% Basque Industrial Employment	% Basque Total Employment
Electrical Appliances	10	1,459	4,961	2.76	1.30	1.99	0.53
Maritime	103	1,189	9,332	2.25	1.06	3.74	1.00
Paper	32	1,427	4,614	2.69	1.27	1.85	0.50
Aerospatial	31	713	3,959	1.35	0.64	1.59	0.43
Machine Tools	72	812	5,345	1.53	0.72	2.14	0.57
Hand Tools	19	317	2,190	0.60	0.28	0.88	0.24
Metal	888	8,367	37,938	15.80	7.45	15.19	4.08
Automobile	252	9,232	38,277	17.43	8.22	15.33	4.11
Environmental	55	1,645	4,693	3.11	1.46	1.88	0.50
Chemical	82	1,304	3,950	2.46	1.16	1.58	0.42
Electronics	32	305	3,764	0.58	0.27	1.51	0.40
Energy	27	8,545	5,952	16.14	7.61	2.38	0.64
<b>Total</b>	<b>1,603</b>	<b>35,315</b>	<b>124,975</b>	<b>66.70</b>	<b>31.44</b>	<b>50.06</b>	<b>13.42</b>

Source: Basque Parliament Report (2008)

Table 1.7 contains the recent trends (2000-2005) in terms of turnover, employment and productivity for the main Basque industrial clusters both at the regional and global level. Combining growth trends in turnover and employment (at regional and global level) give us the productivity trends which are represented on the productivity column. Comparison of these indices allows us to draw some conclusions for each cluster.

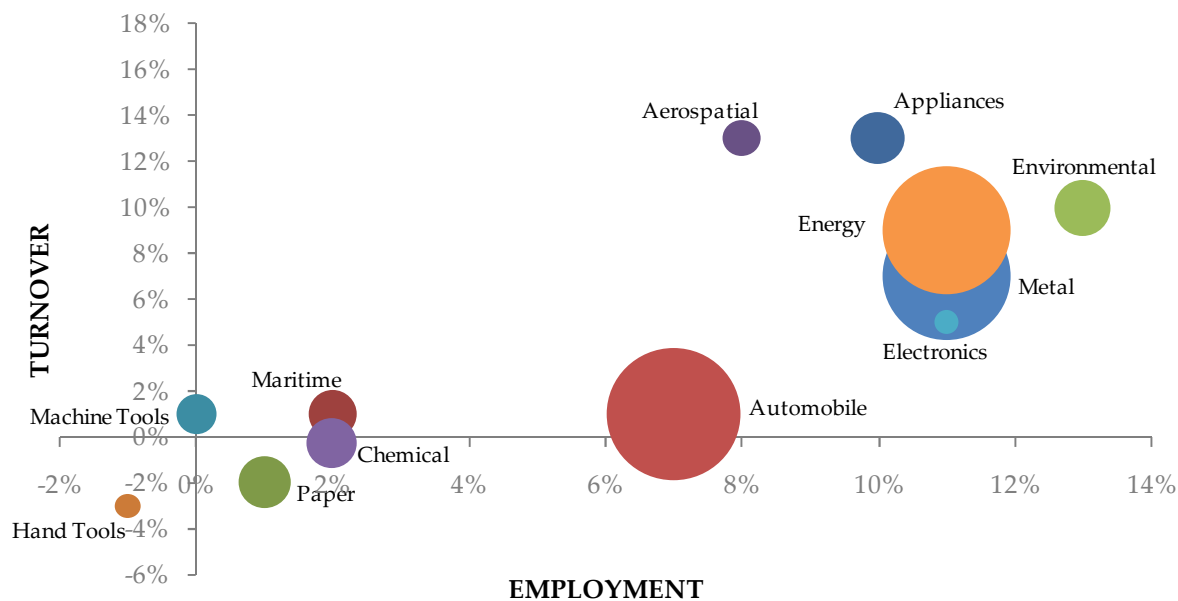
Table 1.7 - Recent Trends in the main Basque Industrial Clusters

CLUSTER	TURNOVER	EMPLOYMENT	PRODUCTIVITY
Electrical Appliances	Δ Interannual average turnover = 10%	Δ Interannual average employment = 13%	Δ Productivity 2000-2005 = -8%
	Average turnover 2000-2005 = €1,560 million	Average employment 2000-2005 = 10,222 jobs	Δ interannual average productivity = -2%
Maritime	Δ Interannual average turnover = 2%	Δ Interannual average employment = 1%	Δ Productivity 2000-2005 = 6%
	Average turnover 2000-2005 = €494 million	Average employment 2000-2005 = 1,796 jobs	Δ Interannual average productivity = 1%
Paper	Δ Interannual average turnover = 1%	Δ Interannual average employment = -2%	Δ Productivity 2000-2005 = 24%
	Average turnover 2000-2005 = €575 million	Average employment 2000-2005 = 2,190 jobs	Δ Interannual average productivity = 4%
Aerospatial	Δ Interannual average turnover = 8%	Δ Interannual average employment = 13%	Δ productivity 2000-2005 = -14%
	Average turnover 2000-2005 = €670 million	Average employment 2000-2005 = 4,582 jobs	Δ interannual average productivity = -2%
Machine Tools	Δ Interannual average turnover = 0%	Δ Interannual average employment = 1%	Δ productivity 2000-2005 = -3%
	Average turnover 2000-2005 = €642 million	Average employment 2000-2005 = 4,052 jobs	Δ interannual average productivity = 0%
Hand Tools	Δ Interannual average turnover = -1%	Δ Interannual average employment = -3%	Δ productivity 2000-2005 = 9%
	Average turnover 2000-2005 = €2,408 million	Average employment 2000-2005 = 15,436 jobs	Δ interannual average productivity = 2%
Metal	Δ Interannual average turnover = 11%	Δ Interannual average employment = 7%	Δ Productivity 2000-2005 = 16%
	Average turnover 2000-2005 = €3,346 million	Average employment 2000-2005 = 16,729 jobs	Δ Interannual average productivity = 3%
Automobile	Δ Interannual average turnover = 7%	Δ Interannual average employment = 1%	Δ Productivity 2000-2005 = 38%
	Average turnover 2000-2005 = €6,542 million	Average employment 2000-2005 = 42,296 jobs	Δ Interannual average productivity = 7%
Environmental	Δ Interannual average turnover = 13%	Δ Interannual average employment = 10%	Δ Productivity 2000-2005 = 20%
	Average turnover 2000-2005 = €1,261 million	Average employment 2000-2005 = 4,251 jobs	Δ Interannual average productivity = 5%
Chemical	Δ Interannual average turnover = 2%	Δ Interannual average employment = -0,3%	Δ productivity 2000-2005 = 12%
	Average turnover 2000-2005 = €4,047 million	Average employment 2000-2005 = 9,077 jobs	Δ interannual average productivity = 2%
Electronics	Δ Interannual average turnover = 11%	Δ Interannual average employment = 5%	Δ Productivity 2000-2005 = 32%
	Average turnover 2000-2005 = €1,626 million	Average employment 2000-2005 = 8,063 jobs	Δ Interannual average productivity = 6%
Energy	Δ Interannual average turnover = 11%	Δ Interannual average employment = 9%	Δ productivity 2000-2005 = 8%
	Average turnover 2000-2005 = €14,872 million	Average employment 2000-2005 = 21,574 jobs	Δ interannual average productivity = 2%

Source: own elaboration based on data from Basque Parliament Report (2008)

Figure 1.3 offers a visual idea of the positioning of the main industrial Basque cluster according to their size (size of the bubbles) and recent trends in turnover and employment.

Figure 1.3 - Main industrial Basque cluster according to their size and recent trends in turnover and employment



Source: own elaboration based on EUSTAT data and Report to the Basque Parliament (2006)

The largest one, the automobile cluster is placed on a threshold between two main cluster groups. The Basque automobile shows a big effort of competitive adjustment by means of productivity gains: there has been a substantial turnover increase maintaining employment.

The most dynamic group of industrial clusters shows both significant turnover and employment increases. To this group belong two big traditional sectors (Metal and Energy), two emergent sectors (Electronics and Aerospace) and also a new sector in expansion (Environmental). The appliances sector that also belongs to this group has a long tradition in the Basque country and was performing relatively well though nowadays because of current financial crisis one of its main enterprises (Fagor) is under difficulties because of its recent acquisitions in France.

A brief conclusion for clusters in this group is the following one: Good results in terms of turnover and employment in the metal sector mean that this activity is competitive and continues its expansion. In the energy cluster manufacturing firms of equipment goods for the power sector are in good competitive position as it is shown by its high productivity levels, employment and activity growth. The aerospace sector is under expansion and is growing both domestic and internationally. Electronic activity has experienced a noticeable increase in the period under analysis which means that the sector is facing relatively well the challenges posed by globalization. Environmental cluster is an expansion sector with big productivity gains in the last years. In the period under analysis it is worth mentioning that in the appliances sector there has been an important international expansion reflected in the important increase in employment outside the Basque country in comparison with the increase registered domestically.

The less dynamic group takes in some basic industries (paper, chemical, maritime and ship building) and some traditional Basque industries (machine tools and hand tools). The increase in productivity in the paper sector is due to decreases in employment as a consequence of strategic restructuring and labour costs reductions. Chemical sector has kept a quite stable activity in the period under analysis registering very low productivity gains being exposed to warning signs arising from global competition. Since 2003 the maritime sector has grown in productivity with little employment variation being the result of specialization in higher

value added niches and/or improvements in productive processes. The machine tools sector is on a relatively stable path both in employment and turnover and finally the hand tools cluster shows a decrease in the turnover jointly with an employment reduction which are signs of a certain downward adjustment.

### 1.3.1.4 Innovation potential

Table 1.8 - Innovation potential (NUTS2)

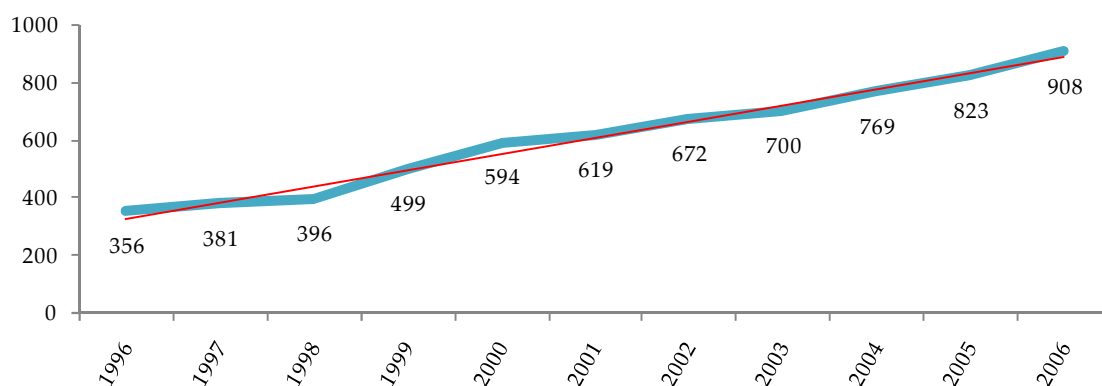
Indicator	Unit	Regional				National			EU-15		
		1995	2000	2006	Δ(%) 2000- 2006	2000	2006	Δ(%) 2000- 2006	2000	2006	Δ(%) 2000- 2006
Business enterprise expenditure on R&D – BERD as percentage of GDP	% of GDP	0.9	0.9	1.1*	22.2	0.5	0.7	40.0	1.1	1.3	18.2
Gross domestic expenditure on R&D - GERD	% of GDP	1.1	1.2	1.5*	25.0	0.9	1.2	33.3	1.8	2.0	11.1
Employment in high-tech sectors on total	% on total employment	n.a.	2.6	3.4	30.8	2.9	3.4	17.2	4.7	4.6	-2.1
Number of total publications	Units per million inhabitants	n.a.	428.3	623.7	45.6	n.a.	n.a.	-	n.a.	n.a.	-
R&D personnel in all sectors	% on total employment	n.a.	1.4**	2.1	50.0	1.2**	1.6	33.3	n.a.	n.a.	-

\* Data for 2005. \*\* Data for 2001

Source: Core team processing of Eurostat data

Global expenditure in R&D reached 1.47% of GDP in the Basque country in 2006. This level is above the Spanish average (1.2% in 2006) although quite far from the European levels (EU-15 =2.0% in 2006) and half way from Barcelona target (3% in 2010). The effort made in terms of R&D expenditure in the last decade has been very important. In absolute terms total R&D expenditure (current values) has shown a clear growth trend increasing from €356 million in 1996 up to €908 million in 2006. Figure 1.4 shows this tendency.

Figure 1.4 - R&amp;D Expenditure in the Basque Country 1996-2006 (€ million)



Source: own elaboration based on EUSTAT data

Both Spain and the Basque country have narrowed the gap with the EU-15, having increased R&D shares on GDP by 33.3% and 25.0% from 2000 to 2006 a period in which the EU-15 increase was much lower (11.1%). These ratios are still far behind the targets of Lisbon Agenda (3.0% R&D expenditure on GDP by 2010). This target is really ambitious given the current position of the Basque country. It implies doubling the 2006 share of R&D expenditure on GDP which assuming an average GDP growth of 3% in the period 2006-2010 R&D expenditure in the Basque country would have to amount €2,000 million an increase of 120% with respect to the 2006 figure.

With respect to the sources of Basque funding of R&D total expenditure it is worth mentioning that enterprises play a more important role than in the Spanish average. In 2006 Basque enterprises funded almost 2/3 (61.2%) of total R&D expenditure well above Spanish (46.3%) and European averages (54.3%)<sup>3</sup>. Taking into account implemented R&D expenditures the share of enterprise expenditure amounts 79.5% of total Basque R&D expenditure. The former indicator has slightly decreased from its 2000 value (69.2%) while the latter has kept stable.

Table 1.9 - R&amp;D Expenditure Delivered by Firms and Technological Centres in the Basque country

	1997		2000		2003		2006	
	€ thousand	%	€ thousand	%	€ thousand	%	€ thousand	%
Multisectoral Technological Centres	39,381	14.6	79,144	16.6	111,122	20.1	144,622	20.0
Sectoral Technological Centres	2,457	0.9	11,705	2.4	14,901	2.7	24,032	3.3
Firms	228,789	84.5	387,333	81.0	427,505	77.2	552,700	76.6
Total	270,627	100.0	478,181	100.0	553,528	100.0	721,354	100.0

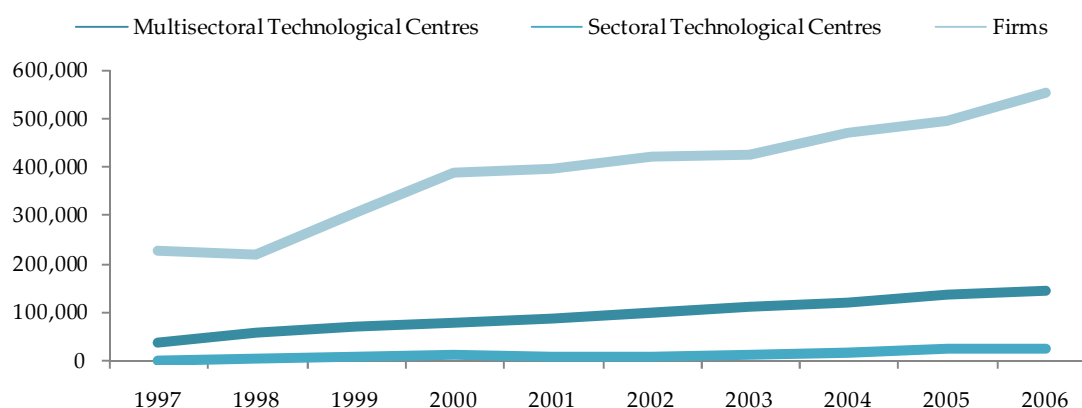
Source: own elaboration based on EUSTAT data

Table 1.9 illustrates an important feature of the Basque innovation system being the highly relevant role played Technological Centres (TC). Most of them are market oriented non-profit organizations which perform R&D activities (mainly technological development) in partnership with their associates and other

<sup>3</sup> Spanish and EU data refer to year 2005

firms through venture projects. These TCs were able to increase its relative position in the last decade moving from 15.5% of total Basque R&D expenditure in 1997 to 23.4% in 2006. These figures are really significant on account of the high growth trend of Basque R&D expenditure in the period as it is shown in Figure 1.4. Figure 1.5 breaks down the evolution of R&D expenditure by main actors.

Figure 1.5 - R&D Expenditures by Firms and Technological Centre (Basque country 1997-2006, € thousand)



Source: own elaboration based on EUSTAT data

In terms GDP, R&D expenditure is made by Basque firms represents 1.16% in 2006 (1.14% in 2005). This ratio is considerably above the Spanish one (0.7%) and is closing the gap with the EU-15 average (1.3%). However, if we discount the contribution to R&D expenditure made by technological centres (multisectoral, sectoral and cooperative research centres) the share decreases to 0.86% (though accordingly to Frascati manual business enterprise expenditure takes in nonprofits organizations).

With regard to R&D personnel Table 1.10 shows the evolution in the last decade full time equivalent R&D personnel in the Basque innovation system broken down by sectors.

Table 1.10 - Full Time Equivalent Personnel in R&D Activities in the Basque Country

	2000		2002		2004		2006	
	Num.	%	Num.	%	Num.	%	Num.	%
Tertiary education	2,158	23.7	2,302	20.6	2,800	23.5	2,829	21.7
Public Administration	280	3.1	416	3.7	394	3.3	471	3.6
Technological Centres	1,161	12.8	1,453	13.0	1,611	13.5	2,235	17.1
Firms	5,494	60.4	6,994	62.6	7,120	59.7	7,530	57.6
<b>Total</b>	<b>9,092</b>	<b>100.0</b>	<b>11,165</b>	<b>100.0</b>	<b>11,925</b>	<b>100.0</b>	<b>13,065</b>	<b>100.0</b>

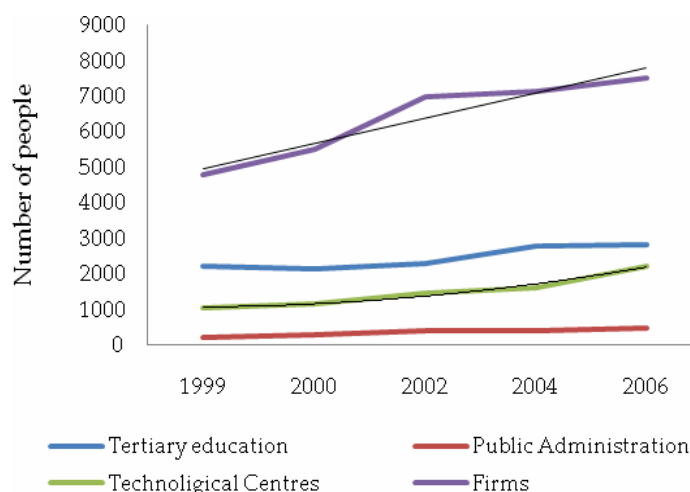
Source: own elaboration based on EUSTAT data

The total number of full time equivalent R&D personnel has increased from 9,092 in 2000 up to 13,065 in 2006. These figures represent respectively around 1.4% and 2.1% on total employment<sup>4</sup>. Again the business

<sup>4</sup> These shares are lower if compute full time equivalent R&D personnel (1.07% in 2000 and 1.3% in 2006, according to EUSTAT data). Considering only full time equivalent researchers the shares are respectively 0.65% and 0.83%.

enterprise sector (firms and technological centres) represents the largest share in terms of personnel involved in R&D activities with a share of 73.2% in 2000 increasing up to 74.7% in 2006. It is worth mentioning the role played by the technological centres whose share has notably increased from 12.8% in 2000 up to 17.1% in 2006. Tertiary education and public administration shares exhibit a quite stable pattern. Figure 1.6 offers a visual image of the main patterns of structure and evolution of R&D personnel in the Basque innovation system and the tendency lines of its most dynamic components (firms and technological centres).

Figure 1.6 - Full time personnel in R&D activities



Source: own elaboration based on EUSTAT data

Focusing on employment in high-tech sectors the Basque country share on total employment in 2006 is similar to the Spanish average (3.4%) and considerably below the EU-15 average (4.6%). However both Spain and the Basque country have had a growth tendency since 2000 that has allowed to narrow the gap from 1.8 percentage points in 2000 to 1.2 in 2006 in the case of Spain and from 2.1 to 1.2 in the Basque country case. That reflects the fact that the employment in high-tech sectors in the Basque country has performed better than the Spanish average.

The total number of Basque country scientific publications (4.3% of total Spanish Publications) reflects a productivity which is lower than the Spanish average on accounting of its relative share on total R&D personnel (7.4%)<sup>5</sup>. The publication shares are quite behind the Spanish leading regions such as Madrid (28.5%) and Catalonia (20.3%). In terms of publications in scientific journals with international diffusion the Basque country has increased its effort substantially moving from 428.3 per million inhabitants in 2000 up to 623.7 in 2006.

In terms of European patent applications (EPO) the Basque country with 29 patents per million inhabitants in 2005 is far from the European leading regions (Germany 312) and also below the European average (136.7). In terms of US patent applications (USPTO) the figure for 2005 was 7.9 per million inhabitants.

Regarding other innovation related outputs the number of new European Community brands per million inhabitants was 368 in 2006 a figure above the European average 100.7. New European designs reached 268 per million inhabitants also above the Spanish average (106.2) and the European average (110.9).

<sup>5</sup> These data refers to 2005.

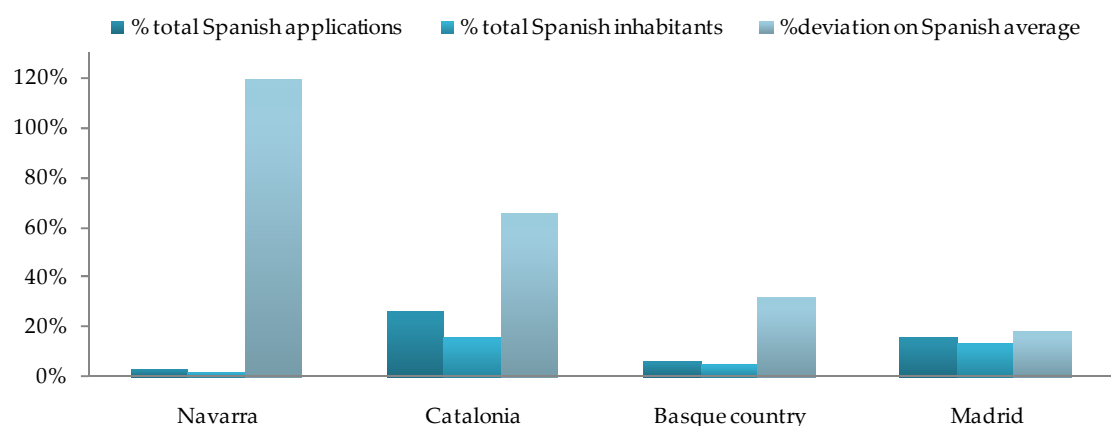
Table 1.11 - Patent and design applications in R&amp;D leading Spanish regions (2006)

NUTS2 regions	Applications			Inhabitants		Inventions	
	Num.	% annual variation	%	Num.	%	Applications / Mill. Inhb.	% deviation on the average
Navarra	169	5.60	2.93	605,876	1.34	279	119
Catalonia	1,529	0.80	26.54	7,210,508	15.95	212	66
Basque country	361	-8.60	6.27	2,141,860	4.74	169	32
Madrid	918	5.40	15.93	6,081,689	13.45	151	18
Total Spain	5,762	0.20	100.00	45,200,737	100.00	127	

Source: own elaboration based on EUSTAT data

Table 1.11 and Figure 1.7 offer a comparative image of Basque innovative activities in a broad sense (patents and design applications) with respect to some of the Spanish leading regions. It can be seen that the Basque country innovative activities are placed among the top in the Spanish ranking.

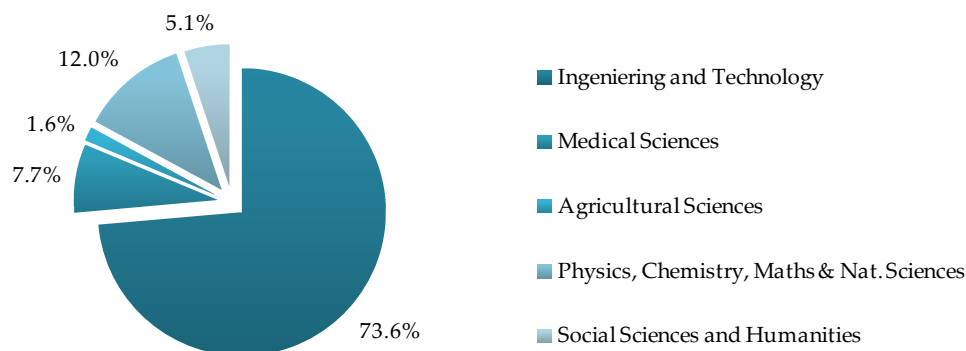
Figure 1.7 - Applications for registered inventions 2006



Source: own elaboration based on EUSTAT data

Concentration of innovation in big companies is also an important feature in the Basque country innovation system although its magnitude is much lower than in other countries. The excess of fragmentation of the innovative effort is characterized both by a certain concentration of R&D expenditure and the low firm's average expenditure in R&D (88 firms undertake 79% of total RD expenditure), and the low number of technicians and researchers per firm. 60% of firms involved in R&D activities have less than one researcher full time contract and spend less than 200,000 €/year.

Figure 1.8 - R&D expenditures by discipline (Basque country 2006)



Source: own elaboration based on EUSTAT data

R&D in the Basque country is highly concentrated in engineering and technology especially in mechanical areas. Figure 1.8 offers the evolution of R&D expenditures broken down by knowledge branches. Recently the Basque country innovation policy has seriously addressed the challenge posed by diversification towards new strategic areas such as biotech, nanotechnologies and by embedding into the regional innovation system top scientific research.

### The Basque Country Technology and Innovation Network

In the last 20 years the Basque country has developed an important net in science and technology which has been mainly based on the so called technological centres (TCs) and to a lesser extent on the university system. This feature can be considered as an idiosyncratic feature of the Basque country regional innovation system. In a different way to other leading Spanish regions such as Catalonia and Madrid where the innovation system relied on the scientific potential of big universities, the Basque innovation system has been prompt by development of multiple TCs, a set of non-profit organizations structured around local actors and entrepreneurial partnerships linked to the traditional industrial activities located in the Basque country.

The crisis of the seventies had made visible a weakness in the traditional Basque industrial sector. An important part of the entrepreneurial establishment, public bodies and main stakeholders became aware of the need of restructuring the productive system and foster competitiveness by means of innovation, knowledge and technological development. TCs were set up to fill the technological gap and to enhance the capabilities of Basque industrial sectors. The Basque regional government actively supported TCs with the target of building new capabilities in a clear technological supply policy. The main policy instrument was the support given to these centres on account of their qualification as “centros tutelados” (guided centres) and the funding granted on the grounds of the targets and operational plans submitted to the Basque authorities. The *Sociedad para la Promoción y Reconversión Industrial* (SPRI, Society for promotion and industrial restructuring) was created in 1981 and became the entrepreneurial development agency of the Basque country. SPRI through its innovation and technology strategic unit (UETI) has been in charge of managing

most of the Basque technological and innovation policy on behalf of the Departamento de Industria e Innovación (industrial and innovation department) of the Basque government.

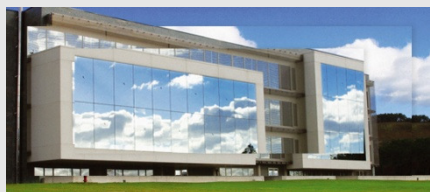
The Basque science, technology and innovation network (henceforth BSTIN)<sup>6</sup> was launched in 1997 by the Basque government with the aim of gathering together the efforts of private and public bodies in charge of prompting the use of science, technology and innovation as a means of improving firms competitiveness and contributing to the economic and social development of the Basque country.

BSTIN members are grouped according their nature, activities and organization into different categories: Technological Centres (TCs, sectoral and multisectoral), firms’ R&D units, Cooperative Research Centres (CRC), International Centres of Technology Transfer and Development, Universities, Certificating Bodies and Test Labs, Public Research Centres, Innovation Support Centres, Technological Parks and Business and Innovation Centres.

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<sup>6</sup> SARETEK in Basque language

**Box 1 - R&D Scientific and Technological Potential in the Basque Country - CIC BIOGUNE**



**CIC BIOGUNE: Headquarter**



**CIC BIOGUNE:**  
Structural Biology Unit Building num.  
800 PTV

The word “biogune” in Basque language means a site for biosciences. CIC bioGUNE is a Centro de Investigacion Cooperativa (CIC, Spanish acronym for research cooperation centre). It was designed as a place to attract talented researchers from all over the world and a centre for joint projects with other scientific institutions.

It is a non-profit organization set up by public institutions, the university, research and technological centres, hospitals and companies (Provincial Council of Biscay, University of the Basque Country, Network of Technology Parks, BIO Foundation, INBIOMED Foundation, TCs –AZTI, GAIKER, LEIA, NEIKER- and firms - Dominion Pharmakine, Faes Farma, Mondragon CC., Noraybio, OWL Genomics, Progenika)

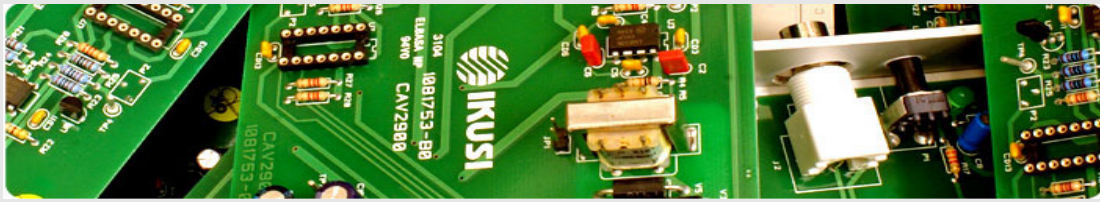
CIC bioGUNE first started its activity at the end of 2003 with the recruitment of the management staff. Since then, 119 positions have been filled by international investigators and qualified professionals. In 2008 it had hired 128 staff members being 105 researchers, 14 maintenance personnel and 9 administrative and managerial personnel. At present time Biogune involved researchers from 18 different nationalities.

2002-2008 total funding amounted €70.5 million. It was provided by private entities (7.4%) and the following public ones: Basque government (56%, mostly through ETORTEK program: €35.04 million), Spanish Government (24.7%), Provincial Council of Biscay (11.5%) and EU (0.5% through the Framework Programs).

CIC bioGUNE has become, since it was first opened in January 2005, a centre of excellence for biomedical research. The main R&D indicators are 103 publications in top international journals and 11 registered patents.

**Source: Company sources and interview with responsible managers.**

**CIC BIOGUNE, Parque Tecnológico de Vizcaya (PTV), ed. 801 A, 48160 Derio, [www.cicbiogune.com](http://www.cicbiogune.com).**

**BOX 2 - IKUSI a successful innovative firm**

Ground and satellite TV and radio signal transmission systems



IKUSI Expansion across the world

IKUSI is the trade-mark used by Angel Iglesias SA for most of its business activities. IKUSI develops its activities in the telecommunications sector. Initially, it was a small firm founded in 1971 in San Sebastian (Guipuzcoa). At present IKUSI has expanded its business across the world. IKUSI has 1,100 employees and a turnover of €148.9 million.

The setting up of an R&D department in 1980 by IKUSI was the key element for the firm future business success. In 1991 IKUSI developed a digital device for a transparent conversion of signals from different sources which was at that time the only one in the world. Because of this invention IKUSI was awarded the Spanish “Príncipe Felipe” prize in 1995 (a prize give on the basis of entrepreneurial excellence by the Spanish Ministry of Industry and Commerce).

The internationalization of IKUSI group was implemented by means of the setting up and acquisition of commercial and technical services subsidiary firms in the main national markets. These firms have national partners but are controlled by IKUSI group which holds the large majority of the stock.

IKUSI has been a beneficiary firm of several reimbursable RTDI aids from CDTI and it can be considered an excellent case to illustrate the collaboration synergies (in a system of open innovation) among firms and technological centres (TCs).

IKUSI has partnership projects with several TCs, many of them in the Basque Country covering different fields: Theoretical simulation with CEIT (a TC linked to the San Sebastian engineering school), Tele-control processes with IKERLAN (a member of the IK-4 Basque technological alliance and in digital TV and many industrial processes with ROBOTIKER (a member of TECNALIA, a big Basque technological corporation recently founded as a merge of a great part of Basque TCs).

IKUSI partnership projects with TCs are not cases of outsourcing and simple technological transfer. IKUSI is deeply involved in the development and implementation of the projects. There are always members of the IKUSI team in all the different project stages, so that scientific and technological knowledge is kept inside the firm allowing it to handle by its own the problems arising from its business technological content.

IKUSI GROUP, Angel Iglesias SA, PS de Miramon, 170, 2014 Donostia-San Sebastian, España, [www.ikus.com](http://www.ikus.com)

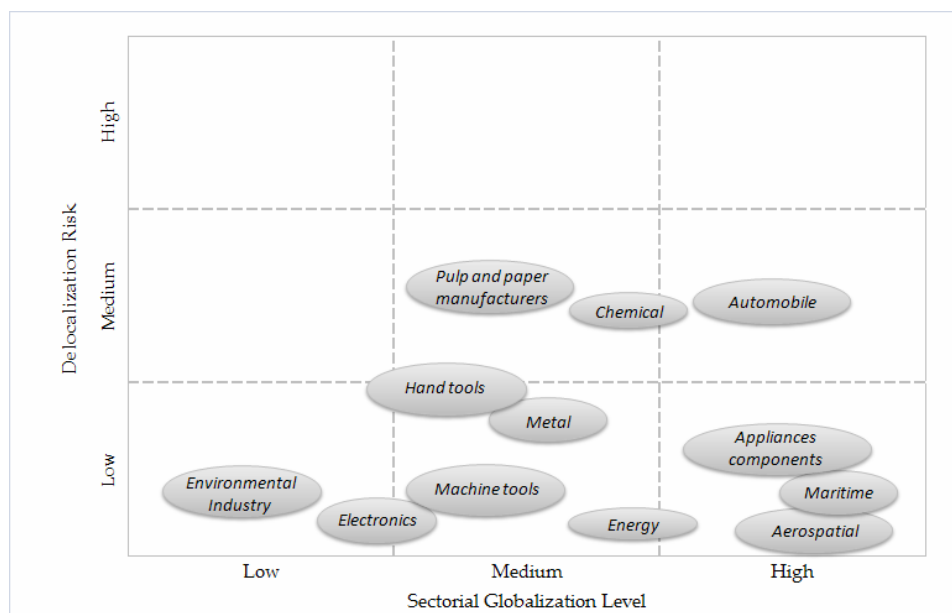
Source: Interview and questionnaire with IKUSI R&D Staff.

### 1.3.1.5 Relocation strategies and internationalisation

A recent report to the Basque Parliament (June 2008) has carried out an extensive analysis of the delocalization risk for the main clusters of industrial activities. This report uses market signals on the evolution of turnover and employment inside and outside the region to draw conclusions on delocalization risks and moreover it takes into account other factors affecting delocalization issues such as those related to

markets and products (type of clients, type of manufactured products, position in the value chain, competition and the like), internal structure (ownership, size, financial structure, managing staff, investment and R&D+i expenditure) and environment factors (fiscal issues, regulatory issues, public aids, infrastructures, human resources and the like). Combining this information an assessment on delocalization risks in the Basque industrial clusters was carried out.

Figure 1.9 - Positioning Matrix referring to the Real Delocalization Risks taking into account Sectorial Globalization Levels (Basque Country)

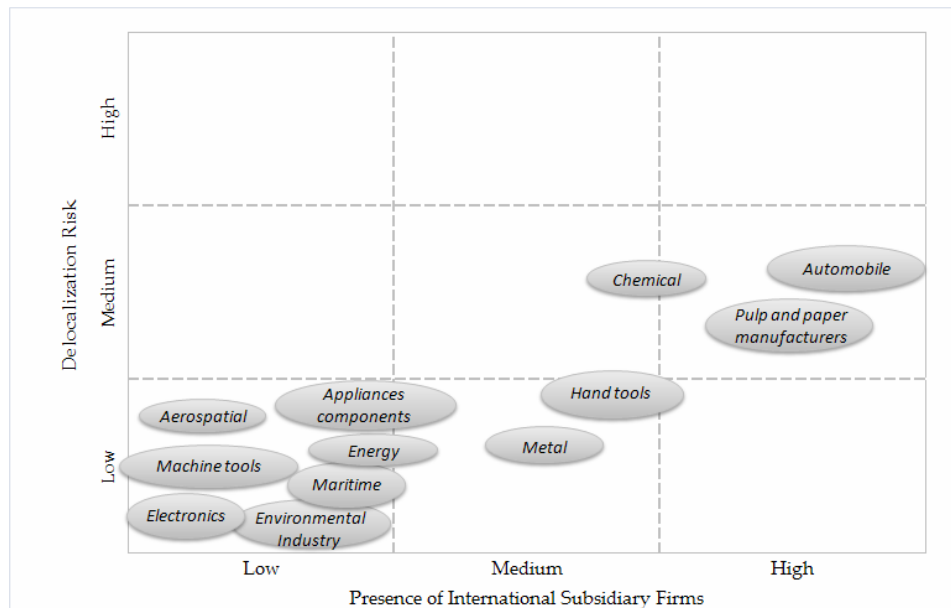


Source: Report Basque Parliament (2008)

The general conclusion drawn from the analysis is that real delocalization risk is relatively low (around 1% of the Basque industrial activity) and is focused on some specific activities such as paper, automobile and Chemist. The positioning matrix (Figure 1.9) which combines a graded classification of delocalization risk and levels of globalization in low, medium high reflects the qualitative comments made above.

Delocalization risks in the mentioned sector are more visible if we take into account the presence of multinational enterprises which is a key factor in delocalization propensity. Taking into account the former factors Figure 1.10 illustrates again the sectors under more delocalization risk.

Figure 1.10 - Positioning Matrix referring to Real Delocalization Risks taking into account the Presence of International Subsidiary Firms (Basque Country)



Source: Report Basque Parliament (2008)

### 1.3.2 Understanding the geography of structural change

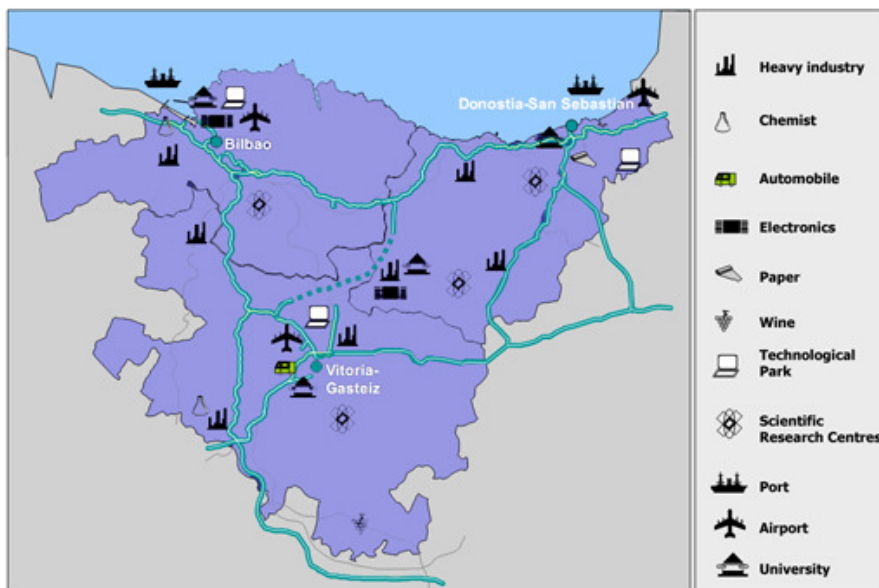
The population of the Basque Country is unevenly distributed, with most living in Vizcaya and Guipúzcoa provinces. Fewer than 10 percent live in the region’s largest province, Álava, which encompasses about 40 percent of the land area.

The regional capital is Vitoria (population, 2007, 229,484), in Álava province. Bilbao (353,168), an industrial centre on the Nervión River, is the Basque Country’s largest city and its most important economic centre and the capital of the Vizcaya province. The other main city, San Sebastián (183,090), is the capital of the Guipuzcoa province.

Bilbao has undergone a deep urban renewal linked to the restructuring of traditional industries (Ship building) and the Consortium Ria de Bilbao 2000 has successfully managed this process which ended up in a downtown (left river bank) fully renewal with some emblematic architectural projects such as the Guggenheim Museum Bilbao, located on Bilbao’s waterfront, opened in October 1997.

The core of the Basque Country’s economy is the city of Bilbao and the province of Vizcaya. Restructuring of traditional industries and the development of the service sectors are the faces of the “new Bilbao” (the province has the highest percentage of tertiary employment, 65%, in the Basque country). The traditional least developed province, Álava, has experienced a very important development and its capital city, Vitoria, has been chosen as the administrative capital of the Basque government. Nowadays Vitoria is an important automobile-manufacturing centre with a subsidiary of Mercedes Benz (this factory manufactures the Vito van), giving the province one of the highest percentages of industrial workers in Spain (42.4%). Guipúzcoa province also has a high industrial employment rate, 38.6%, being services the most important source of employment, 58.5%.

Figure 1.11 - Basque Country Economic Geography



Source: Basque Country ERDF OP 2007-2013

Figure 1.11 offers a visual image of the main productive specialization sites in the Basque country. These sites are mainly structured around the urban places and in the last decades a tendency towards a concentration around the three biggest metropolitan conurbations, Metropolitan Bilba, Donosti-San Sebastian and Vitoria-Gasteiz has been developed. Basque country regional dimension is relatively small and the type of industrial city model is evolving placing population settlement and employment in the outskirts of the cities, building on the one hand low density residential areas and on the other hand industrial and services parks.

Table 1.12 - Geography of structural change (NUTS3)

Gross domestic product per capita (€ PPP)				
Region	1995	2000	2005	Δ (%)2000-2005
es211 Álava	18,002.4	25,592.3	32,165.4	25.7
es212 Guipúzcoa	16,491.1	23,153	29,680.9	28.2
es213 Vizcaya	15,276.4	21,727.8	28,324.8	30.4

Source: Core team processing of Eurostat data

Table 1.13 - Geography of structural change (NUTS3)

Employment by sector (%)				
Region	Year	Agriculture	Industry	Services
es211 Álava	1995	4.6	39.6	55.8
	2000	4.6	41.0	54.4
	2005	3.2	42.4	54.4
	Δ (%)	-30.4	3.4	0.0
es212 Guipúzcoa	1995	2.4	39.7	57.9
	2000	2.8	39.5	57.7
	2005	2.9	38.6	58.5
	Δ (%)	1.4	-2.1	1.4
es213 Vizcaya	1995	2.1	33.2	64.7
	2000	2.6	30.6	66.8
	2005	2.3	32.4	65.3
	Δ (%)	-13.6	6.0	-2.2

Source: Core team processing of Eurostat data



## 2. Regional policy 2000-2006: strategy and objectives

### 2.1 Regional policy mix for structural change and globalisation

In order to place the overall strategy of the Basque Country 2000-2006 SPD in the framework of the regional policy mix over this period, we have analysed the Basque Country general budget in the period to obtain comparable figures according with the priority Axis of the 2000-2006 SPD.

The procedure we have followed was to compute a total budget for the Basque Government across 2000-2006 expressed in current values in order to make it comparable with the SPD figures. We have used the Basque Government general budgets (BGGB) broken down by main functions excluding debt expenditures. As it is the case of most of the Spanish regional governments, the largest share of the BGGB is devoted to education, health and social services, amounting approximately 75% of the total budget. The share of the BGGB devoted to economic development policy<sup>7</sup> (transport infrastructures and communications, knowledge society and RTDI, and productive fabric –excluded primary sectors) which is comparable with the priorities in the SPD represents 10.4% of the BGGB amounting to €3,760 million. The Basque 2000-2006 SPD budget (€610,846 million) means only around 1.7% of the total BGGBs but it reaches a more important share in the comparable economic development policy expenditures (16.2%).

The policy mix for economic development in the BGGB reflects a relative decrease in the share devoted to the general support of the productive fabric (from 38% in 2000 to 28.7% in 2006). The efforts made to foster RTDI in the Basque Country along the Nineties are reflected in the relatively high share of RTDI expenditures in the economic development policy expenditure in the 2000 budget (14%), this figure has speed up from 2003 onwards thanks to the new Basque 2010 science, technology and innovation plan (PCTI 2010) reaching a share close to 17% by 2006. Expenditure on basic and transport infrastructures keeps on an stable path along the period although its relative share on economic development policy expenditures is very important (45% in 2006).

In Spain industrial and economic development policies are mostly competences of regional governments (Comunidades Autónomas), so it is the case with scientific and technological policy. However the Spanish central government also plays an important role in the former fields. In particular in Science, Technology and Innovation the Spanish plans (Plan Nacional de Investigación Científica, Desarrollo e Innovación Tecnológica 2000-2003 and 2004-2007) forecast important resources to be employed in R&D related activities (€9,200 millions in the first two years 2004-2005) aiming to reach 1.22% of GDP in R&D expenditure in 2005. In this year, according to the reinforced Lisbon Strategy, Spanish government has launched the national reform programme (Programa Nacional de Reformas) in which technological and scientific actions were channelled through three big programmes: CENIT (partnerships in technological research), CONSOLIDER (critical mass and research excellence) and AVANZA (convergence in knowledge society).

As it obvious the Basque country has also benefited from these national programmes aimed to foster innovation and promote structural change. However the overall strategy and the measures included in the 2000-2006 Basque SPD were designed in partnership by the central and regional governments. According to their competences both central and regional authorities have been assigned to undertake the measures contained in the Basque SPD.

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<sup>7</sup> These expenditures are included as number 4 and 5 functional groups of the functional budgetary classification.

The role played by European structural funds (ERDF and ESF) supporting the main regional policy actions is ruled by programming documents, in particular the Basque SPD 2000-2006. Spanish administrations have set up a system of specialized coordination units to manage the European funding. They have closed the cycle of Planning-Programming-Budgeting by means of fitting the programmed annual aids and expenditures into the national and regional budgets. This implies that European Funds priorities are closely linked to the actual policy priorities gathered in the compulsory expenditure framework of public budgeting.

## 2.2 Overall strategy of the 2000-2006 Objective 2 programme

The main priorities of the 2000-2006 Basque SPD are summarized in Table 2.1. The main priority Axis dealing with structural change and globalization are Knowledge Society (Axis 3) and Development of Productive Fabric (Axis 1). They represent respectively the first and the second largest shares of the programme (36.0% and 20.6%). The difference between these two shares in favour of the knowledge society reflects the emphasis given to RTDI and information society to promote structural change and face the challenges of globalization. Both priorities account for more than half of the programme's budget (56.6%) and the share of the expenses in the others priority Axis are in the range of 12-17%: Communication and Energy Networks (Axis 4, 16.9%), Environment, Natural and Hydric Resources (Axis 2, 14.0%) and Local and Urban Development (Axis 5, 12.1%).

The former financial break down by priority Axis of the SPD is coherent with the strategic needs of the Basque Country economy to promote structural change and globalization. Moreover these ERDF interventions fit well with the regional policy mix and the goals highlighted in the planning documents of the Basque Country, especially with the additional boost given to scientific and technology convergence and the adaptation to information society from 2003 onwards with the PCTI 2010. On the other hand the ERDF interventions also square well with the internal priorities of the economic development policy expenditures contained in the Basque government general budgets (BGGBs) although the former are relatively more focused on RTDI than the latter.

Comparing the ERDF funding with the comparable aggregates of economic development policy expenditures in the Basque government budgets (BGGBs) in the period 2000-2006, it can be seen that knowledge society ERDF aids amounts around 24%, while development of productive fabric ERDF aids represents 11% and transport infrastructures amounts 6% of the Basque government comparable expenditures.

Table 2.1 - Synoptic view of the Objective 2 programme

Overall programme	Brief description and objective	Budget (€ and % of total budget)
Axis 1 - Improvement of Competitiveness, Employment and Development of Productive Fabric	Support to industrial, commercial and services firms and handcraft. Supply and conditioning of industrial areas and services to enterprises. Improvement of funding conditions for firms. Support to firms internationalization and promotion of foreign trade.	€125,549,842 (20.6%)
Axis 2 - Environment, Natural and Hydric Resources	Water supply infrastructures, sewage treatment and drainage systems, urban and industrial waste integral management, preservation and regeneration of natural spaces, surveillance and control of environmental pollution	€85,473,671 (14.0%)

Overall programme	Brief description and objective	Budget (€ and % of total budget)
Axis 3 - Knowledge Society (Innovation, R&D, Information Society)	Reinforcing human capital in research, science and technology (ESF) Research innovation and technological development projects, scientific technological equipment, technological transfer and diffusion, Technological centres and research public centres. Information Society: Promotion of ICTs in the productive fabric and new ICT supported managerial procedures.	€220,118,028 (36.0%) (of which €20,389,708 3.3% - ESF)
Axis 4 - Communication and Energy Networks - Communication and Energy Networks	Transport infrastructures (Roads, motorways, railways, underground, ports), multimodal transport systems, transport and logistics centres.	€103,401,506 (16.9%)
Axis 5 - Local and Urban Development	Rehabilitations and equipment of urban areas, improvement of urban transport systems, infrastructures and support equipment for social integration in urban areas, touristic and culture infrastructures, historic-artistic and culture inheritance, vocational training centres and local development agencies	€73,641,679 (12.1%)
Axis 6 - Technical Assistance	Program management and monitoring	€2,662,102 (0.4%)
<b>Total Aid</b>		<b>€610,846,828</b>
<b>Transitory Aid</b>		<b>€12,493,877 (2.0%)</b>

Source: Basque Country SPD 2000-2006

## 2.3 Selected fields of intervention and measures

After a full check of the Basque country 2000-2006 SPD, the monitoring system and the last Annual Implementation Report (June 2008) the relevant measures suitable to face structural change and globalization are describe in Table 2.2. Table 2.2 is break down in 10 columns. The first column contains the priority Axis of the SPD, the second column contains a brief description of the measure, the third and fourth ones provide for every selected measure respectively the amount of programmed funding and their budget shares on total SPD funding. Columns five and six contain the amount of certified payments and their ratio with respect to the programmed funding. Column seven, based on the information provide in the annual report 2007, gives the main indicators showing the outcome of the measures in terms of output, results and impact. Column eight classifies the measures according types of intervention. Column nine highlights the relevant feature in the structural change dimensions and finally the last column gives a synthetic assessment of the degree of relevance of each selected measure.

According to the conceptual model<sup>8</sup> provided by the core team, the hypothesis to be tested is the one referring to “Innovation potential” (number 4), which fits in a very convenient way with the Basque country productive features and the strategic policy measures developed by the Basque government along the lines of the 2000-2006 SPD. The general hypothesis states that “apart from significant differences among Objective 2 regions in terms of institutional thickness, the innovation system may suffer from missing innovation drivers on the demand side. Barriers to innovation are determined by a lack of absorptive capacity by local firms. Especially in old-industrial areas, path-dependence from existing technological trajectories constrains product and process innovation”.

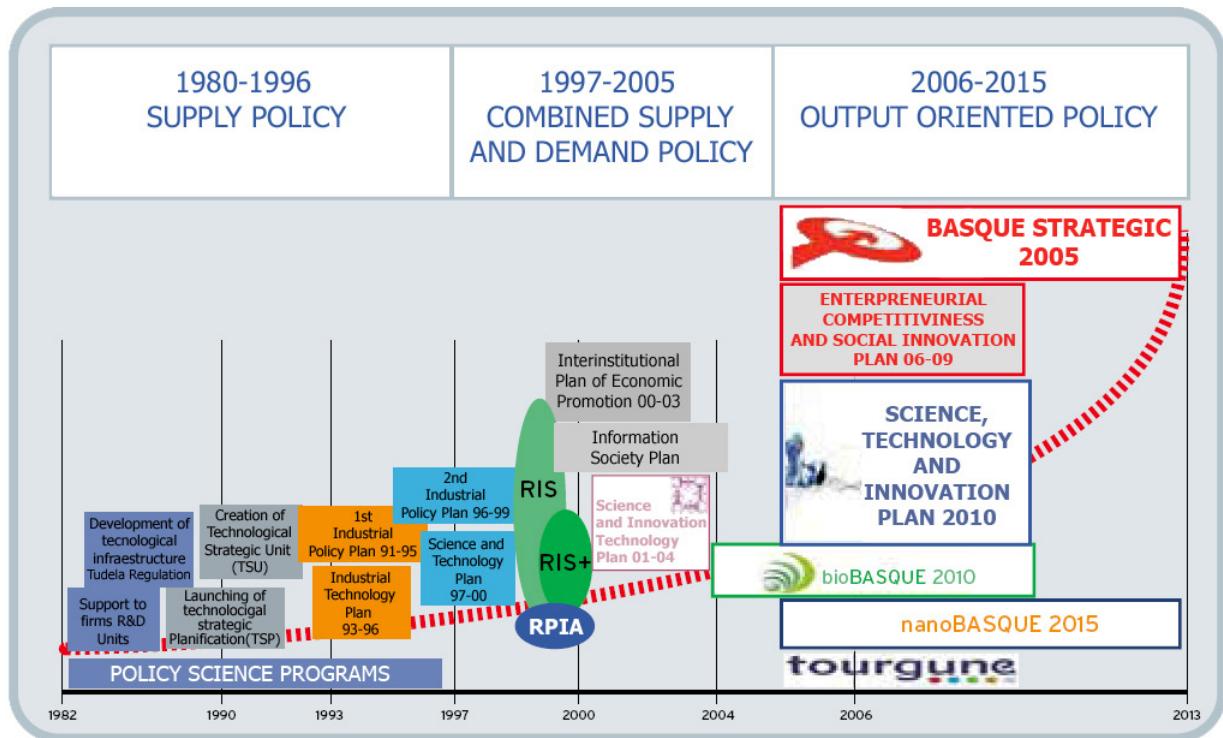
<sup>8</sup> See the First Intermediate Report.

Based on the innovation potential hypothesis we will focus our case study research on the following questions: which measures are important to address path dependence problems in traditional industrial sectors? Which measures can be important to build RTDI capabilities in traditional industrial regions? Which measures can be important to effectively smooth firms' innovation barriers, especially in SMEs? Is it possible to boost RTDI demand drivers?

In the particular case of the Basque country the three problems highlighted in the hypothesis 4 (lack R&D drivers on the demand side, barriers to innovation and path-dependence problems in existing old-industrial technologies) were serious handicaps of the Basque economy in the eighties. The awareness of these problems by leading entrepreneurial actors, public officers and local stakeholders has set up the grounds for an strategic policy in terms of R&D and innovation which has evolved through different stages aimed to meet the key solvable problems shown up at each stage and to gradually smooth or remove the main constraints acting in different stages.

Figure 2.1 shows the key building blocks of the Science, Technology and Innovation Policy in the Basque country since the eighties. Each building block corresponds to a different period of time meeting key solvable problems and implementing the actions to remove the main constraints hampering the jump to the next superior stage. Three main logical and chronological stages can be distinguished: 1) 1980-1996 can be referred to as a "Supply Policy" period in which the grounds for the Basque, Science and Technology Network have been set up. 2) 1997-2005 can be termed as a "Combined Supply and Demand Policy" in which the main efforts were driven towards the consolidation of the Basque Science, Technology and Innovation Network and to meet the needs of the entrepreneurial and social players. 3) 2006-2015 can be termed as an "Output Oriented Policy" period in which the main aims are addressed to the diversification of the entrepreneurial fabric and the challenges posed by increasing globalization, taught competition from new member countries in the EU and the evolution of the euro exchange rate. Figure 2.1 also summarizes the main policy lines taken place in each period.

Figure 2.1 - Key building blocks of the Science, Technology and Innovation Policy in the Basque Country



Source: Basque 2010 Science, Technology and Innovation Plan

The relevant measures selected in Table 2.2 deal with the problems highlighted in the different hypotheses put forward in the conceptual model. Intersecting these measures with the problems implied by hypothesis 4 "Innovation potential", the most relevant measures to tackle them are the following ones: Measure 3.2, "Research, Innovation and Technological Development Projects", takes in grants for research, technological development and innovation projects by firms including partnerships between businesses and/or research institutes. This is a "demand side" policy measure being its main aim to foster innovation drivers across the productive and entrepreneurial fabric. Measure 3.5, "Research Public Centres and Technological Centres", is made of grants to foster knowledge acquisition and research in public centres and technological centres in key areas of interest for the Basque country entrepreneurial fabric. To a great extent this is a "supply side" policy measure aimed to build scientific and technological knowledge and capabilities in TCs and public research centres, but it also includes some "supply-demand actions" aimed to get scientific and technological capabilities to meet specific needs in some clusters or enterprises.

These demand and supply policy measures provide funding support to eligible initiatives and projects on the grounds of carrying out the tasks and paying off the costs. The main difference with output oriented policy measures is that in order to receive the grant it is not enough to carry out the tasks and pay off the costs but also accomplish the proposed goal of the initiative/project.

There is another relevant measure to tackle the problems referring to innovation potential mentioned in hypothesis 4. This measure is the 3.1 "Reinforcement of Human Resources in Research, Science and Technology" (ESF aids aimed to support training and hiring of PhDs, technicians and researchers).

In the next section we will proceed with a finer analysis of the effects of the measures we have chosen especially for the measures funded by the ERDF.

Table 2.2 - Measures relevant to structural change and globalisation: main features

Measures	Description	(a) Programme d	Budget Share %	(b) Payment s	a/b %	Main indicators Annual Report 2007 (June 2008)	Type of intervention	Structural change dimensio n	D R
1.1 "Support to industrial, handcraft, commercial and services firms"	Aids to productive investments of firms to modernize productive structures and improve firms' competitiveness	162,347,722	13.2	150,497,587	92.7	OUTPUT: 5,115 beneficiary firms RESULTS: 1,138 new or consolidated firms and €1,024 million of induced private investment IMPACT: 6,299 new jobs created and 9,192 maintained	Business support (Aids to productive investment)	Regional specialisation.	*
1.2 Land and services supply for firms emplacements	Support infrastructures to facilitate placement of firms in convenient spaces with easy access to ICTs and other telematic and entrepreneurial services	7,885,480	0.6	7,595,521	96.3	OUTPUT: 23 projects and 3,396 m2 conditioned RESULTS: 144 beneficiary firms and €1.9 million of induced private investment IMPACT: 431 new jobs created	Business support (Supply of business infrastructures)	Regional specialisation	*
1.4 Improvement of firms funding conditions	Interest rates bonus and accessibility to long term loans (Financial restructuring)	46,559,208	3.8	41,533,592	89.2	OUTPUT: 2,485 beneficiary firms RESULTS: €1,245 million induced private investment IMPACT: 3,985 new jobs created	Business support (Interest rates bonus)	Regional specialisation	*
1.5 Support to firms' internationalization and foreign promotion	Small direct aids to promote internationalization and foreign setting ups of SMEs.	34,307,274	2.8	28,808,278	83.9	OUTPUT: 3,059 SMEs beneficiary firms, 2,198; 2,198 Trade fair attendance and 2,004 commercial missions. RESULTS: €44 million of induced private investment and 387 SMEs exporting for the first time. IMPACT: 110 new jobs created	Business support (Financial aid to promote SMEs internationalisation and foreign expansion)	Internationalisation	*
2.4 Preservation	Planning and rehabilitation of	21,032,190	1.7	20,751,887	98.7	OUTPUT: 42 sensitization	Rehabilitation of natural	Regional specializat	*

Measures	Description	(a) Programme d	Budget Share %	(b) Payment s	a/b %	Main indicators Annual Report 2007 (June 2008)	Type of intervention	Structural change dimensio n	D R
and regeneration of natural environment	natural environment					campaigns; rehabilitation of 340,000 m2 in protected natural spaces and 196,026 m2 restored land RESULTS: 207,972 beneficiary people in sensitization campaigns and 349,417 visitors to environmental centres IMPACT: 446 new jobs created	environment	ion	
2.5 Surveillance and control of environmental pollution	Surveillance stations for pollution control	7,661,706	0.6	7,661,705	100 .0	OUTPUT: 21 pollution control stations RESULTS: 2,098,096 beneficiary people	Environmen tal infrastructur e (Air pollution surveillance)	Regional specializat ion	*
3.1 Reinforcement of human resources in research, science and technology	ESF aids aimed to support training and hiring of technicians and researchers	45,310,461	3.7	43,915,113	96. 9	OUTPUT: 414 beneficiary firms (of which 269 SMEs) and 10,418 beneficiary persons RESULTS: 110 scholarship beneficiaries having got a job related to research and technology	Innovation and technology	Human capital	* * *
3.2 Research, innovation and technological development projects	Grants for research, technological development and innovation projects by firms including partnerships between businesses and/or research institutes	230,561,678	18.7	166,037,027	72. 0	OUTPUT: 961 R&D+i projects cofounded RESULTS: 5,723 involved researchers and €491,5 million of induced private investment IMPACT: 225 new jobs created and 358 maintained.	Innovation and technology Support to business R&D projects	Innovatio n potential	* * *
3.3 Scientific and technological	Grants for the acquisition of RTD equipment	58,598,108	4.7	60,054,277	102 .0	OUTPUT: 288 R&D equipments, 96 installed equipments	RTDI Infrastructur e	Innovatio n potential	* *

Measures	Description	(a) Programme d	Budget Share %	(b) Payment s	a/b %	Main indicators Annual Report 2007 (June 2008)	Type of intervention	Structural change dimensio n	D R
equipment	by universities and research institutes					in technological centres and universities with a cost higher than €60,000 RESULTS: 70 beneficiary centres and 1,793 beneficiary researchers IMPACT: 70 new jobs created			
3.4 Transfer and technological diffusion	Grants to foster transfer of knowledge and research results from public research centres and institute to the business sector	2,168,724	0.2	1,017,984	46.9	OUTPUT: 25 projects supported RESULTS: 3 patents and 7 international technological transfers IMPACT: 6 new jobs created	Transfer and Technological diffusion from public to private sector	Innovation potential	*
3.5 Research public centres and technological centres	Grants to foster research in public centres and technological centres in key areas of the Basque country entrepreneurial fabric	89,755,826	7.3	85,729,359	95.5	OUTPUT: 67 centres strengthened RESULTS: 911 researchers using new o renewed facilities IMPACT: 52 new jobs created	Grants to strength non profit research centres	Innovation potential	*
3.6 Information society	Set up of the Basque network of science, technology and innovation	18,372,304	1.5	17,984,753	97.9	OUTPUT: 1 science, technology and innovation network RESULTS: 100 users (research and technological centres, institutes and other public facilities) IMPACT: 46 new jobs created	ICT(including security and safe transmission measures) and basic infrastructure	Innovation potential	*
5.1 Urban renewal	Rehabilitation of urban areas	56,273,058	4.6	68,290,015	121.3	OUTPUT: 195,812 mts. conditioned roads, streets, sidewalks, etc; 7,204 m2 park and leisure areas; 6,249 m bike lanes, 138,997 m2 rehabilitated green	Rehabilitation of urban areas	Regional specialization	*

Measures	Description	(a) Programme d	Budget Share %	(b) Payment s	a/b %	Main indicators Annual Report 2007 (June 2008)	Type of intervention	Structural change dimensio n	D R
						spaces; 11,100 m2 new pedestrian streets. RESULTS: 1,0684,067 bnf. people IMPACT: 50 new jobs created at the maintenance stage and 790 at building stage; 21,14 m2 green spaces per inhabitant			
5.9 Training centres and local development agencies	Building, improvement and equipment of training centres	21,745,608	1.8	19,735,82 4	90. 7	OUTPUT: 5 new buildings; 21,900 m <sup>2</sup> new built surface and 10,905 m <sup>2</sup> rehabilitated surface RESULTS: 28,273 beneficiary students and 119 implemented projects IMPACT: 403 new jobs created	Social infrastructur e (Vocational training)	Human capital	* *

Legend: BS: Budget share; DR: Degree of relevance, \* low relevant, \*\* relevant, \*\*\* very relevant

Source: own elaboration based on data from SPD Basque Country 2000-2006 and Annual Implementation Report (2007)



### 3. Effects of the selected ERDF measures on the process of structural change and adaptation to globalisation

#### 3.1 Assessment of the structural and socio-economic effects

Table 3.1 shows the implementation level of Measure 3.1 whose payments have been almost completely certified by the year 2007.

*Table 3.1 - Implementation of Measure 3.1 “Reinforcement of human resources in research, science and technology”*

Year	Programmed (a)	Payments (b)	b/a
	€	€	%
2000	8,981,662	3,376,373	37.59
2001	9,150,671	3,323,009	36.31
2002	9,343,824	3,450,196	36.92
2003		4,749,655	
2004	8,788,507	3,624,085	41.24
2005	8,981,662	7,078,708	78.81
2006	9,174,816	8,731,298	95.17
2007		9,581,786	
2000-2007	45,310,461	43,915,113	96.92

Source: Annual Implementation Report (2007)

It can be considered as a good example of coordination among measures funded by different Structural Funds. Within this measure on the one hand the Spanish government through its research DG granted funds to promote PhD studies (FPI grants in Spanish) and firms PhD hiring (Torres Quevedo Program) in order to face the PhD shortage of the Basque Science, Technology and Innovation Network. On the other hand other important actions were undertaken to strengthen the technological core of the Basque Science, Technology and Innovation Network: the so called Technological Centres. The TCs involved were Inasmet, Robotiker and Azti (TECNALIA Corporation) and Tecniker (IK-4 Alliance) and the main actions implemented were research personal training, young researchers and PhDs hiring and knowledge transfer among working centres and research centres (including actions to anticipate technological requirements of the productive fabric). TCs have trained 541 researchers and hired 77 young researchers and PhDs. The hiring figure represents 34% of the total number of new jobs created under the whole measure.

*Table 3.2 - Implementation of Measure 3.2, Research ,innovation and technological development projects*

Year	Programmed (a)	Payments (b)	b/a
	€	€	%
2000	25,881,832	4,202,924	16.24
2001	25,771,590	21,671,814	84.09
2002	26,762,542	31,058,154	116.05

Year	Programmed (a)	Payments (b)	b/a
	€	€	%
2003	32,199,844	40,128,267	124.62
2004	37,363,498	31,258,046	83.66
2005	38,180,698	24,932,041	65.30
2006	41,367,560	6,657,294	16.09
2007		6,067,705	
2000-2007	230,561,678	166,037,027	72.01

Source: Annual Implementation Report (2007)

Table 3.2 displays the path of certified payments under the Measure 3.2 “Research, innovation and technological development projects”. It can be seen a slow down path in the certified payments from 2004 onwards.

Under this measure ERDF co-funds a part of the so called ETORTEK program managed by the Basque government. This action is aimed to support strategic projects in science and technology. The Basque government has a programmed amount of €62 million to co-fund technological projects which at present time have been certified in a 44.5%. As it is mentioned in the 2007 Annual Report of the 2000-2006 SPD: “The low level of certified payments is originated by the fact that the expenditures under this measure could not be still certified due to they are pending of fulfilment of control requirements established in the art. 4 of the Regulation 438/2001. Once these requirements are fulfilled the certified level will be close to 100% of the programmed amounts for the measure” (2007 Annual Report of the 2000-2006 SPD, p. 74).

Within this measure ERDF funding is applied to the Spanish Centre for Industrial Technological Development (CDTI), an autonomous agency of Spanish central administration. CDTI grants reimbursable aids to support the launching of technological projects by firms. These aids are paid back after the end of the project usually on a 10 years time span. On average failing projects ratio is quite low due careful selection of beneficiary firms, being the technological failure of the project the main cause for not to be obliged to payback the grant. Aids are 50% co financed by the ERDF and the paybacks of the instalments are reinvested by CDTI on new grants.

Table 3.3 displays the number of cofounded projects, the amount of granted funding (total and average) and the investment in the project along the different years of the 2000-2006 period.

Table 3.3 - Reimbursable Aids Granted by the Spanish Centre for Industrial Technological Development (CDTI)

Year	Project Number	(a)	Average Funding	(b)	(a/b)
		Funding	per Project	Investment	(a/b)
		€	€	€	%
2000	26	9,505,706	365,604	27,383,314	34.7
2001	33	11,701,873	354,602	31,957,744	36.6
2002	27	9,327,547	345,465	23,921,500	39.0
2003	13	4,610,801	354,677	13,061,300	35.3
2004	6	2,072,709	345,452	4,113,100	50.4
2005	5	1,714,170	342,834	3,533,500	48.5
2006	33	13,231,777	400,963	26,457,785	50.0

Year	Project Number	(a)	Average Funding	(b)	(a/b)
		Funding	per Project	Investment	
		€	€	€	%
Total	143	52,164,583	364,787	130,428,243	40.0

Source: own elaboration based on data from Annual Implementation Report (2007)

A total of 143 projects submitted (most of them by SMEs) were supported. The average grant given by project was €364,787 and the average cofounding rate was 40.0% of the investment. The evolution path shows again a slow down during the years 2003, 2004 and 2005. Table 3.4 shows the breakdown of CDTI aids by main activities. It can be seen than the bulk of funding is concentrated in the main Basque country industrial activities (Machinery, Metal, Chemical an Electrical and Electronics) which represent 74% of the total.

Table 3.4 - CDTI Aids Broken down by Activities

Activities	Project Number	(a)	Share on	Average Funding	(b)	(a/b)
		Funding	Total	per Project	Investment	
		€	%	€	€	%
Machinery and Mechanical Equipment	30	12,900,837	24.7	430,028	28,172,664	45.8
Metal Industry and Metal Products	25	9,841,921	18.9	393,677	21,992,415	44.8
Chemical, Petrochemical and Plastic Ind.	21	7,577,263	14.5	360,822	20,517,614	36.9
Machinery and Electrical and Electronic Materials	20	8,368,663	16.0	418,433	23,249,956	36.0
Business Services	19	4,176,826	8.0	219,833	9,336,439	44.7
Wood, Paper and Graphic Arts	7	1,716,054	3.3	245,151	6,468,129	26.5
Elements of Transport	6	2,692,795	5.2	448,799	7,308,082	36.8
Recycling	4	1,053,386	2.0	263,346	2,326,287	45.3
Precision Instruments	3	1,704,254	3.3	568,085	5,587,770	30.5
Furniture and other Manufactures	3	1,123,090	2.2	374,363	2,667,676	42.1
Food Industry	2	355,778	0.7	177,889	1,143,726	31.1
Mineral non-metallic industrial products	1	285,574	0.5	285,574	760,000	37.6
Building	1	211,121	0.4	211,121	465,183	45.4
Commerce	1	157,021	0.3	157,021	432,300	36.3
Total	143	52,164,582	100.0	364,787	130,428,242	40.0

Source: own elaboration based on data from Annual Implementation Report (2007)

Table 3.5 - Main Indicators of Measure 3.2 "Research, innovation and technological development projects"

	(a)	(b)	%
	Achieved Values	Foreseen Values	(a/b)
OUTPUT			
Centres Receiving Grants	34	8	4.29

	(a) Achieved Values	(b) Foreseen Values	% (a/b)
R&D+I Cofounded Projects	961	2,472	0.39
<b>RESULTS</b>			
Induced Private Investment (€)	491,542,996	413,209,908	1.19
Involved Researchers	5,723	4,000	1.43
Patents	-	6	-
<b>IMPACTS</b>			
New Jobs	226	140	1.61
Maintained Jobs	358	1,400	0.26
Total Employment	584	1,540	1.87

Source: own elaboration based on data from Annual Implementation Report (2007)

Table 3.5 contains the main indicators for the Measure 3.2 “Research, innovation and technological development projects” (obtained from the database built upon 2007 Annual Report). The overall results can be considered good. In terms of result indicators the foreseen values for induced private investment and involved researches have been overcome (19% and 43% respectively) and also the impact indicator on the creation of new jobs was a 61% above the foreseen value. However in terms of output the number of RTDI cofounded projects is below the target of the measure due to a certain extent to the backlog in the certified payments.

The micro-analysis of interviews and questionnaires to beneficiaries focused on the reimbursable aids from CDTI shows that these kinds of aids have been effective to foster RTDI investment and to improve the competitive position of the firms. Taking into account the main dimensions of our beneficiaries selection (manufacturing vs. engineering services oriented and size –small, medium and big), the evidences obtained from the examples we have studied are the following ones: 1) A big manufacturing oriented firm with relatively low technological requirements (such as Envases Metalúrgicos de Alava SA) has stated that as a result of the aids its RTDI activity has increased, as well as its internal knowledge and market share. These effects have also been declared by a medium-size manufacturing firm with medium technological requirements (W. Diamant Herramientas SA) in this case associated to an important increase in employment. A big vehicles transmission manufacturing firm (Spicer Ayra Cardan, SA) has achieved an important turnover increase (€5 million) and also improved internal knowledge and knowhow. A very big lift manufacturing firm (Orona SA) has stated that the impact of the project on the firm’s turnover has not been much relevant but provided a significant leverage effect for RTDI and allowed investments for manufacturing and “launching a new equipment generation”. 2) A big manufacturing firm in the telecommunication sector (Ikusi group) has stated that important productivity increases based on labour and inputs costs reduction have taken place as a consequence of the project. But the most important impact of this kind of aids was “to allow the firm to develop technological products and services in the fields of remote control devices and digital TV which have placed the firm in a top international competitive level which facilitated the expansion of Ikusi group across the world”. 3) Two engineering services oriented firms, a very small one (Team SL) and medium size one (Idec SL) have both increase RDTI personnel and expanded their business. These cases are further commented on the boxes shown below.

**Box 3 - A beneficiary firm in Vizcaya: "TEAM SL"**



**TEAM SL**  
Technical Office



**TEAM SL**  
Tunnel P

TEAM SL is a very small company with 6 staff members established in 1990. It offers its services to public administrations and private companies mainly in the fields of: 1) Environmental services such as assessment of environmental impacts, diagnosis and environmental auditing and environmental surveillance programs, etc. and 2) Risk analysis and emergency plans such as geotechnical reports, tunnel projects, natural and flooding risks, technological and industrial risks, etc.

The firm clients portfolio reaches 100 entities and firms.

In October 2004 TEAM SL was granted under Measure 3.2 an aid from CDTI amounting €166,080 (50% ERDF funding). The aid is a reimbursable aid which must be returned back of in case of firm economic success. The total budget of the project amounts €276,800 and 60% was financed by the reimbursable aid. At present time TEAM SL is actually returning the funds back by instalments up to 2015.

The project was undertaken jointly with LABEIN-Tecnalia and the group of Hydrogeology and Geotechnics of the Basque country university. The goal of the project is to analyse the main causes of concrete degradation in tunnels' revetments and embankments and propose remedies to solve a European important problem which has been detected in countries such as Suisse, North of Italy, North of England and North of Spain.

The ERDF funds and public Spanish funding (CDTI) funded 50%-50% 60% of the project budget. ERDF were devoted to the following items: 1) €12,600 to technological equipment purchases (drill, ph-meter, conductivity-meter and others) and other materials, 2) €114,200 to payments for the research, lab tests and trials carried out by the Technological Centre LABEIN (€90,200) and the Basque Country University (€24,000), 3) €14,280 to payments to project managerial services and 4) the remaining €25,000 to trips, networking and relational marketing.

ERDF funds have made possible to develop a research line on the pathology affecting civil engineering works using projected concrete. More over the staff increased from 5 members to 8, one of which is a PhD in charge of firm's R&D.

The grant made possible for a small firm like TEAM to afford for a project which amounted 62% of its total assets (€444,597 in 2003) and has had a crucial impact on the firm's life. Turnover was increased from €276,878 in 2003 up to €659,108 in 2007. The negative operational surplus of the firm in the year 2003 has never appear again and its return ratios have been substantially increased since 2004 and they are quite good in 2007, ROE has reached 12.37% and ROA has gone up to 6.03%.

**Measure 3.2. Research, Innovation and Technological Development Projects.**

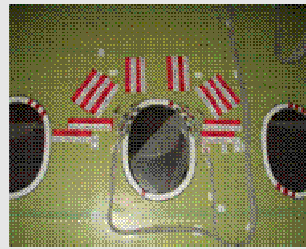
TEAM Ingeniería Ambiental y de Riesgos, S.L, Parque Tecnológico Vizcaya (PTV), Ed. 207 B, 48170 Zamudio, e-mail: team@team.euskalnet.net.

Source: Interview and questionnaire with Team Staff.

**Box 4 - A beneficiary firm in Alava: "IDEC SL"**



**IDEC SL**  
Headquarter



**Airbus A380**  
Tired Trial with Window  
Frames developed by  
IDEC

IDEC SL, Spanish acronym for Ingeniería y Desarrollos en Composites (Composites Development and Engineering) is a company with 45 staff members established in 1996. Its business areas lay in engineering and manufacturing of industrial and aero spatial structures with advanced materials like composites. IDEC SL participates in the main European aeronautic programs jointly with AIRBUS and EADS (European Aeronautic Defence and Space Company). IDEC has developed its own technology in the so called "out of autoclave advanced composites". IDEC exports 25% of its production to foreign markets

In 2004 IDEC SL was granted under Measure 3.2 an aid from CDTI to the project "Window Frames A380" amounting €437,000 (50% ERDF funding). The aid was a reimbursable one which must be returned back of in case of firm economic success. The total budget of the project amounts €728,000 and 60% was financed by the reimbursable aid. At present time IDEC SL is actually returning the funds back by instalments up to 2015.

The goal of the project was to develop the design technology, the materials and the manufacturing procedures for the new AIRBUS A380 window frames made of from composite material with carbon fibre by means of the so called Resin Transfer Shaping Technology. The main partners involved in the project were the Basque technological centre INASMET, the Aeronautics Engineering School of the UPM (Universidad Politécnica de Madrid, Madrid Technical University) and the two most important providers of manufactured moulds, tools and special equipment: the firms are ALUR located in Alava and DISMODEL in Vizcaya.

The ERDF funds and public Spanish funding (CDTI) funded 50%-50% 60% of the project budget. ERDF were devoted to the following items: 1) €137,000 to technological equipment purchases, 2) €20,000 to collaboration with the Basque Technological INASMET (lab trials and technological literature from NASA on 'Advanced Technology Composite Fuselage : Materials and Processes, Manufacturing', although this job research was carried out by the research staff of IDEC , 3) €100,000 to external collaborations with other firms (ALUR and DISMODEL mainly) and institutions (Aeronautics Engineering School of Madrid, UPM), 4) €150,000 to hiring personnel to develop the project and 5) the remaining €30,000 to trips, networking and relational marketing.

ERDF funds have made possible to successfully develop the project on its technological dimension. The commercial dimension has been affected by the delay in the launching of the new AIRBUS A380. However the project has given IDEC a solid reputation in this technological field enabling it to participate in other RTDI projects placing the RTDI firm capabilities in a top level.

**Measure 3.2. Research, Innovation and Technological Development Projects.**

IDEC, Ingeniería y Desarrollos en Composites, Parque Tecnológico de Alava, edificio CEIA, Minano, 01510 Alava, e-mail: jl.leon@idec.tv.

Source: Interview and questionnaire with IDEC Staff.

These two cases, in which the innovative projects have been carried out by means of collaboration between the enterprise and the appropriate TC or public research centre, are clear examples of a way of overcoming knowledge and technological barriers to innovation in SMEs. This kind of practices according to Cohen and Levinthal (1990) refer to as absorptive capacity. They address the particular competences that companies build in R&D for being able to access and absorb external ideas, science and other kinds of knowledge inputs

to innovation. This type of collaborations enterprise-TC to a higher or lesser extent have also been significant in all innovative projects carried out by beneficiary firms under the measure 3.2.

Table 3.6 contains the yearly implementation of Measure 3.5 "Public Research Centres and Technological Centres". Certified payments reach 95.5% and it is for sure that the measure will fully certified.

*Table 3.6 - Implementation of Measure 3.5 "Public Research Centres and Technological Centres"*

Year	Programmed (a)	Payments (b)	b/a
	€	€	%
2000	16,448,832	18,927,531	115.07
2001	16,648,892	24,003,919	144.18
2002	17,855,924	6,294,330	35.25
2003	18,286,104	15,184,865	83.04
2004	6,168,584	2,053,387	33.29
2005	6,312,706	11,410,793	180.76
2006	8,034,784	6,961,307	86.64
2007		893,225	
2000-2007	89,755,826	85,729,359	95.51

Source: Annual Implementation Report (2007)

The main action under this measure corresponds to ERDF eligible expenditures (50% ERDF co-financed), managed by the Basque government, given to public research and technological centres (TCs). TCs are market oriented non-profit organizations structured around local actors and entrepreneurs to fill the technological gap and to enhance the capabilities of Basque industrial sectors. TCs perform R&D activities in partnership with their associates and other firms through venture projects constituting an idiosyncratic feature of the Basque innovation system.

Under this action the ERDF co-financed a part of the Basque government SAIOTEK program aimed to consolidate the TCs at the core of the Basque Science, Technology and Innovation Network. The other main actor in the measure was the Spanish government Research DG which also managed ERDF eligible expenditure (50% ERDF funded) funding to support public and technological research centres in the Basque country by an amount of €31,440,249, representing 81.47% of its programmed amount.

*Table 3.7 - Distribution of Aids to Public Research and Technological Centres given by the Basque Government*

Beneficiary Centres	Cumulated Funding	Average Funding per beneficiary Centre	Funding Share by Tranches
Cumulated Num.	€	€	%
11	39,007,454	3,546,132	79.09
22	46,200,861	653,946	14.58
33	48,683,180	225,665	5.03
43	49,322,166	63,899	0.01

Source: own elaboration based on data from Annual Implementation Report (2007)

Table 3.7 briefly summarizes the ERDF eligible expenditure (50% ERDF funded) given by the Basque government to beneficiary centres ranked in quartiles from a top-down approach in terms of funding.

The number of beneficiary centres supported was very important covering almost the entire set of TCs: 43 TCs were granted with financial support. The top-down distribution in Table 3.8 shows that first 25% of TCs got a significant amount of funding, being €3.5 million the average funding per TC. The second and third quartile of TCs also got important amounts of funding being respectively €653 thousand and €225 thousand the average funding per TC.

Once the ERDF funds under this action reached 107% of implementation in 2003, the Basque SAIOTEK program (recently renamed as EMAITEK with a more results oriented aid scheme) have been maintained from 2003 onwards entirely financed by the Basque Government.

According to the interviewed TCs experts' opinion, the foundations of this type of aids could be considered "as the equivalent to the R&D firm investment support" in the sense that they are directly addressed to increase and update the organization stock of scientific and technological knowledge. The own TCs business interest in finding project partnerships and contracts with firms plus the marketing activities carried out by their marketing departments have led to both the sensitization among firm managers on RTDI activities and the offering of R&D services and proposals quite oriented to firms' technological needs. This has made possible an effective reduction of knowledge and technological barriers to firms' RTDI activities, which is especially important for SMEs.

*Table 3.8 - Main Indicators of Measure 3.5 "Public Research Centres and Technological Centres"*

	(a) Achieved Values	(b) Foreseen Values	% (a/b)
<b>OUTPUT</b>			
Renewed and/or Reinforced Centres	67	65	103
<b>RESULTS</b>			
Researchers using the Centres	911	850	107
<b>IMPACTS</b>			
New Jobs	52	75	69

*Source: own elaboration based on data from Annual Implementation Report (2007)*

The main indicators of the whole measure are shown in Table 3.8. In terms of output the measure performed well. Reinforced centres fulfil the foreseen values. In terms of results, almost one thousand researchers enjoyed the new opportunities provided by reinforced Centres (107% of foreseen value) and the impact in terms of new jobs is quite good, although the 52 new jobs created represents 69% of the foreseen value.

The Basque program SAIOTEK according to the figures shown in Table 3.7 was 50% cofounded by ERDF aids. The Aids granted to TCs were aimed to carry out projects to obtain scientific and technological knowledge in specific fields of interest submitted by TCs and supervised and finally approved by the Basque Government. 80% of these aids were devoted to cover basically the share of wages and salaries of R&D personnel assigned to the co-financed projects as well as the costs incurred in business trips, meetings and the like. Moreover equipment investments and other specific actions were financed under the "infrastructures" and "specific actions" headings, though these expenditures rarely amounted over 20% of the aid granted.

The projects were classified according to the following typologies: 1) Technological specialization projects aimed to scientific and technological development in some specific fields of knowledge taking into account the specialization profile of the centre. This knowledge was expected to be transferred to client enterprises in the medium and long run. 2) Supply-Demand projects, which main goal was to develop TCs scientific and technological capabilities in the short and medium run to meet specific needs of some clusters of firms. 3) Strategic research projects were aimed to high priority new technological fields such as biotechnology, biomaterials, micro and nano-technologies, intelligent processes and materials and others.

The evidence gathered from the interviews with the most important beneficiaries (4 of the top 11 aid receivers) suggest that around 15% of the new hiring personnel by TCs was linked to ERDF public expenditure (50% ERDF aid). These figures on new jobs impact do not include indirect employment effects which must be much higher. Researchers participating in ERDF co-financed projects amount around 40% of TCs R&D personnel having spillover effects on the remaining TCs R&D personnel. The boosting effects on partnership projects with private enterprise were assessed as important. Estimated figures range around 20% for specialization projects and 65% for supply-demand and strategic ones. The impact in terms of TCs participation in European programs (V and VI Framework Programs) was important and the assessment given by TCs technology responsible persons estimated that around 80% of the TCs European projects were made possible thanks to these aids. These estimations from TCs experts fit well with the statistical evidence on R&D magnitudes in Basque TCs (Table 3.9) and with the development of RDTI activities made by Basque firms over the time (Table 3.10).

By the end of the period 2000-2006 most TCs are grouped in two platforms TECNALIA and IK-4. TECNALIA is a technological corporation which takes in the following TCs: Azti, European Software Institute, Inasmet, Labein, Robotiker and Neiker as an associated centre. Its goal is to contribute to development of the social and economic environment by fostering technological innovation through research. TECNALIA employs 1,060 researchers and works in 18 economic sectors which take in 36 technological areas, more than 350 technology applications and 10 strategic technologies which range from the more technical ones (such as nanomaterials, biotech, micro energy and wireless) to the ones which are more closely related to firms and society (such as linguistic info engineering and new technologies applied to business management within the knowledge and information society). TECNALIA is involved in a process of sectoral technological specialization and gives support to more than 3,500 firms maintaining multiple project partnerships and participating in different programs of the Basque country science, technology and innovation plan and in the VI European framework program.

IK-4 is an alliance which takes in six TCs: Ceit, Cidetec, Gaiker, Ikerlan, Tekniker y Vicomtech. These centres keep their autonomy as independent organizations benefiting from the advantages of sharing a common goal. IK-4 employs 900 people, 131 PhDs and 300 technical and scientific Bachelor Degrees. IK-4 was created with the aim of gathering together the knowledge and experience of its members to reach a critical mass being able to foster innovation processes with high socio-economic impact. IK-4 adds up the strength and tested competences of the allied research teams to get synergies which allow to meet the more ambitious projects of the leading firms linked to the alliance.

These two platforms cover most of the Basque country TCs and use an overwhelming portion their human and financial resources, as it can be seen in Table 3.9. More over Table 3.9 offers a breakdown of the main R&D magnitudes of the idiosyncratic TCs structure within the Basque innovation system.

Table 3.9 - Main R&amp;D Magnitudes in Basque Technological Centres (2006)

	€ thousand	%
<b>R&amp;D EXPENDITURE</b>	<b>168,654</b>	
<i>By Expenditure Type</i>		
Current Expenditure	143,697	85.2
Capital Expenditure	24,957	14.8
<i>By Scientific Field</i>		
Physics, Chemistry, Maths and Natural Sciences	32,595	19.3
Engineering and Technology	133,301	79.0
Medical Sciences	2,104	1.2
Agricultural Sciences	653	0.4
Social Sciences	0	0.0
<i>By Funding Source</i>		
Public Administration	77,615	46.0
Firms	73,874	43.8
Non-profit Organizations	1,223	0.7
Foreign	15,942	9.5
<b>FULL TIME EQUIVALENT PERSONNEL</b>	<b>2,235</b>	
<i>By Function</i>		
Researchers	1,599	71.5
Technicians	396	17.7
Assistants	239	10.7
<i>By Gender</i>		
Women	882	39.5
Men	1,353	60.5
<b>PERSONNEL</b>	<b>2,390</b>	
<i>By Qualification</i>		
PhDs	364	15.2
Bachelor Degrees (5-year degree)	1,392	58.2
Bachelor Degrees (3-year degree)	235	9.8
Secondary Education	373	15.6
Other studies	26	1.1
<b>GDP</b>	<b>61,763,759</b>	
<b>% TCs R&amp;D EXPENDITURE ON GDP</b>		<b>0.27</b>

Source: EUSTAT (2007)

Table 3.10 - Basque Firms with R&amp;D Activities broken down by their R&amp;D launching periods

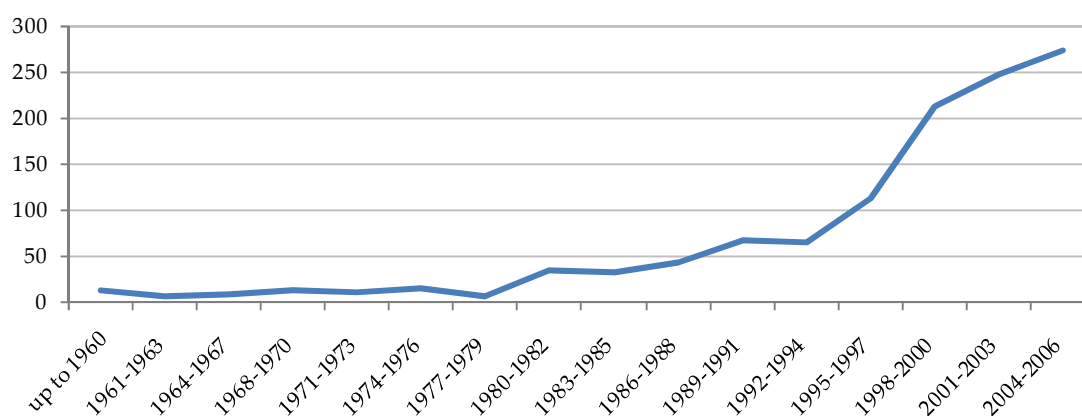
Periods	Number of Firms	%
up to 1960	13	1.1
1961-1963	6	0.5
1964-1967	8	0.7

1968-1970	13	1.1
1971-1973	10	0.9
1974-1976	14	1.2
1977-1979	7	0.6
1980-1982	34	2.9
1983-1985	32	2.8
1986-1988	44	3.8
1989-1991	66	5.7
1992-1994	64	5.5
1995-1997	113	9.8
1998-2000	212	18.3
2001-2003	247	21.3
2004-2006	274	23.7
<b>Total</b>	<b>1,157</b>	<b>100.0</b>

Source: own elaboration based on EUSTAT data

The process of building R&D capabilities on the supply side, especially in a decentralized system as it is the case with TCs, have had a catalysis effect on demand drivers through partnership with private firms. As a result of this process R&D innovation barriers in SMEs were smoothed and a more and more firms have started R&D activities in the Basque country. Table 3.10 and the associated Figure 3.1 proxies the evolution pattern of firms starting R&D activities since the early sixties by tracing back the existing firms with R&D activities.

Figure 3.1 - Basque Firms with R&D Activities broken down by their R&D launching periods



Source: own elaboration based on Table 3.10

As can be seen in Figure 3.1 three different stages can be distinguished which fit well with the main stages of the Basque Science, Technology and Innovation policy (see Figure 2.1). The first stage covering until 1980 is a rather stagnated period. The second stage starts around 1980 and goes to 1996, it is a period of moderate growth which coincides with the Supply Policy period of R&D+I Basque Policy. Finally the third stage

starting around 1997 is a period of remarkable growth fuelled by the Combine Supply Demand Policy period of the R&D+I Basque Policy.

In order to illustrate the task undertaken by Basque TCs we have chosen two TCs (Labein and Inasmet) which have had a close cooperation with the beneficiary firms we have presented in the previous boxes.

**Box 5 - A beneficiary research centre in San Sebastian: INASMET**



**INASMET**  
Headquarters  
San Sebastian Technological  
Park



**INASMET**  
Spanish coordinator for Spacelink,  
ESA technology transfer programme

INASMET is an acronym for the Metallurgical Research Association of the Basque Country (in Spanish INASMET). Recently INASMET has been integrated in Tecnalia Corporation. INASMET-Tecnalia is a private, non-profit-making technological centre serving the productive and institutional fabric. Its mission is “to contribute actively to economic and social development, promoting and facilitating technological innovation and development processes as a competitive strategy, as well as helping to increase the competitiveness of its clients focused on business.

INASMET was one of the main beneficiaries of Measure 3.5 having been granted an aid of €5.3 million (50% ERDF aid) during the years 2000-2003. The aid was used to finance:

- 1) projects of technological specialization (€2.56 million) in the fields of new materials, hybrid plastic-metal materials and composites for different uses in automobile and aerospace sectors, corrosion of foundry materials, energy, micro-components and nanotechnologies.
- 2) Supply-Demand Projects (€0.98 million) in the fields of components for aeronautic engines, spray-forming technology for aeronautic components, tired trial studies on components life cycle and many other on many different sectors from aero spatial to welding.
- 3) Strategic Research Projects (€0.88 million) in the fields of micro and nanotechnologies, advanced equipment and materials for biomedical uses and intelligent processes and materials.
- 4) Technological equipment purchases amounted €0.64 million and finally specific actions and internationalization projects reached €0.30 million.

The main results linked to the granted aid laid upon the following lines:

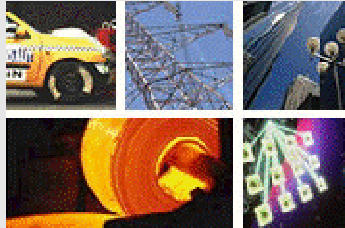
- 1) with regard to employment, R&D personnel grew by 64 persons of whom 42 were Bachelor degree. It is estimated that 10 new Bachelor degree employees were directly linked to ERDF aids.
- 2) Referring to the induced effect on project partnerships with private firms it is estimated that approximately 32 new projects were developed thanks to the previous knowledge effort financed by ERDF cofounded aids.
- 3) the high rate of participation of INASMET in European Programs is estimated to be made possible in an 85% level thanks to the granted aids given during 2000-2003. In particular INASMET participation the European Framework Programs reached 46 financed projects (during 2000-2002) in the V Framework Program and 42 (2002-2006) in the VI Framework Program.

**Measure 3.5. Research Public Centres and Technological Centres**

**INAMET-Tecnalia, Parque Tecnológico de San Sebastian, Gipuzkoa**

**Box 6 - A beneficiary non-profit organisation in Derio: LABEIN**

**LABEIN Headquarter**  
San Sebastian Technological Park



**LABEIN**  
Main Technological Areas

LABEIN is a non-profit organization integrated in TECNALIA, a big Basque technological corporation.

LABEIN is an acronym for the Spanish "*Laboratorios de Ensayos e Investigaciones Industriales*" (Industrial Testing and Research Laboratories) that was created in 1955 and has evolved to become a leading technological centre. Its main technological areas are automobile, building and territorial development, energy, environment, siderurgy and enterprise innovation systems and innovation management.

LABEIN was another of the main beneficiaries of Measure 3.5 being granted €5.5 million from the Basque 2000-2006 SPD during 2000 and 2001 (50% ERDF aid). The aid was used to finance: 1) projects of technological specialization (€2,580,000) in the fields of development of new material and reuses of materials in the building sector, methodology for remote diagnosis and consultancy in the information society, virtual prototypes and multi physics engineering applied to cooperative working in aeronautics. 2) Supply-Demand Projects (€1,160,000) in the fields of composites, intelligent materials and nano-materials applied to the building sector and physical and virtual modelling of key processes in the foundry sector, 3) Strategic Research Projects (€830,000) in the areas of advanced system for the characterization of polluted soils and integration of monitoring and simulation technologies for manufacturing processes optimization. 4) Technological equipment purchases amounted €720,000 expended in lab technical infrastructures and ICTs and finally specific actions projects reached €230,000 employed in the implementation of knowledge management system.

During the period 2000-2003 LABEIN R&D personnel increased in 76 researchers (from 204 up to 280) and it is estimated that 8 new researchers have been hired as a result of the granted aid. These researchers have been working on the fields of building systems, materials reuses, polluted soil rehabilitation, modelling of business processes and key foundry processes, composites and nano structured materials, and metal processing for automobile sector. Lab and trial services provided by the centre in number of client firms increased from 935 up to 1008 from 2000 to 2003, approximately 10-15% of this increase can be imputed to the granted aid. With regard to innovative projects developed in partnership with the centre the number of basic and applied research projects grew from 7 to 17 between 2000 and 2003. Regarding to the projects directly contracted by firms although the number of them has decreased from 390 in 2000 to 165 in 2003 there was an important increase in the average contracts' amount from €21,636 in 2000 up to €85,304 in 2003 which substantially compensates the reduction in the number. The interviewed TC expert estimates that around 20% of these results can be imputed to the aid granted

Turnover has increased from €12.7 million in 2000 up to 27.7 in 2007. LABEIN has moved from negative returns in 2000 (Return on Equity (ROE) =-15.7% and Return on Assets (ROA) =-5.4%) and other years to positive ones in 2007 (ROE=3.61% and ROA=1.37%) which are in line with its expansion plans and its sustainability.

LABEIN Tecnalia promotes and develops both at national and international levels alliances and technological projects with other leading centres and firms. It also participates in excellence networks in its strategic areas. It has over 1,000 firm clients portfolio per year. Staff personnel grew from 213 in 2000 to 349 in 2007 including 30 training grant holders.

During the VI Framework Program (2003-2006), LABEIN Tecnalia has contracted 48 projects, leading 11 of them which places LABEIN among the top European technological centres in certain areas such of building and civil engineering, environment, innovation systems, automobile and siderurgy.

**Measure 3.5. Research Public Centres and Technological Centres**

**LABEIN-Tecnalia, Pº Parque Tecnológico de Vizcaya (PTV), 700, 48160 Derio, [www.labein.es](http://www.labein.es)**

### 3.2 Assessment of the effects on institutional capacity and policy learning

European Cohesion funding had a significant impact both at regional and national level. Spanish administrations made an effort to manage the European funding in close contact with their policy measures, setting up specialized coordination units and closing the cycle of Planning and Programming by means of fitting the programmed annual aids and expenditures into the national and regional budgets. In that way most Spanish regional and central administrations adopted the classical Planning-Programming-Budgeting-System (PPBS). This implied that European Funds management was closely linked to the actual policy priorities gathered in the compulsory expenditure framework of public budgeting.

One important feature in the Basque country was the entrepreneurial oriented management of the measures aimed to foster firms competitiveness and RTDI which has notably increased the efficacy and efficiency in the implementation of the measures related to these issues. The management outsourcing to SPRI (Spanish acronym for society for industrial restructuring) by the Basque government of industrial restructuring, competitiveness and science, technology and innovation policies has made possible a more flexible and ground approach management to effectively meet such difficult policy issues as those mentioned above where usually more bureaucratic systems failed by their lack of momentum. Issues such as wide delivery of information and soften the paperwork burden for SMEs are key factors for a successful implementation of policies in these areas.

This is especially the case with the launching and development of Basque CICs (Spanish acronym for research cooperation centres such as Biogune, Biomagune, Microgune). The awareness of industrial restructuring problems in the eighties by some Basque leading entrepreneurial actors, public officers and local stakeholders has been an important step forward in the launching and development of Basque technological centres in a partnership system based on non-profit organizations in a kind of bottom-up approach.

Nonetheless, this has not impeded an active and sensible planning process in the science, technology and innovation field which designed the successive stages of Supply Policy, Combined Supply and Demand Policy up to the present Output Oriented Policy (1993-1996, 1997-2000, 2001-2005 and 2006-2010).

“Nowadays we are facing a very important change in the Basque innovation system which is going to be endowed with the institutional architecture it was lacking”...[this institutional architecture] “takes in organizations such as the Science and Technology Basque Council, the Basque innovation agency (Innobasque) and the Basque science foundation (Ikerbasque). In these years the taking off of the technological corporations of the Basque system has started [Tecnalia and IK-4]. [I mean] “we have a new institutional architecture, new agents, new entities and also the boost of new persons. And I obviously feel a great satisfaction for being working in Tecnalia” (J. Jaureguizar, Tecnalia CEO and former Director General for Technology in the Basque government).

Regarding the role played by European Cohesion Policy and Structural Funds two main action lines can be distinguished in the Basque policy sphere. The first one refers to the awareness and sensitization of the policy priority targets highlighted by Lisbon strategy, the European programming guidelines and the benchmarks from European best practices and European innovation scoreboard. The second one refers to the incentive effect linked on the one hand to a “substitution effect” characterized by the subsidy effect on priorities supported by EU co-financing and on the other to a “wealth effect” derived from the budgetary enlargement provided by EU co-financing. This second effect reinforces the first one because of the awareness of the high priority of Lisbon strategy targets.

These two effects were widely tested in the interviews we have maintained with politicians, public officers and managers. In particular the former Director General for Technology<sup>9</sup> of the Basque government has told us about a kind of “alignment effects which European guidelines and benchmarks”. In the political scene it was very important to convince politicians of the key role and high priority of R&D investments and in the backstage of budgetary discussions public officers in charge of technology matters were very to be backed by Lisbon strategy targets and Structural Funds guidelines. They judge these effects as crucial in order to get the right amount of budgetary appropriations and financial resources to implement an effective RTDI policy.

In the entrepreneurial system, entrepreneurs (even SMEs) are aware of the fact that regional and Spanish markets are relatively narrow so that big businesses mean reaching European and International markets. In such a way we can talk of a kind of an “alignment effect” with European R&D policy targets as a competitive tool to have success in their businesses. This effect spreads over the whole entrepreneurial system through outsourcing processes from large firms to small ones and especially through the dynamism introduced by TCs and its partnerships and joint ventures with SMEs and micro-firms. The Exemplar of Measure 3.2 “Research, Innovation and Technological Development Projects” (see Box 3) is a fine example illustrating how a very small firm (only six staff members) can become actively involved in an important European project. These diffusion effects of R&D business practices are supported by the evidence provided in Table 3.10 and Figure 3.1 on the acceleration process experienced from 1995 onwards on the number of firms entering in R&D activities.

The central role played by TCs as R&D demand drivers and suppliers is captured by the statistical information provided in the previous section which shows the relative weight they achieved in terms of human resources and R&D business expenditure. The way they operate is illustrated in Ikerlan and Labein cases (Measure 3.5, Boxes 5 and 6).

Recently, and accordingly with the third stage of the Basque RTDI policy (the Output Oriented Policy stage) some important weaknesses of the Basque science and technological system have been highlighted. On the one hand Basque TCs have on average only 5% or 6% of foreign researchers well below the standards for excellence research centres with an average of 20% foreign researchers and on the other R&D activities tend to be highly concentrated in the technology and engineering fields. To break these weaknesses a new strategy was launched by means of the so called cooperation research centres (CICs). CICs are tools to diversify R&D activities towards new strategic fields for the Basque economy such as biosciences, biotechnologies, biomaterials and nano technologies. They also pay special attention to selection procedures of researchers trying to attract talent from all over the world. The case of Biogune (Box 1 in the innovation potential section) illustrates a good practice deploy resources in an uncovered area of the Basque science, technology and innovation system.

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<sup>9</sup> As a result of the last Basque elections a new government has taken over May the 5<sup>th</sup> 2009.



## 4. Conclusions: key findings and main message

### Key findings

1. The challenge posed by structural change and globalization was really relevant for the Basque economy which was based on traditional industrial sectors heavily affected by economic crisis in the seventies and early eighties. The awareness of these problems by leading entrepreneurial actors, public officers and local stakeholders has set up the grounds for a strategic policy in terms of R&D and innovation which has evolved through different stages aimed to meet the key solvable problems shown up at each stage and to gradually smooth or remove the main constraints acting in different stages. It started with a first stage of Supply Policy (in the 1980-1996 period), it went on a second stage with a Combined Supply Demand Policy (in the 1997-2005 period) and it has entered a third stage with an Output Oriented Policy (in the 2006-2015 period).
2. ERDF interventions fit very well in the Basque country policy and economic context. Measures in the Basque 2000-2006 SPD tackling structural change and globalization represent 65.5% of total budget, while those specifically addressing science, R&D and innovation policy amount 36% of total budget and the one selected as extremely relevant to face R&D policy challenges reach 29.6% of total budget. This financial distribution is coherent with the strategic needs and policy orientations of the Basque country.
3. The selected measures contributed to boost R&D and innovation potential in the Basque economy. Reinforcement of human resources in research, science and technology (ESF Measure 3.1) addressed the shortage of PhDs in the Basque innovation system and was well coordinated with ERDF measures by providing qualified human resources and grant holders to technological centres. Support to research, innovation and technological development projects (ERDF Measure 3.2) was a suitable measure to smooth financial barriers to innovation in SMEs and micro-firms. Support to public and technological research centres (ERDF Measure 3.5) was conveniently designed to consolidate the Basque network of research and technological development.
4. Besides the monitoring system and the main indicators of the SPD, the evidence on the increasing number of firms entering R&D activities, especially from 1997 onwards and the significance of the human resources and R&D expenditure implemented by Basque technological centres (0.27% of GDP in 2006) support the effectiveness of the Basque 2000-2006 SPD measures to foster R&D and innovation potential in the Basque country. This evidence fits well with the results from the microanalysis carried out with selected beneficiary enterprises and TCs which support the idea that SPD measures have effectively contributed to smooth innovation barriers in SMEs and micro-firms.
5. European Structural Policy has had a significant effect on the selection of suitable priorities and adequate funding for R&D policy measures. It has produced a kind of “alignment effects with European guidelines and benchmarks”. Politicians and public officers in charge of technology matters judge these effects as crucial in order to get the right amount of budgetary appropriations and financial resources to implement an effective RTDI policy. From the entrepreneurial point of view we can also talk of a kind of an “alignment effect” with European R&D policy targets as a competitive tool to have success in their businesses. This effect spreads over the whole entrepreneurial system through outsourcing processes

from large firms to small ones and especially through the dynamism introduced by TCs and its partnerships and joint ventures with SMEs and micro-firms.

### **Main message**

The three problems highlighted in the innovation potential hypothesis (lack of R&D drivers on the demand side, barriers to innovation and path-dependence problems in existing old-industrial technologies) were serious handicaps of the Basque economy in the eighties. The main messages to be drawn from our analysis in the particular case of the Basque country are:

- Measures to support public and technological research centres were very important to tackle the path dependence problems in the traditional industrial sector of the Basque country. Moreover they have also contributed to a diffusion process on the key role played by R&D and innovation as a power tool to build sustainable competitive advantages throughout the entrepreneurial fabric.
- Measures addressed to SMEs and micro-firms to soften financial barriers to innovation combined with building absorptive capacities and knowledge and technological exploration are very effective to boost R&D drivers on the demand side. This is specially the case with reimbursable aids to fund R&D projects granted by specialized industrial and technological agencies, such as the Spanish CDTI.

As a conclusion we can finally state that hypothesis 4 of the Core Team conceptual model, “Innovation potential”, is validated in the case of the Basque Country.

## 5. Annexes

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## 5.2 List of persons interviewed

Company/Institution	Name	Position	E-mail	Type of Interview	Date
Biobasque	María Aguirre	Directora		*	07/01/2009
CEIT Centro de Estudios e Investigaciones Técnicas de Gipuzkoa	José Ignacio de Carlos Gandasegui	Subdirector General	<a href="mailto:icarlos@ceit.es">icarlos@ceit.es</a>	*, ***	09/03/2009
Centro para el Desarrollo Tecnológico Industrial (CDTI)	Carlos Durán	Departamento de Promoción de la Innovación	<a href="mailto:duan_carlos@cdti.es">duan_carlos@cdti.es</a>	***	07/10/2009
CIC bioGUNE	Alfonso Egaña	Director Administrativo-Financiero	<a href="mailto:aegana@cicbiogune.es">aegana@cicbiogune.es</a>	***	07/17/2009
Consejería de Industria (Gobierno Vasco)	Alberto Fernández	Director General de Tecnología		*	05/05/2009
Dirección de Economía y Planificación (Gobierno Vasco)	Aitor Romero Fernández	Técnico Política Regional	<a href="mailto:aitor-romero@ejgv.es">aitor-romero@ejgv.es</a>	*	04/23/2009
Dirección de Economía y Planificación (Gobierno Vasco)	José Antonio Varela	Servicio de Fondos Europeos		*	05/05/2009
Envases Metalúrgicos de Alava, S.A	Begoña Bustinza	Responsable I+D	<a href="mailto:bbustinza@envases.org">bbustinza@envases.org</a>	** , ***	09/02/2009
Fundiciones Urbina S.A.	Andres Rubio Villahoz	Director Innovación	<a href="mailto:arubio@urbina.com">arubio@urbina.com</a>	**	09/08/2009
IDEC Ingeniería y Desarrollos de Composites S.L. (Vitoria)	José Luis León Delgado	Director Gerente	<a href="mailto:jleon@idec.tv">jleon@idec.tv</a>	**	07/17/2009
				**	07/23/2009
				*	08/06/2009
				*	08/20/2009
Ikerlan	Guillermo Irazoki	Director de Marketing	<a href="mailto:girazoki@ikerlan.es">girazoki@ikerlan.es</a>	*, ***	09/08/2009
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	Borja Pérez	Jefe del área I+D	<a href="mailto:perez.b@ikusi.es">perez.b@ikusi.es</a>	**	08/27/2009
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Code: \* In situ interview, \*\* Telephonic Interview, \*\*\* Written Questionnaire