

## **OECD THEMATIC REVIEW OF TERTIARY EDUCATION**

### **Country Background Report: PORTUGAL**

This report was prepared by the Portuguese Ministry of Science, Technology and Higher Education as input to the OECD Thematic Review of Tertiary Education. The document was prepared in response to guidelines the OECD prepared to all the participating countries. The guidelines encouraged the authors to canvass a breath of views and priorities on higher education issues and the present report had contributions from several research centres and governmental departments in Portugal. The report developed from an initial contribution from the Centro de Investigação de Políticas do Ensino Superior (CIPES) and was then complemented with contributions from the Research Centre on Regional and Urban Economics (CIRIUS) and the Ministério do Trabalho e da Solidariedade Social on labour market issues; another from the Centro de Investigação e Estudos de Sociologia (CIES-ISCTE) on the characterisation of the higher education students, as developed for the Eurostudent Report. Inputs and contributions were also received from the Direcção Geral do Ensino Superior (DGES), the Observatório da Ciências e do Ensino Superior (OCES), and the Fundação para a Ciência e Tecnologia (FCT). The opinions expressed are not necessarily those of the Government of Portugal, the Ministry of Science, Technology and Higher Education, the OECD, or its Member countries.

**The Ministry of Science, Technology and Higher Education**

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## LIST OF ABBREVIATIONS

ADISPOR – Association of the Portuguese Polytechnics Institutes  
APESP – Portuguese Association of Private Higher Education Institutions  
AdI – Innovation Agency  
CCISP – Coordinating Council of the Portuguese Polytechnics Institutes  
CERN – European Organisation for Nuclear Research  
CET – Specialised Technology Courses  
CIES – Centre for Research and Studies in Sociology  
CIRIUS – Research Centre on Regional and Urban Economics  
CNASES – National Council of Student Social Support  
CNAVES – National Council for Evaluation of Higher Education  
CRUP – Council of Rectors of Portuguese Universities  
DEPGEF – Department for Financial Management and Planning  
DGES – Directorate General for Higher Education  
EFTA – European Free Trade Association  
EMBL – European Molecular Biology Laboratory  
EMBO – European Molecular Biology Organisation  
ESA – European Space Agency  
ESO – European Southern Observatory  
ESRF – European Synchrotron Research Facility  
EU – European Union  
EUROSTAT – Statistical Office of the European Communities  
FAE – Federation of Student Unions  
FCT – Foundation for Science and Technology  
FEANI – European Federation of Engineering National Associations  
FTE – Full time equivalent  
FUP – Foundation of Portuguese Universities  
GDP – Gross Domestic Product  
GNP – Gross National Product  
HEI – Higher Education Institution  
ICT – Information and Communication Technologies  
INE – National Institute for Statistics  
ISCED – International Standard Classification of Education  
ISCTE – Higher Institute for Work and Enterprise Sciences  
IT – Information Technologies  
JNICT – National Committee of Scientific and Technological Research  
MCTES – Ministry for Science, Technology and Higher Education  
NEOTEC – New Technologies Initiative  
NEST – New Technology Based Companies  
NUTS – Nomenclature of Territorial Units for Statistics  
OCES – Observatory of Science and Higher Education  
OCT – Observatory of Sciences and Technologies  
PALOPs – African Countries with Portuguese as Official Language  
POCTI – Operational Program for Science, Technology and Innovation  
POSI – Operational Program for Information Society  
SILATEE – Longitudinal Information System for Following the Entrepreneurial Trajectories and Enterprises

## Executive Summary

This Background Report examines the higher education system in Portugal, with emphasis on the last decade and focusing on issues that require particular policy attention. It traces the rapid and unregulated growth of the system during the last decades, characterising the high rates of growth in the number of student enrolments in higher education, as well as the lack of highly qualified human resources and scientific skills that still characterize the Portuguese society. The number of enrolled students increased almost 800% relative to the student population in 1974. The report also examines the fast increase in the number of new PhDs since the mid 90s. To absorb the demand, the system expanded to include a number of teaching-based, regionally distributed polytechnics and private universities, generally concentrated in urban areas. By the late 90s, the system started to slow down, enrolment decreased and higher education institutions began to feel the downswing, together with the continuing lack of a qualified demand.

The current system of higher education consists of a complex network of institutions, integrating 14 public universities and one university institute and 15 public polytechnics, and a network of about 117 private institutions. In 2005-2006 the higher education system offered 80 bachelor degree programmes, 1932 “licenciaturas” and 622 masters’ programmes. To address the questions of quality and internationalisation of the network of higher education institutions, the government has taken a series of initiatives. An overall evaluation of the higher education system has been commissioned to the OECD in 2005-2006. An overview of the system of quality assurance leading to the establishment of a new quality assurance agency has been commissioned to ENQA; and institutional evaluations carried out by EUA are presently being supported by the government.

The analysis addresses emerging issues in higher education policy from growth and quantity aspects, to those related to quality and internationalization. This includes the analysis of low levels of qualifications in older cohorts, with lifelong learning inadequately addressing the issue of formal and informal qualifications. Also, drop-out rates in secondary education are alarmingly high and subsequently manifested in the falling enrolment in higher education; while the mission and objective of higher education institutions need to be further defined. In addition, the needs of the labour market changed and higher education institutions face new employment demands. As a result, the pressures on higher education institutions are for greater openness and for increasing competitive levels of performance, although most higher education institutions reacted defensively. This has been particularly enlightened with the extensive international evaluation of the research sector, as established since 1996, thereby leading to a subsequent reorganisation of the R&D sector and the acceptance of international standards of evaluation within the academic community.

Recent higher education policy measures have begun to address some of the evident weaknesses of the higher system. The government’s “technological plan” has targeted as major goals for 2010 the increase of higher graduates in science and technology to reach 12 per thousand of population aged 20-29 years, the percentage increase of GDP on R&D to reach 1% and the increase of number of new PhDs per thousand population aged 25-34 to reach a level of .9%. The low levels of qualification of the population remains a cause for concern but some respite is visible. The number of enrolments in professional training programmes has increased as has the number of adult admissions to higher education institutions. Almost 5 thousand new candidates to higher education are expected for 2006-2007. Both these indicators reveal a positive turn in what has been a long-standing weakness of the educational qualifications of the adult population. Furthermore, the focus on quality and performance has been recently emphasised, with public funding being linked to performance indicators since 2006. At the same time, international programmes and high level institutional partnerships with leading research and higher education institutions worldwide are being encouraged; with links between education and research promoted.

There are still many areas that require further policy attention. The overall structure and network of higher education institutions is still a concern. The use of *numerus clausus* as a policy instrument has become increasingly questionable in many fields of study. The objective and mission of public and private universities and polytechnics needs clarification, while the rationalisation of the overall system has been questionable. While the scientific enforcement on higher education institutions has been a major concern, issues of governance of higher education institutions also need further attention. The majority of higher education institutions work within the public administration system, with teachers, researchers and staff managed as public servants. This has led many authors to argue that higher education needs modern and efficient governance systems, focusing on emerging challenges and opportunities facing institutions and their resources. They need to be attuned to the social and economic needs of the market and society, as well as to the increasingly emerging opportunities of science and technology. The socio-economic profile and characteristic of higher education students was presented, leading to more policy questions on access, opportunity, funding, tuition and students' social support systems.

This report is part of a process of general reflection and evaluation, initiated with the Background Report prepared to support the international assessment of the Portuguese system of higher education as requested by the OECD. It addresses many issues confronting the higher education system and thereby hopes to contribute to the overall discussion and debate and to provide some insights on trends and changes in policy development of higher education in Portugal.

## 1: THE NATIONAL CONTEXT OF HIGHER EDUCATION

1. The purpose of this chapter is to briefly present the broad political, demographic, economic, social and cultural developments that shape higher education policies in Portugal.
2. A main feature of Portuguese higher education has been its consecutive and significant growth for over thirty years - from 30000 students in the nineteen sixties to over 400000 in 2001. This dramatic increase began in the early 70s when the system was opened to young people of all social classes.
3. Since 2001, a period of declining enrolment and relative stagnation in the number of students seeking admission to higher education occurred. This trend can, in part, be explained by declining demographic trends. In the last year a number of policy measures have been introduced to counter the declining enrolment in higher education.
4. Declining birth rates associated to increasing life expectancy has resulted in an ageing population (Table 1.1), which dropped the number of students seeking admission to higher education.

Table 1.1 – Population forecasts, Portugal

Ages	2000	2005	2010	2015	2020
0-4	534 286	554 738	522 843	484 303	446 623
5-9	532 394	550 703	558 604	524 290	485 886
10-14	573 995	548 906	555 003	560 471	526 237
15-19	682 010	599 837	555 763	558 865	564 391
20-24	783 305	721 495	610 807	561 357	564 596
25-29	806 880	821 305	731 002	614 891	565 785
30-34	754 144	837 913	827 765	732 825	617 507
35-39	763 331	778 298	841 519	827 097	732 966
40-44	721 530	777 749	778 315	837 926	823 878
45-49	679 543	727 562	773 422	772 191	831 660
50-54	636 353	678 434	718 900	763 155	762 691
55-59	565 965	629 529	664 695	703 914	748 239
60-64	545 635	552 795	608 967	642 918	682 286
65-69	533 000	517 321	523 242	577 425	611 654
70-74	449 620	483 070	470 957	479 771	532 401
75-79	344 734	377 783	410 450	404 530	417 368
80-84	199 783	256 904	288 368	319 940	321 398
85+	150 150	147 489	185 443	220 817	253 586
Total	10 256 658	10 561 829	10 626 062	10 586 682	10 489 152

Source: INE, 2005

5. Low birth rates combined with increasing life expectancy has resulted in the number of elderly people steadily increasing while the number of young people has been consistently decreasing. During the 1990s, the population of continental Portugal lost 390,000 people of the “normal” age cohort expected to enrol in basic and in upper secondary education. Population forecasts made by the National Institute of Statistics (INE) for 2006 show that the situation will not significantly change in the near future, Table 1.2. So far the effects of immigration have not compensated this phenomenon.

Table 1.2 – Population by age groups (mainland Portugal)

Age interval	1991 (1)	2001 (2)	D[(2)-(1)]	D (%)	2006*(3)	D[(3)-(2)]	D (%)
6 – 9	494,495	406,428	-88,067	-18	410,199	+3,771	+1
10 - 11	277,757	213,368	-64,389	-23	199,680	-13,688	-6
12 - 14	457,871	330,128	-127,743	-28	315,292	-14,836	-4
15 - 17	484,535	372,523	-112,012	-23	328,660	-43,863	-12
Total: 6 – 17	1,714,658	1,322,447	-392,211	-23	1,253,831	-68,616	-5

\* estimates

Sources: XIII and XIV Population census, INE

6. Portugal has a population of 10.4 million inhabitants (112.4 inhabitants/km<sup>2</sup>). A number of social indicators reveal the progress achieved since the 1980s (Table 1.3).

Table 1.3 – Social indicators

	1980	1990	2002
Mean life expectancy	71.5	74.1	77.3
Infant mortality (deceased/1000 births)	21.8	21.8	5.0
Medical doctors/100 000 inhabitants	196.9	196.9	324.0
Women average at first birth	23.6	24.7	27
Higher education enrolments	106 316*	187 193	400 831
Schooling rate – upper secondary education	-	8.4%	13.0%
Schooling rate – higher education	-	6.6%	11.4%
Families with computers (%)	-	11**	28
Mobile phone subscribers	-	340 845**	8 530 410

\* 1985 \*\* 1995 Source: The Ministry of Finances, The Portuguese Economy, Lisbon, July 2005

7. Portugal has a GDP (current prices) equal to 135,078 million € (2004) and a *per capita* GDP (ppp) equal to 16,370 € (2004). The economic performance over the more recent years has presented a negative evolution, which partly results from increasing difficulties of an economy based on jobs characterised by low salaries/low knowledge content in an increasingly global world (tables 1.4 and 1.5).

Table 1.4 – Economic indicators, Portugal

	Real GDP		Work Productivity (ppp; EU = 100)	Inflation rate (%)
	Rate of change %	Difference to EU pps		
2002	0.4	-0.6	62.4	3.6
2003	-1.1	-2.0	59.8	3.3
2004	1.0	-1.4	59.0	2.4
2005 <sup>a</sup>	0.8	-1.2	58.4	2.7

Sources: INE, Eurostat, European Commission, Bank of Portugal, Ministry of Finances  
a – estimate, Ministry of Finances, Programa de Estabilidade e Crescimento 2005-9, July 2005Table 1.5 – *Per capita* GDP

	Per capita GDP, current prices		Per capita GDP, current prices (in ppp)	
	EUR	UE15 = 100	EUR	UE15 = 100
1998	9 907	48.7	13 922	68.5
1999	10 620	49.8	14 979	70.2
2000	11 300	49.9	15 953	70.4
2001	11 931	51.1	16 481	70.6
2002	12 495	51.9	17 048	70.9
2003	12 536	51.6	16 727	68.8

Source: European Commission, AMECO data base, April 2004. ppp – purchasing power parity

8. The deteriorating economic situation has impacted upon the unemployment rate (Table 1.6) and some traditional sectors such as the textile and the shoe industry have been affected by competition from emerging economies. In general the low level of qualifications is one of the factors that contribute to the lower Portuguese productivity in comparison with other OECD's countries.

Table 1.6 – Labour market indicators

	2003	2004	2005
Homologous change rates (%)			
Salaries implicit in collective contracts	2.9	2.9	2.7
Work cost index <sup>1</sup>	3.0	1.6	3.5
Total employment	-0.4	0.1	-0.3
Unemployment rate (%) <sup>2</sup>	6.3	6.7	7.5
Activity rate (15-64 years) (%) <sup>3</sup>	72.8	72.9	73.1

Sources: INE, Ministry of Work and Social Security and Ministry of Finances

1 – Without the Public Administration; 2 – Unemployed population/Active population;

3 – Active population (15-64 years)/Total population (15-64 years)

9. In spite of the significant increase of the number of students in higher education the Portuguese population continues to have quite low levels of academic qualification. Table 1.7 summarises the available statistical data (2001 Population Census) on the academic qualification of the Portuguese population aged 25-64. Educational levels are still similar to those of developing countries, such as Mexico or Turkey.

Table 1.7 – Academic qualification level (2001)

No academic qualification	11%
4 years of schooling	36%
6 years of schooling	15%
9 years of schooling	13%
Upper secondary education	13%
Tertiary education	11%
Others	1%

Source: INE, 2001 Population Census

10. The deficit in qualifications, especially at the level of secondary education, continues to be an obstacle to the adoption of organisational structures that would allow greater labour flexibility and adaptation, associated with increasingly competitive markets, and scientific development.
11. The low literacy levels coexist with the economy as Portugal has one of the highest levels of labour participation for those people with the lowest level of literacy. This is partially explained by the demands of large sectors of the economy, which so far have not required advanced skills. This, however, is an area that has been targeted for reform by government. The objective is to significantly increase the number of people who participate in life-long learning training programmes. Specifically, the goal is to increase the number of people aged 25 to 64 years involved in lifelong learning from 4.8% in 2004 to 13% by 2010. This represents an increase from 200 to 700 thousand people in lifelong learning initiatives.
12. However, it is important to recognise that there is a duality of the Portuguese society that looking at average and aggregate numbers may obscure. The duality is evident when one looks not at static comparisons of levels, but at dynamic comparisons of rates of change. Portugal



shows one of the largest increases on R&D gross domestic expenditure of all OECD countries from 1995 to 2000. During this five-year period, R&D expenditure has grown at an annual rate of 10% in Portugal, while in the European Union as a whole it has grown at a 3% annual rate. This growth represented a recovery from the slowdown of 1991-1995, when the Portuguese R&D expenditure has grown only 3.8%, while from 1985 to 1990 it has grown 14%.

13. The same duality is present if one looks at other features. For example, Portugal has one of the lowest shares of new science and technology PhDs per thousand of population aged 25-34 years (only 0.23%, compared with 0.55% in the European Union; figures are for 2000). However, it has, by far, the largest growth rate: 12% growth from 1998 to 1999, compared with no growth at all at the European Union level. In terms of publications, Portugal, in 1999, had 248 scientific publications per million of population. The average annual growth rate from 1995 to 2000 was almost 16%, while for Greece (the second ranking country) it was 7%, and in the EU below 3%.
14. While significant rates of growth have been identified structural weaknesses remain. Basic education retention rates are still one order of magnitude higher than the European average (Ferreira and Rosa, 2003). Portugal also exhibits the highest rates of school dropouts from the 9<sup>th</sup> to the 12<sup>th</sup> year of schooling. And in the active population (with ages between 20 and 34) Portugal has a significant deficit in qualifications.
15. To conclude, there is a wide diversity of performance across the Portuguese society and economy. Averages are low, but they may be misleading, since there is a large dispersion across cohorts. To simplify, one has put forward the idea that Portugal can be characterised as exhibiting a dual nature, with high levels of performance co-existing with low levels. This, however, does not mean that it is enough to hope for the best-performing cohorts to “take over” the low-performing ones, since structural weaknesses remain and persistently affect even the best performing sectors.

## **2: OVERALL DESCRIPTION OF THE HIGHER EDUCATION SYSTEM**

### **2.1. Introduction**

16. This chapter outlines the main features of the higher education system, its goals, trends and key policy issues. It identifies the key parts of the system as well as the key players. It concludes with the identification of the most important changes in the last ten years.
17. The Comprehensive Law of the Educational System (Law 46/86 of 14 October) defined the main objectives of higher education as teaching and research, cultural production and the development of entrepreneurial and scientific spirit and reflexive thought. Higher education should also train graduates able to be integrated into the different professional sectors and to participate in the development of society and continuing education; to promote research activities aiming at the development of science and technology, humanities and arts and to contribute to cultural creation and diffusion. Higher education should also promote and valorise the Portuguese language and culture and promote critical thinking and the freedom of speech and research. However the law does not refer to the role of higher education institutions as providers of services to the outside community, nor to industry.
18. Portugal has a binary system integrating universities and polytechnics, both public and private. Public universities have pedagogical, scientific, and financial autonomy. Although knowledge creation is increasingly important, the social standing of research in universities is still relatively undervalued in comparison with education. Polytechnics are expected to have stronger vocational character than universities and to develop applied research activities, with closer ties to regional and local authorities. Polytechnics are also expected to play a role in regional development, a rationale that explains why the legislation imposes that local authorities play a role in the polytechnics' governance bodies and that these institutions can set a number of vacancies for students from the respective region.
19. Some strain has developed between universities and polytechnics due to academic and professional drift. On the one hand, polytechnics resent what they consider to be lower social and autonomic status relative to universities. Indeed, the autonomy of public universities was guaranteed in the 1976 Constitution, and thus these institutions have a higher level of autonomy than polytechnics. On the other hand, universities have tried to meet the demands of employers, consequently seen as occupying some of the polytechnics' professional areas.
20. Furthermore, declining enrolment has increased competition between universities and polytechnics. Until the mid 1990s the system was growing and expanding and there were sufficient candidates for every institution. However, since 1996/97 the number of candidates began to decline, a phenomenon immediately felt by private institutions and more recently by public polytechnics and even some public universities located in interior regions.

### **2.2. The overall size of the higher education system**

21. At the time of the 1974 revolution the Portuguese higher education system was an elite system with gross participation rate below 7%, mainly composed by students from the more affluent, privileged classes. Since then there has been an increase in demand that was contained by the government's decision to introduce a generalised *numerus clausus* system. Increasing demand for higher education together with the need to converge with Europe forced an expansion of the system resulting in private initiatives and the establishment of a public polytechnic sector with shorter vocational courses.
22. From 1990 to 2000 there was a 105.8% overall increase of students' enrolments unevenly distributed across the system. Enrolments in public universities increased by 62%, while enrolments in public polytechnics had an impressive increase of 224.7% and enrolments in the

private sector increased by 121.7%. In 1983/84 the share of enrolments was 76.2 % in public universities, 12.6% in public polytechnics, 11.2% in the private sector. In 1989/90 those shares became, respectively 63.5%, 15.0%, 21.5% and 1997/98 those values were 44.3%, 20.9% and 34.8%. In 2000/01 enrolment shares were, respectively, 43.6%, 27.9%, 28.5%, and in 2004/05 those values were, respectively, 45.6%, 28.4% and 26.0%. If one looks at the gross participation rates (20-24 years) one observes an increasing trend from the very low 7% value of 1974 to 38% in 1995, 49% in 2000 and 53% in 2004.

23. The current situation of the Portuguese higher education corresponds to a period of slightly declining and/or relative stagnation in the growth of students after a period of more than 30 years of consecutive growth, as quantified in Figure 2.1. This rapid increase in the student population, comparatively to the development in other European countries during the same period should be acknowledged, although the recent decrease in the number of students since 2002 has been expected for a number of years based on consecutive estimates.

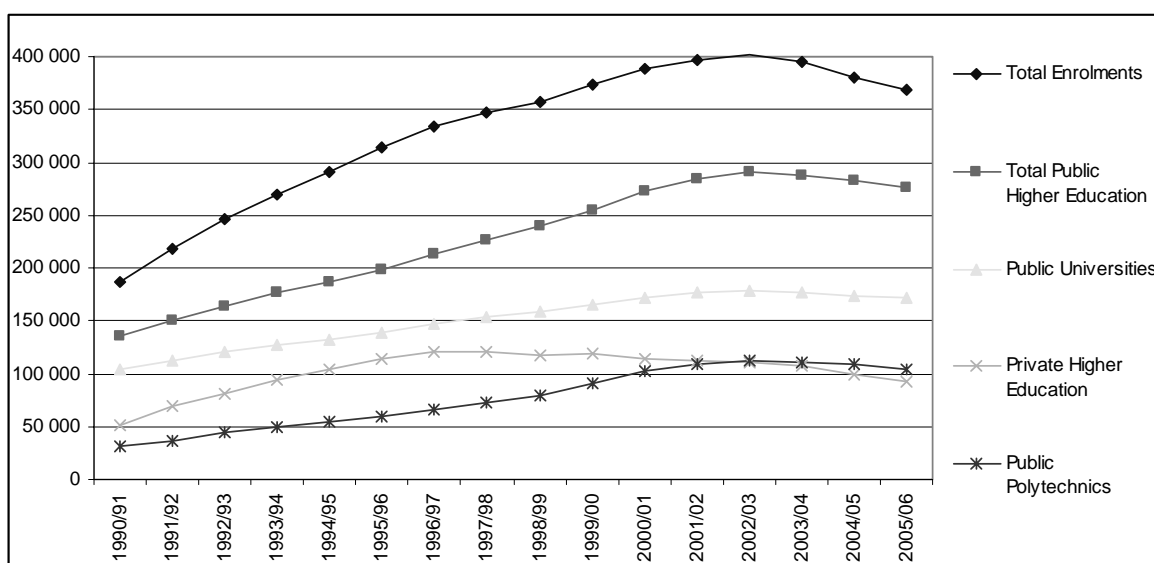


Figure 2.1 Evolution of the overall number of students (graduate and post-graduate) enrolled in higher education in Portugal, 1990/91 – 2005/06; Source: OCES-MCTES

24. These changes in the relative weights of the different components of the higher education system confirm that the fast increases in enrolments was mainly due to increasing enrolments in public polytechnics and in the private sector. Enrolment in public universities increased at slower pace. Initially the growth was due to the private sector, which in 1991 registered a 33.5% annual increase in enrolments as shown in Table 2.1. This expansion rate started to slow down after the mid 1990s, and in 1997 it became negative, a trend that persists today. The public polytechnics' enrolments have registered a more sustained rate of increase and their enrolment is today higher than the private sector, although the recent tendency of decreasing enrolments is visible. This slow-down of enrolments can be observed for public universities, with a first negative value in 2003.

Table 2.1 – Higher education enrolments' annual increase (%)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Public sector													
University	6.9	5.6	4.1	5.2	5.9	2.7	3.4	3.5	4.0	2.2	0.4	-1.2	-2.1
Polytechnics	19.0	11.5	9.9	10.3	9.6	11.2	10.1	12.8	12.7	6.6	3.7	-0.9	-2.8
Total Public	9.9	7.2	5.7	6.7	7.0	5.3	5.5	6.7	7.2	3.8	1.7	-1.1	-2.3
Priv. sector	18.9	14.9	11.05	10.25	5.9	-0.5	-2.4	0.6	-3.8	-2.1	-1.4	-3.3	-7.7
TOTAL	12.7	9.7	7.5	8.0	6.6	3.2	2.7	4.6	3.6	2.1	0.8	-1.7	-3.8

Source: OCES, 2005

25. Figure 2.2 compares the growth rates of students in higher education in a selective group of European countries.

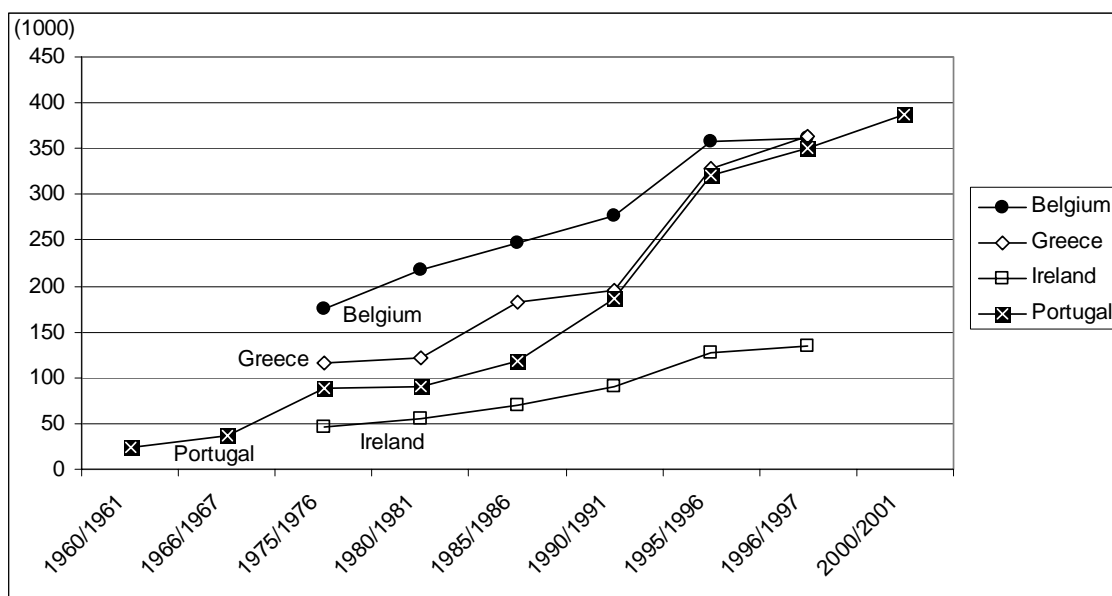


Figure 2.2 Total numbers of students in the higher education system for the period 1960-2002

in a selected group of small European countries; Source: Conceição and Heitor (2005); Primary data from Eurostat, UOE, INE, DAPP.

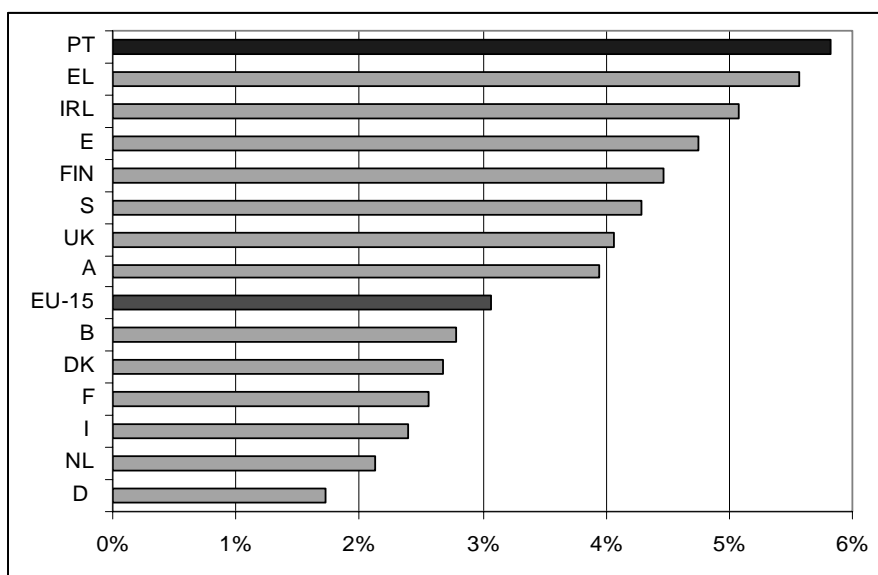


Figure 2.3 Compound annual growth rate of the number of students enrolled in tertiary education

(ISCED 5 and 6), 1975/76 – 2000/01; Source: Eurydice (2005), Key data on Education in Europe 2005, Luxembourg, Office for Official Publications of the European Communities

26. Table 2.2 presents the evolution in student enrolments by sub-sector and for the total higher education system. Enrolments in the private sector started to decline in 1996/97, and then later affected the public higher education sector as well.

Table 2.2 – Enrolments in higher education 1995-96 to 2004-05

	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05
Public Universities	139 121	147 349	151 400	156 480	161 966	168 517	172 152	172 830	170 733	173 897
Public Polytechnics	59 673	65 377	72 691	80 007	90 286	101 795	108 486	112 532	111 482	108 376
Total Public	198 794	212 726	224 091	236 487	252 252	270 312	280 638	285 362	282 215	282 273
Private Universities			93 914	89 361	88 190	82 979	79 908	77 109	73 708	67 157
Private Polytechnics			26 917	28 572	30 547	31 194	31 904	33 190	33 046	31 507
Total Private	114 641	121 399	120 831	117 933	118 737	114 173	111 812	110 299	106 754	98 664
TOTAL	313 435	334 125	344 922	354 420	370 989	384 485	392 450	395 661	388 969	380 937

Source: OCES, 2005, 2006.

27. The decline in student enrolment called for immediate policy attention. In 2006 the government introduced two measures (Decreto-Lei n° 64/2006 of 21 March and Decreto-Lei n° 88/2006 of 23 May) to redress declining enrolment and to promote access. These measures reduced the age criteria of adults who wish to participate in higher education to 23 years and expanded post-secondary course offerings in higher education institutions. Figure 2.4 presents the recent evolution in student enrolments for the public higher education system. It further shows the predicted change in tendency for 2006-2007. Adult students are expected to reach of 3628 and students in technology courses are expected to reach 5516.

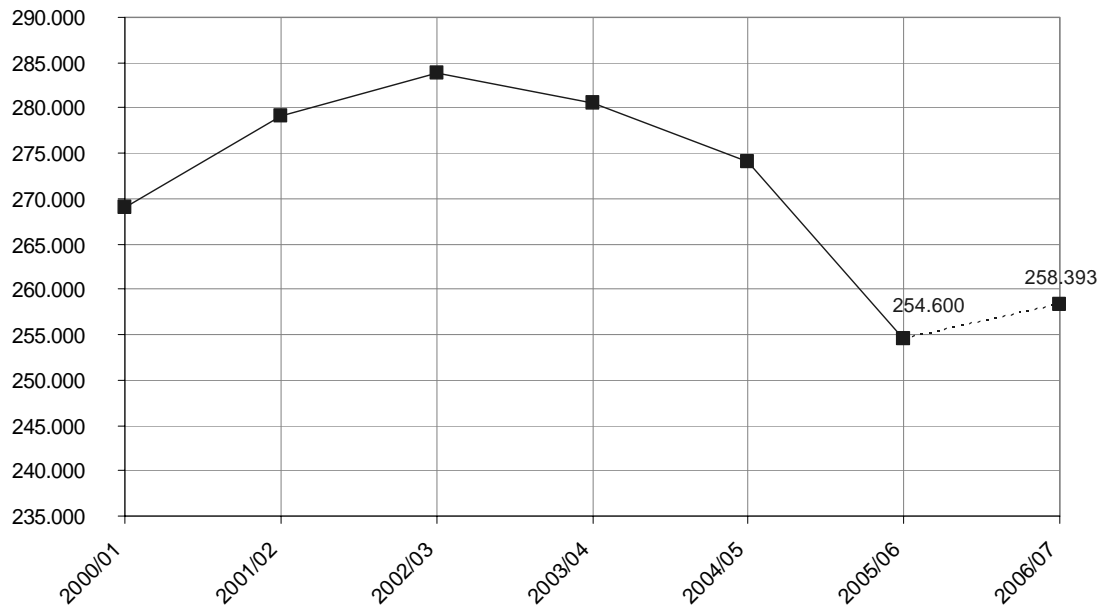


Figure 2.4 N° of students enrolled in public higher education institutions (2000/01 a 2005/06) and predictions for 2006/07. Source: OCES.

28. By the early 1990s women were the majority of undergraduate and graduate students in all sub-systems of higher education. This follows from the higher success rate of female students in basic and in secondary education. Female enrolment in higher education has varied by field of study. Initially it began in areas regarded as socially more acceptable and that allowed women to pursue a professional career. Eventually, women entered other fields of study such as economics, law, medicine and engineering, and became a majority in every degree programme except for the more technological ones.
29. Various factors contributed to this increase in female enrolments. Following high rates of participation in the labour force and progressive liberalisation of social conventions, women have significantly increased their participation in higher education. Labour force participation occurred initially at the lower qualification levels, due to the acceleration of industrialisation, largely supported by labour intensive industries, and associated with the integration of the Portuguese economy within the European Free Trade Association (EFTA). These industries heavily recruited female workers. During the 1960s new opportunities for women in terms of the higher education sector and the labour market became possible. Overall, these changes in society allowed women to pursue professional activity with their traditional roles and provided a stimulus to other women by demonstrating that, despite many obstacles, it was possible to pursue a higher degree and a professional career.
30. Within the students enrolled in higher education in Portugal, female population represents about 61% of the overall number of students, as shown in comparative terms with other European countries in Figure 2.5.

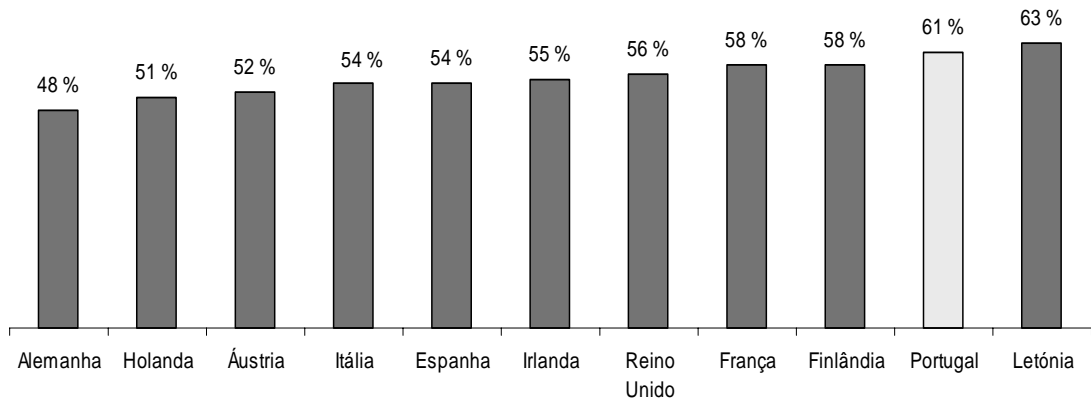


Figure 2.5 Overall percentages of women enrolled in higher education, 2004

Source: CIES-ISCTE, Eurostudent 2005

31. The number of PhDs attributed by Portuguese universities has also increased significantly. High growth rates in fields such as in Biological Sciences, Health Sciences and Computer Sciences are evident. The attraction to science fields contrasts with a general trend throughout most of Europe where many young people seem to shy away from science. The main funding agency, the Foundation for Science and Technology supports higher education training. Between 2000 and 2005 the FCT attributed over 12,000 fellowship grants for Masters, PhDs and post-docs. The majority of the fellowships are carried out in Portugal (54%), but 29% are undertaken abroad and 17% have some type of mixed modality between Portugal and abroad.

Table 2.3 - PhDs completed or recognised by Portuguese universities, by field, 1970-2005

	1970-1979	1980-1989	1990-99	2000	2001	2002	2003	2004	2005	Total
Mathematics	31	134	259	48	37	42	58	61	63	733
Physics	77	155	267	40	38	54	57	36	55	779
Chemistry	87	116	315	51	53	52	49	47	64	834
Biological Sciences	33	114	470	74	86	90	110	89	136	1.202
Earth and Space Sciences	30	44	167	45	63	38	41	41	35	504
Agrarian Sciences and Veterinary	56	136	260	34	20	55	39	41	38	679
Health Sciences	145	301	633	84	85	78	67	76	81	1.550
Mechanical Engineering	28	92	176	22	25	31	35	44	53	506
Material Sciences and Engineering	6	33	100	16	13	16	12	18	22	236
Civil Engineering and Mining	24	98	204	21	19	30	23	41	29	489
Biochemical Engineering	-	9	97	21	16	35	33	30	20	261
Chemical Engineering	47	107	186	18	20	31	26	28	33	496
Electrical Engineering and Computer Science	38	153	380	55	80	82	90	111	106	1.095
Economics	21	130	192	33	40	45	30	33	32	556
Management	-	15	82	24	22	24	35	46	53	301
Law	17	14	67	13	18	15	24	17	21	206
Political Science	2	12	21	4	9	7	7	11	7	80
Sociology	9	37	96	20	29	27	30	39	49	336
Demography	-	1	0	1	-	-	-	-	-	2
Anthropology	-	18	63	7	9	13	19	13	10	152
Geography	8	17	48	7	6	11	8	8	11	124
Education Sciences	9	56	265	32	52	43	49	57	58	621
Psychology	4	37	155	35	30	26	30	36	39	392
Linguistics	9	29	64	22	17	11	19	19	17	207
Communication Sciences	1	4	28	5	7	11	15	12	9	92
Philosophy	24	34	82	12	13	25	9	16	17	232
History and Archaeology	30	70	225	43	28	20	40	49	52	557
Architecture and Urbanism	2	2	68	11	10	19	13	9	10	144
Literature	30	93	214	53	53	33	46	38	42	602
Art	2	4	28	9	8	20	11	14	15	111
<b>Total</b>	<b>770</b>	<b>2.065</b>	<b>5212</b>	<b>860</b>	<b>906</b>	<b>984</b>	<b>1.025</b>	<b>1.080</b>	<b>1.177</b>	<b>14.079</b>

### 2.3 National goals and targets

32. During the late 1970s and the mid 1980s Portugal pursued a process of convergence that aimed at: massification and diversification of the system (implementing the binary system and promoting the private system); conferring increased institutional autonomy to the public sector; regulating the growth of the higher education system by means of access policies.
33. Since the early 1980s government policy was directed at expanding participation rates in higher education. Initially, most of the expansion of Portuguese higher education system was the result of the government's decision to encourage the development of private institutions, both universities and polytechnics, which had the advantage of providing an answer to the increasing demand for higher education without extra strain on the public purse. It was only after joining the EU in 1986 that Portugal invested significantly in public higher education with the financial support from the European funds.



34. The demand pressure to increase enrolment continued. In this context, private higher education played an important role by admitting students that the *numerus clausus* system would keep out of higher education without any valid alternative.
35. The development of the public polytechnic sector followed the World Bank's recommendations for vocationally oriented courses that would promote scientific and technological and economic/business studies. The main argument supporting the creation of the polytechnic sub-system was the requirements by Portuguese industry of intermediate level manpower, capable of technical and practical work.
36. Diversification and regionalisation of higher education was an important political argument in favour of establishing the polytechnic network. Polytechnics would offer vocationally oriented training distinct from university education, and their location was distributed across the country with institutions in almost every district, therefore contributing both to regional diversity and development. Furthermore, polytechnics could develop expertise in specific fields of applied research that would take regional demand into account in the areas of technology, services and education.
37. By the end of the 1990s the participation rate in higher education was around 50% and demand was beginning to decrease. Government attention shifted from quantity to quality factors. The qualifications of teaching staff as well as their research and publication record, the quality of the higher education provision, including the need to raise admission standards to enter higher education created a new momentum where competition for new students became evident between higher education institutions.
38. The education level of the Portuguese population in general remains quite low. Lifelong education is still a relatively underdeveloped area of the Portuguese education system. Until recently students over 25 years of age and without formal qualifications could enter higher education by sitting in special entrance examinations. However, the number of students using this alternative entrance road was very limited, representing only 1.1% of total first year enrolments in 2004/05. In 2006 the government reduced the age criterion to 23 years to encourage candidates to higher education. The impact of this measure is starting to be felt.
39. Increasing enrolment in higher education is a major government priority. At present, 44.3% of all 20 year olds attend higher education (level 5 and 6); the government goal is to reach 50% by 2010. Currently, the survival rate in higher education is around 50%; the government goal is to reach 80% by 2010.
40. Access routes to higher education remain traditional with impediments for the enrolment of new publics. There is neither tradition nor accumulated knowledge in the area of recognition of informal training activities. Transfer between institutions is not in general facilitated and credit recognition can be a very uncertain business for students. Government reform and the Bologna process aims to address some of these difficulties.

#### **2.4. The higher education system's corporatist structure**

41. In general, educational reforms are government initiatives resulting in a decree-law passed by the government or a law passed by the Parliament. There is a systematic consultation process that involves various stakeholders. Proposals are discussed in the National Education Council and by the appropriate associative bodies such as the Portuguese Council of Rectors (CRUP), the Portuguese Association of Private Higher Education (APESP), and the Coordinating Council of Public Polytechnics (CCISP), as well as professional unions (including the teachers unions) and student associations. The President of the Republic oversees the Constitutional conformity of the legislation and may ask for the opinion of the Constitutional Court before promulgating any new legal diploma.

42. The most important actor in charge of higher education is the Ministry. The Directorate General of Higher Education is responsible for the administrative processes related to higher education. The role of the DG of Higher Education was altered with the 1988 University Autonomy Act and by the 1990 Polytechnics Autonomy Act. The Law of Autonomy of 1988 (article 4) gives Council of Rectors for Portuguese Universities (CRUP) the mission “of co-operating with the State in proposing national policies for education, science, and culture”. Co-operation, at this formal level, is translated into compulsory advising functions on all legislative projects concerning higher education.
43. The Council of Rectors for Portuguese Universities (CRUP) and the Polytechnic's Co-ordinator Council (CCISP) are two of the main actors in the national higher education policy. The CRUP was created by Decree 107/79, but it became a relevant player following the discussion and implementation of the Law of Autonomy.
44. On several occasions CRUP has taken more public, critical stands such as its position regarding the unrestrained expansion of private higher education and the decision to facilitate the accumulation of teaching activities in public and private institutions. CRUP has produced policy papers on the HE system that address, amongst others, the problems of diversity and the relationship universities/polytechnics as well as the importance of life-long learning.
45. In recent years the CCISP has assumed a more prominent public role by demanding a level of autonomy similar to that of public universities.
46. Students' unions play an important role in higher education. Following the 1974 revolution, students have participated at all levels of institutional governance. Many of their leaders were more concerned with political party struggle than with academic policies, and therefore student's unions tended not to be very visible in the definition of higher education policies. The governmental decision to increase the level of tuition fees (kept frozen for decades) acted as a catalyst of student discontent thus propelling student's organisations into a much more active role in the definition of political regulation instruments such as fees, grants, social student support assistance or *numerus clausus*.
47. Paradoxically, at the very same time that governments initiate a new discourse giving the market a more important role in the regulation of higher education and emphasising the importance of higher education as a factor for the development of economic activities, Portuguese employers and their organisations are far from assuming the statute of effective actors or stakeholders. Employers and employers' organisations remain conspicuously absent.
48. There are different degrees of autonomy for public universities, public polytechnics and the private sector. The legal framework applying to the statutory autonomy differs for each of the higher education sectors:
- The *Law for the University Autonomy* (Law 108/88) establishes the regulatory framework for public universities;
  - The *Law for the Polytechnic Autonomy* (Law 54/90) applies to the public polytechnics;
  - The *Private and Cooperative Higher Education Act* (Decree-Law 16/94) defines the regulations for the establishment and operation of the private higher education institutions.
49. The autonomy of public universities is sanctioned by the Constitution and the University Autonomy Act (Law 108/88) in principle confers public universities a high degree of autonomy, including pedagogical, scientific, financial autonomy and all the buildings have been transferred to the ownership of the institutions. Public universities receive public funds as a line budget

that can be altered by decision of the rector. Earned income (including tuition fees) and net balances are considered assets of the university that the institution can use at its own discretion.

50. According to the autonomy laws, the Portuguese higher education institutions are not integrated in the State's *direct administration*, although it is doubtful whether they fall into the State's *indirect administration*, as argued by some specialists on administrative law (Amaral, D.F. 1999), or into the *autonomous public administration*, as defended by others (Sousa, M.R. 1999). Anyway, the institutions may define their own statutes, under the limits and guidelines established in the law.
51. The Law 108/88 establishes that the Public Universities are public collective entities with statutory, scientific, pedagogic, administrative, financial and disciplinary autonomy. Each University has the right to elaborate its statutes, in so far as they observe the current legislation.
52. The staffs of all public services are established by law as are the number of public servants in the different pay scales. There are hiring restrictions in place on the number of permanent staff. Staff increase will usually require the consent of the Ministry of Finances, which may be difficult to obtain in periods of financial stringency. Public higher education institutions also find that the academic, administrative and technical staffs in the different scales (full professor, associated professor, administrator, etc.) are also set by law.
53. The University Autonomy Act grants public universities pedagogic autonomy. This means the right to create, suspend and cancel courses; to design study programmes and subject contents, to define educational methods, select methods of evaluation and new pedagogical experiments; the freedom in teaching and learning.
54. New degrees must however be registered with the Ministry, but registration can only be rejected if the degrees are considered illegal (for instance because of duration or number of credits). Nevertheless, the Ministry can use mechanism such as refusing to count the number of students for funding purposes or to control enrolments when defining the *numeri clausi*.
55. The statutes must define the organic structure of the University, as well as the norms for its internal organisation regarding the scientific, pedagogic, financial and administrative levels of activity and the autonomies of its organic units.
56. The autonomy of public polytechnics is not sanctioned by the Constitution, as is that of public universities. Public polytechnics are sanctioned by the Comprehensive Law on Educational System (Law 46/86) and established and regulated by Law 54/90 that grants these institutions a lower degree of autonomy when compared to public universities. Polytechnics do not own their buildings, they cannot change the relative composition of the scales of their staffs and they do not have full pedagogic autonomy.
57. The Law establishes that the polytechnic institutes are public collective entities with statutory, administrative, financial and patrimonial autonomy, under the provisions of the law. But the law also establishes that Schools integrated in Polytechnics are juridical entities with scientific, pedagogic, administrative and financial autonomy. This is conflict generating and makes coordination of the Schools by Polytechnics a rather complex matter.
58. Public polytechnics are not allowed to create, suspend and cancel study programmes; they are required to submit these proposals for the prior approval by the Ministry. This contrasts with public university autonomy. Moreover, public polytechnics tend to have a lengthier process when recruiting staff, which can explain that over 50% of the total staffs, are persons hired under special short-term contracts.

59. The conditions for the creation and operation of private higher education are established in the Decree-Law 16/94. The *founder entities* may be collective private entities set up specifically for this objective or foundations whose scope includes such a possibility. The founder entity must adopt the statutes of the higher education institution and present them to the Ministry for homologation.
60. Private institutions have complete autonomy on financial matters and personnel matters (nature and duration of contracts and salaries). However, private institutions are obliged to get permission from the Ministry before starting any new degree or changing their study programmes. The Ministry also sets enrolment parameters by determining the *numerus clausus* for every study programme offered by private universities.

## **2.5. The network of higher education institutions**

61. The Portuguese public university system includes 14 public universities (including the Open University) and a non-integrated university school, ISCTE.
62. The University of Coimbra is the oldest university founded in 1290. The University of Évora was founded in 1559 by the Jesuits, but closed in 1759 when the Marquis of Pombal expelled the Jesuits from Portugal. Coimbra remained until 1911 as the only Portuguese university. In 1911, the new Republican regime established two new universities - the University of Lisbon and the University of Porto. In 1930, the Technical University was created in Lisbon by integration of four already existing schools: Veterinary Medicine, Agronomy, and Engineering (i.e., Instituto Superior Técnico) and the Institute for Economy and Management.
63. Nearly forty years later, in 1973, the University of Aveiro, the University of Minho and the New University of Lisbon were established while a University Institute was created in Évora and two Polytechnic Institutes were created at Vila Real and Covilhã. In 1976 the University of Azores was created, and in 1979 the University of Algarve was established, while the Évora University Institute was transformed into a university. In 1986 the Polytechnic Institutes of Vila Real and Covilhã were transformed respectively into the University of Trás-os-Montes and Alto Douro (UTAD) and the University of Beira Interior (UBI). Finally, in 1988, the University of Madeira, and the University Aberta – an Open University for long-distance education were created.
64. The public polytechnics network is composed of 15 Polytechnic Institutes and some polytechnic schools integrated in the Universities of Algarve and Aveiro and consist of almost 30% of higher education's enrolments.
65. There are also several schools of nursing, health and health technologies that have been or are in the process of being integrated in existing public polytechnics and/or universities. The nursing schools of Beja, Bragança, Castelo Branco, Guarda, Leiria, Portalegre, Santarém, Viana do Castelo and Viseu have been integrated into the respective polytechnics. The Faro nursing school was integrated in the University of Algarve, the Vila Real nursing school in the UTAD, the São João de Deus in the University of Évora, the Braga Calouste Gulbenkian nursing school in the University of Minho, the Madeira nursing school in the university of Madeira and the Angra do Heroísmo and Ponta Delgada nursing schools in the university of Azores. The Health Technologies Schools of Lisbon, Porto and Coimbra were integrated in the respective polytechnics. Finally, the nursing schools in Lisbon (Calouste Gulbenkian, Artur Ravara, Francisco Gentil and Maria Fernanda Resende), in Porto (São João, Cidade do Porto and Ana Guedes) and in Coimbra (Byssaia Barreto and Ângelo da Fonseca) are undergoing mergers before negotiating their integration. There are also special institutions for the police and the armed forces at the university and the polytechnic level.
66. Including the Catholic University there are 13 private universities but some have *campi* in different locations (Catholic University in Braga, Lisbon, Porto, Figueira da Foz and Viseu;

University Autónoma in Lisbon and Caldas da Rainha; Internacional in Lisbon and Figueira da Foz; Lusíada in Lisbon, Porto and Vila Nova de Famalicão; Fernando Pessoa in Porto and Ponte de Lima; and Moderna in Lisbon and Porto). Some of the *campi* (Católica in Leiria, Autónoma in Caldas da Rainha and Internacional in Chaves).

67. There are also many other private institutions (105), most of them specialised (teacher training, health, management, marketing, etc.). Some have a university character, others a polytechnic character but most do not have post-graduate studies. Size varies considerably but there are some very small institutions. The average size is around 1,000 students but there were 29 institutions with enrolments below 200 students and 35 institutions with enrolments between 200 and 500 students (data for 2003).
68. Overall, public and private, university and polytechnic institutions offered in 2005/06 about 80 bachelor degree programmes (i.e., three-year degrees, “bacharelato”), 1932 “licenciaturas” and 622 masters, as can be seen in Table 2.4. Given the special status of the Catholic University the data is presented separately.

Table 2.4 Number of degree programmes registered for the academic year 2005/06

Sub-system of Higher Education		Number of degree programmes registered, 2005-2006		
		“Bacharelato”	“Licenciatura”	“Mestrado”
Public Higher Education	University	5	723	528
	Polytechnic	27	619	--
	Sub-total	32	1342	528
Private Higher Education	University	10	308	63
	Polytechnic	38	213	--
	Sub-total	48	521	63
Catholic University	University	--	69	31
	Sub-total		69	31
TOTAL		80	1932	622

Source: DGES

## 2.6. Qualification framework

69. In Portugal the study programmes may be officially organised in credits since 1980 but it has not been compulsory until now and many institutions have not used this possibility so far. Assignment of credits to a course tends to be based on a rather rigid or even bureaucratic way of counting the number of classroom hours of teaching, without consideration for the student’s actual workload. Year-by-year syllabus of courses is often established rigidly for each HE programme, so that students are not allowed to stray away from this fixed curriculum. The number of optional credits is very small and closely related to the programme main theme and in general choice may take place only in the last year of the programme.
70. Portuguese universities and polytechnics awarded the academic graduate degrees of *bacharel* and *licenciado* while only universities could award postgraduate degrees of master and doctor (PhD). In the last few years a number of universities have introduced doctoral programmes.
71. Most of the licenciaturas awarded by polytechnics were organised into two cycles, the first of which corresponding to a *bacharel* degree. The *Bacharel* degree (ISCED 97 Level 5B) is awarded after a study programme of usually three years’ duration. The polytechnics may also award the *Licenciatura*. This two-tier *licenciatura* is an attractive factor in polytechnic education as the attainment of a more vocational education is associated to the continuation of studies.

72. In the case of universities the bachelor degree was awarded only in special cases such as teacher training. In general university awards a *licenciatura* after 4 to 6 years of studies depending on the discipline (for instance 4 years for sciences or arts; 5 years for engineering and 6 years for medicine and dental medicine).
73. This degree structure will be changed with the implementation of the Bologna process. The new Decree-Law regulating the implementation of the Bologna process will confer universities and polytechnics the possibility of offering the 1<sup>st</sup> and 2<sup>nd</sup> Bologna type cycles while only universities will be allowed to offer doctoral studies. The legislation also differentiates the 2 first cycles to be offered by universities and polytechnics: while the first cycle can have 180 to 240 credits in universities, whereas it has only 180 credits in polytechnics. Polytechnics can only offer 240 credits first cycles in special cases – when there is national or EU legislation imposing a 4 year degree or when a 4 year first cycle is an established practice in other European countries. Universities can also award an integrated master degree (300 to 360 credits) in special cases – national or EU legislation or an established practice in other European countries.
74. The legislative changes introduced by Decreto-Lei n° 74/2006 of 24 March on the Bologna Process also clarify the binary system of universities and polytechnics by differentiating the objectives of each subsystem, within a comparative European framework of similar models. While both universities and polytechnics offer first and cycle degree programmes, only universities can offer doctoral programmes and PhDs. Polytechnic study courses should be able to provide and promote both vocational and professional activities to its students.

## **2.7. Major changes in the last 10 years**

75. The main changes in higher education over the last ten years have been:
- a) Over the past decades Portugal increased its higher education system at a growth rate that has no parallel in other European country and today participation (20-24 years) corresponds to a gross rate of 50%. After a period of thirty years of consecutive growth, the number of candidates to higher education and total enrolments started to decline. This was seen to be a consequence of the convergence of the effects of declining birth rates combined with high drop-out rates in secondary schools and with more demanding rules for access to higher education.
  - b) Policy measures have been taken to promote the quality of the system and to extend access to new publics. Making higher education training more socially and culturally relevant and improving quality will attract more people to courses and assure better conditions for their successful completion. Also, more vocational courses have been introduced. These measures have changed the declining trend of enrolment and a positive growth of 3793 candidates is expected in the next academic year 2006-2007.
  - c) The number of PhDs attributed or recognised by Portuguese universities has grown significantly. The number of PhDs in Portuguese research units increased over 130% from 1996 to 2003. The yearly number of new PhDs more than trebled from 1990 to 2004.
  - d) In the public sector there has been a tendency for increased cost-sharing by increasing the level of tuition fees.
  - e) There has been a steady reinforcement of research activities following the increase in funding and the implementation of an evaluation system using international review teams.
  - f) There has been an increasing influence of EU education and research policies, with increased mobility and collaboration at a European level.
  - g) Higher education institutions have begun the implementation of the Bologna process following the publication of the legal diploma (Decreto-Lei n° 74/2006 of 24 March) that defines the rules, conditions and objectives of the process of change.

### 3. THE TERTIARY EDUCATION SYSTEM AND THE LABOUR MARKET

76. This chapter addresses the links between higher education and the labour markets as well as the policies that seek to improve these links.
77. The low educational level of the Portuguese older generations remains a heavy handicap in the labour market. Curiously, recent inquiries show that the population is in general satisfied with its education level, which partly helps to explain the low number of people engaged in lifelong training activities. An economic development model where competitiveness was granted by the low qualifications/low salaries of the work force – a model doomed to failure in a context of increasing economic globalisation – has helped sustain this attitude.
78. Data for the total of working population with a higher education degree for the 1st quarter of 2006 show an increase of 6.5% in relation to the homologous period of the preceding year and represents 9.9% of the population with 15 years of age and over.
79. The activity rate of the working population with a higher education degree (aged 15 and over) reached 85.2% (85.9% for men and 84.7 for women). The activity rate of this group continues to be much higher than that of people having the secondary and post-secondary education (67.3%) and than that of the people having an educational level lower than the 3rd cycle of basic education (58.3%).

Table 3.1 - Population, employment and unemployment indicators in Portugal *Thousands*

	2000	2001	2002	2003	2004	2005	1 <sup>st</sup> quarter 2006
Total population (15 and over)	8576.7	8654.1	8723.5	8775.4	8862.5	8912.2	8929.7
Total population with HE	558.6	590.5	610.9	693.8	829.9	848.5	883.5
Working population (15 and over)	5226.4	5325.2	5407.8	5460.3	5487.8	5544.8	5556.6
Working population with HE	487.6	516.3	533.1	614.6	714.2	733.1	752.5
Employed pop. (15 and over)	5020.9	5111.7	5137.3	5118.0	5122.8	5122.6	5126.9
Employed population with HE	472.3	498.6	507.1	580.6	676.3	686.9	710.2
Dependent Workers (15 and over)	3649.6	3710.9	3747.9	3736	3782.3	3813.8	3864.9
Dependent Workers with HE	419.6	438.4	448.1	509.7	594.4	605.0	-
Self-employed (15 and over)	1179.2	1258.0	1270.7	1277.6	1238.6	1204.0	1168.3
Self-employed with HE	47.5	54.1	52.2	65.2	62.1	58.8	-
Unemployed pop. (15 or over)	205.5	213.6	270.5	342.3	365.0	422.3	429.7
Unemployed population with HE	15.3	17.8	26.1	37.0	37.9	46.2	42.3

Source: INE, "Inquérito ao Emprego"

80. In the last five years the employed population holding a higher education degree has increased from 472 thousand in 2000, to about 687 thousand in 2005 (annual averages), that is, an increase of + 45.6%. In this same period the total employed population increased only 2%. That segment of the population was then the main responsible for the net job creation in those six years. The employed population holding a higher education degree represents 13.9 % of the total of the employed population, more 4.4 p.p. than in 2000.

81. In Portugal, even in years with a global reduction of the employment (as in 2003) or stagnation (as in 2004 and 2005) the employment of people with a higher education level has always registered positive growth rates: 14.5% in 2003, 16.5% in 2004 and 1.6% in 2005, in the first quarter of 2006 + 1.3% than in the preceding quarter.
82. This situation reflects the access to the Portuguese labour market of a much higher amount of higher education graduates, that is a result of the expansion of this educational level in the last decades and is also reflected on the increase of the total population with this educational level (+51.9% between 2000 and 2005). In fact, a study carried out by the Directorate-General for Studies, Statistics and Planning of the Ministry of Labour and Social Solidarity concludes that, between 1992 and 2002, an increase of almost 500% was registered in the number of individuals with higher education who entered the Portuguese labour market (of about 6 thousand/year to 30 thousand in 2002). This segment represented, then, 10% of the new entries in 2002, while in the beginning of the period referred it represented 2%.
83. Data from “Quadros de Pessoal”, 2003, show that 7.2% of the employees from the structured economic sector held a degree and 2.4% a bachelor’s degree. These values were, respectively, of 4.8% and 2% in 1998. In all activity sectors cover by “Quadros de Pessoal”, between 1998 and 2003, it is possible to observe an increase in the weight of workers with higher education, mainly in the “Public Administration, Defence and Social Security” sector (26.1 %), followed by the “Financial Activities” sector with 9.6 %. The “Manufacturing Industries” and “Fishing” sectors are the ones where we verify a smaller variation in their relative weight (0.3% and 0.5%, respectively).As to the latter; the majority were between 25 and 34 years of age.
84. As to the sectors of activity, in 2003 the highest percentage of graduates could be found in real estate activities, rentals and services provided to enterprises (19.7), followed by the manufacturing industry (14.4%) and gross and retail trade; 13.7% in repair of motor vehicles, motorcycles and goods for personal and domestic use. However, considering the dependent employment in each sector it is found out that the relative weight of the graduates is higher in the informatics and R&D activities. They attain even higher percentage in the financial activities.
85. Moreover, according to data from “Quadros do Pessoal” referring to October 2003, in the Mainland, the average monthly earnings of the graduates for the total of the economic activity was € 1 941,17. This amount represents 2,3 times the average earnings of the workers checked in the “Quadros do Pessoal” of October 2003 and 3,4 times the earnings of the group of workers with a educational level lower than the 1st cycle of basic education (the group with the lowest educational level).
86. On analysing the average monthly earnings level of workers holding a degree by activity (CAE-REV. 2.1), it is found out that the highest levels belonged to “Posts and Telecommunications” (€ 2 803,40) followed by “Production and Distribution of Electricity, Gas and Water” (€ 2 783,02) and “Extraction of Energy Products” (€2 500,82). The lowest amounts of average monthly earnings were found in “Accommodation and Catering” (€1 273,93), “Leather and Leather Goods Industry (€1 329,76) and in “Agriculture, Animal Production, Hunting and Forestry” (€1 400,84).
87. Table 3.2 presents data on new entrants in the labour market over a 10 years period from 1992 to 2002. It can be seen that despite a consistent increase of the percentage of new employees with a higher education degree (from 2.1% in 1992 to 10.7% in 2002) the data still unveils one of the main problems of the Portuguese economy and its development model – that over a 10 year period only 5.7% of the almost 2 million new entrants into the labour market had a higher education degree.



Table 3.2 – Qualifications of the new entrants in the labour market

Year	HE graduates		Non HE graduates/unknown		Total
	Number	%	Number	%	Number
1992	6 117	2.1	291 865	97.9	297 982
1993	5 292	2.5	202 661	95.5	207 953
1994	6 708	3.3	198 755	96.7	205 463
1995	6 470	4.2	148 384	95.8	154 854
1996	7 070	4.8	140 772	95.2	147 842
1997	9 048	5.8	146 903	94.2	155 951
1998	11 004	7.0	146 919	93.0	157 923
1999	12 583	7.8	148 592	92.2	161 175
2000	14 614	9.4	141 546	90.6	156 160
2002	29 931	10.7	249 045	89.3	278 976
Total	108 837	5.7	1 815 442	94.3	1 924 279

Year 2002 accumulates data from 2001.

Source: SILATEE (2002) as cited in CIRIUS final report, 2004

88. Table 3.3 presents data on the areas of graduation of the new entrants to the labour market and on the evolution of the relative importance of each. One can observe a decline in the percentage of graduates in economics and management and an increase in graduates from social sciences while the percentage of engineering graduates remains relatively stable.

Table 3.3 – Graduation areas of the new entrants into the labour market

	1994		1995		1996		1997	
	Number	%	Number	%	Number	%	Number	%
Economics/management	1 632	22.2	2 000	28.5	1 984	25.5	2 527	25.7
Engineering	1 370	18.7	1 225	17.4	1 457	18.7	1 687	17.1
Arts	253	3.4	222	3.2	261	3.4	357	3.6
Sciences	469	6.4	393	5.6	509	6.5	583	5.9
Education	560	7.6	546	7.8	489	6.3	551	5.6
Health Sciences	345	4.7	299	4.3	289	3.7	342	3.5
Social sciences	581	7.9	485	6.9	546	7.0	605	6.1
Int. relations/communication	229	3.1	290	4.1	351	4.5	606	6.2
Agriculture, Agro Industries	275	3.7	208	3.0	213	2.7	227	2.3
Others	1 628	22.2	1 360	19.4	1 685	21.6	2 362	24.0
Total	7 342	100.0	7 028	100.0	7 784	100.0	9 847	100.0
	1998		1999		2000		2002	
	Number	%	Number	%	Number	%	Number	%
Economics/management	3 161	26.8	2 997	22.6	3 006	21.4	5 610	19.8
Engineering	1 822	15.5	1 609	12.1	2 571	18.3	4 877	17.2
Arts	384	3.3	344	2.6	754	5.4	1 772	6.2
Sciences	574	4.9	525	4.0	501	3.6	1 506	5.3
Education	584	5.0	459	3.5	531	3.8	1 298	4.6
Health Sciences	398	3.4	327	2.5	504	3.6	1 189	4.2
Social sciences	795	6.7	756	5.7	2 157	15.3	4 536	16.0
Int. relations/communication	728	6.2	675	5.1	317	2.3	663	2.3
Agriculture, Agro Industries	265	2.2	192	1.4	173	1.2	294	1.0
Others	3 072	26.1	5 381	40.6	3 565	25.3	6 627	23.4
Total	11 783	100.0	13 265	100.0	14 079	100.0	28 372	100.0

Source: SILATEE (2002) as cited in CIRIUS final report, 2004

89. Despite the massive expansion of higher education in recent decades, an analysis of the rates of return of higher education degrees in Portugal indicates that not only have these been persistently high, but they are at the highest level for the 15 EU countries (Pereira and Martins, 2000). Table 3.4 also shows that 81.2% of the relative earnings of new labour market entrants

with a higher education degree lie in the highest quintile, which compares against only 16.1% for non-graduates.

Table 3.4 – Relative earnings to the new entrants’ average earnings

	HE graduates		Non graduates/unknown		Total	
	Number	%	Number	%	Number	%
Quintile 1	1 120	1.3	265 959	18.9	267 079	17.9
Quintile 2	1 513	1.7	331 972	23.6	333 485	22.3
Quintile 3	3 105	3.5	295 960	21.1	299 065	20.0
Quintile 4	10 947	12.3	284 440	20.3	295 387	19.8
Quintile 5	72 190	81.2	225 456	16.1	297 646	19.9
Total	88 875	100.0	1 403 787	100.0	1 492 662	100.0

Source: SILATEE (2002) as cited in CIRIUS final report, 2004

90. Table 3.5 shows that until 2000 there has been an apparent convergence of the relative earnings of graduates and non-graduates, a trend that seems to have been reversed in 2001-2002.

Table 3.5 – Evolution of the relative earnings to the new entrants’ average earnings

	HE graduates	Non graduates/unknown	Total
	Average	Average	Average
1992	2.74	0.96	1.00
1993	2.62	0.96	1.00
1994	2.47	0.95	1.00
1995	2.15	0.94	1.00
1996	2.04	0.94	1.00
1997	1.93	0.93	1.00
1998	1.93	0.86	0.94
1999	1.89	0.91	1.00
2000	1.77	0.90	1.00
2002	2.03	0.89	1.00
TOTAL	2.03	0.93	1.00

Source: SILATEE (2002) as cited in CIRIUS final report, 2004

91. Table 3.6 presents the evolution of the relative earnings of new labour market entrants with a higher education degree, by area of graduation. One observes that engineering graduates have the highest earnings followed by the health professions. However, in the latter case one needs to take into account that most graduates have degrees in nursing and health technologies, not in medicine. It is also interesting to notice the decreasing trend in the earnings of graduates in economics/management, which probably reflects some labour market saturation.
92. The data seems to indicate that the economic return of education varies (see table 3.7). Pereira and Martins (2000) analysed the economic return for those individuals at the top and bottom income groups. According to the data, the economic return for a similar education qualification is heterogeneous, and seems to have increased during the system’s expansion. This means that the wage benefits from educational qualifications have been decreasing for those getting lower wages and increasing for those getting well-paid ones. This suggests that the economic benefits of education have been declining during the last two decades for those located at the lower end of the pay scale (see table 3.5, salaries for new entrants).

Table 3.6 – Evolution of the relative earnings to the new entrants’ average earnings, by field of study

	1994	1995	1996	1997	1998	1999	2000	2002	Total
Economics/management	2.56	2.31	2.20	2.05	1.92	2.00	1.83	1.75	1.99
Engineering	2.71	2.44	2.31	2.30	2.20	2.34	2.27	2.07	2.27
Arts	1.83	1.77	1.81	1.87	1.57	1.72	1.85	1.80	1.78
Sciences	2.13	1.93	1.81	1.75	1.81	1.78	1.96	1.96	1.90
Education	2.23	2.09	1.94	1.90	1.87	1.85	1.66	1.57	1.84
Health Sciences	2.28	2.35	2.40	2.32	2.17	2.17	2.10	1.93	2.13
Social sciences	2.13	2.04	1.89	1.88	1.85	1.74	1.83	1.72	1.81
Int. relations/communication	2.07	1.98	1.77	1.78	2.04	1.68	1.85	1.51	1.80
Agriculture, Agro Industries	1.97	1.91	1.80	1.81	1.77	1.76	1.65	1.61	1.78
Others	2.37	2.25	2.07	1.92	1.69	1.81	1.73	1.64	1.83
Total	2.40	2.23	2.10	2.01	1.90	1.92	1.90	1.78	1.95

Source: SILATEE (2002) as cited in CIRIUS final report, 2004

93. However, the data seems to indicate that the economic return of education varies (see table 3.7). Pereira and Martins (2000) analysed the economic return to the same level of education for those individuals at the top and bottom income groups. According to the data, the economic return for a similar educational qualification is heterogeneous, and seems to have increased during the system’s substantial expansion. This means that the wage benefits from educational qualifications have been decreasing for those getting lower wages and increasing for those getting well-paid ones. This suggests that the economic benefit of education has been declining during the last two decades for those located at the lower end of the pay scale (see Table 3.5, salaries for new entrants).

Table 3.7 - Estimated average return to same education level for top and bottom income groups (%)

Year	OLS*	1 <sup>st</sup> Deciles	9 <sup>th</sup> Deciles
1982	11.0	8.7	11.0
1995	12.6	6.7	12.6

\*Ordinary least squares Source: Pereira and Martins 2000

94. An analysis of patterns of job creation shows that the Portuguese labour market is characterised by high job rotation, with high job creation/destruction occurring for all groups of workers regardless of their level of schooling (Cardoso and Ferreira 2001). However, both the raw and net rates of job creation were persistently higher for workers with higher education degrees than for those with lower schooling, between the mid-1980s and the late 1990s, precisely the period of greatest higher education expansion. Hence, the slight increase in graduate unemployment did not result from a decline in the willingness of companies to recruit higher education graduates, but rather from the labour market’s incapacity to absorb the massive flow of graduates.
95. More recently one can observe a gradual unemployment increase of the number of people with graduate and post-graduate degrees (Table 3.8) that is probably associated with the present slow-down of the economy and the saturation of some labour-market areas such as school teachers. However, as the number of people with higher education degrees has also been increasing significantly, the unemployment rate for graduates remains below 5%.

Table 3.8 - Number of unemployed with higher education degrees

	2000	2001	2002	2003	2004
Graduates	16 640	16 343	22 890	31 338	27 775
Masters	101	105	188	256	260
Ph.D.s	14	12	21	32	52

Source: Ministry of Work and Social Solidarity, 2005

96. Brain drain has so far not been a problem for Portugal, but current international trends on the competition for skilled people represent new challenges for Portuguese policies. There is an increasing capability of Portuguese universities in offering PhD programmes, which also creates new challenges for the mechanisms that guarantee their quality, and the need to strengthen their internationalization and to establish international scientific research networks, where PhD students can be fundamental links.
97. Employing Portuguese PhD holders raises a series of new issues associated to emerging challenges and opportunities in terms of scientific employment, which can be analyzed on the basis of three surveys carried out between 1999 and 2001 to former FCT scholarship holders since 1990. They clearly show that most of these former scholarship holders carry out their professional activity in Portugal, mainly in higher education institutions (Figure 3.1).

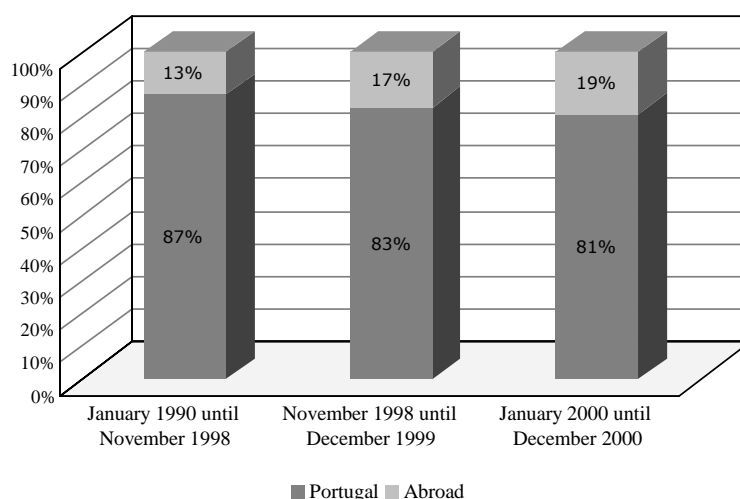


Figure 3.1 – Results of the surveys made to former FCT’s scholarship holders that develop their professional activity in Portugal or abroad

Source: FCT 1997-2001 – 5 years Report, Portuguese Science and Technology Foundation; Primary data from OCES, Survey on the professional situation of former PhD scholarship holders.

98. It should be noted that the improvement of the S&T system over the last few years has been associated with a critical challenge related to the need to restructure the university faculty career’s system. This includes understanding forms of merit enhancement devoted to young researchers, regardless of the existence of vacancies in the university faculty staff derived from the number of undergraduate students. Indeed, the progressive saturation of these vacancies, at least in older universities, has stalled the attractiveness of scientific careers, which requires the change of university recruiting systems to schemes such as those in force in more developed S&T systems.
99. In terms of scientific employment, the information on the employability of Portuguese PhD holders shows that the importance of higher education in scientific employment. Since 1998 there has been an incorporation of recent PhDs by the private higher education and by the polytechnic sub-systems. There has simultaneously been a slight growth of former scholarship

holders working abroad, namely in universities or in research centres. Thus, national and international mobility of new PhD holders, mainly within the European area and in a context of an effective need to promote the internationalization of research units, is particularly pertinent in the current development stage of the national S&T system. PhDs may also tend to increase their permanence abroad, unless short-term measures for the promotion of scientific employment are taken.

100. Only a small percentage of PhD holders develop their professional activity in companies. Some cases of new technology-based firms created by young PhDs are noteworthy in particular in the areas of information technologies, biotechnology and, more recently, space technologies. In the period 1997-2003, FCT helped to integrate 77 PhD holders and 63 Masters in nearly 50 firms, through the support of the Innovation Agency, with total public funding around 1.2 million Euros in 2001. There is some legal provision allowing for university professors and researchers to spend some time in industry. The continuity and sustainability of this process goes beyond the public effort and requires the establishment of effective networks with universities, namely through R&D units, which are in a particularly privileged position to facilitate and develop close relationships with new technology-based firms.
101. The main difficulties result from the structure of Portuguese enterprises, which is dominated by SMEs. Portuguese universities in general enter more easily in cooperation agreement with large foreign companies than with Portuguese companies, namely when competing for EU research projects.
102. There is no explicit policy to ensure that graduates produced by higher education institutions match market needs. However the national quality assessment system does take into consideration the employability of graduates and the opinions of employers.
103. Until quite recently Portuguese industry was able to compete with low-qualified manpower, as demonstrated by the low number of people with a PhD working in industry, the low qualification level of many entrepreneurs and the low dimension of lifelong education and training activities. Under these circumstances it is almost inevitable that there will be a mismatch between the products of the higher education sector and the demands of the labour market. This is clearly evident in the difficulty of people with post-graduate degrees to find places in industry, a problem that can emerge also at the level of graduate higher level education in times of economic stagnation. Indeed, one can say that the higher education sector is producing in advance of market needs and demands, as it is characteristic of an economy that still has many characteristics of a developing economy.
104. In Portugal the generalized system of *numerus clausus* allows the state to determine the maximum number of students that may enroll in each scientific or professional area. However this has not been consistently used as a regulation tool for labour market needs. Labour market analyses need to be further linked to higher education study programmes.
105. Quality assessment mechanisms are another tool to promote the adaptation of the education provision of higher education to labour market needs. The national quality assessment system uses employability and the opinions of employers as one of the assessment criteria while some professional organizations have the power to accredit study programmes and thus can influence the behavior of higher education institutions.
106. Some of the more important issues that still need to be addressed are:
  - The low percentage of students completing upper secondary education (just below 50%); the target for 2010 is to increase this percentage to 65% (against the 85% recommended at EU level – the Lisbon strategy). This low percentage of upper secondary graduation severely limits enrolments in higher education.

- Vocational education at pre-university level represents only a small percentage of total enrolments. The percentage of students enrolled in technological upper secondary education was 29.9% of total enrolment (in 2003-04), most students show their preference for general courses with a direct link to enter higher education.
- The CETs (short cycle technological specialisation courses) have been recently strengthened but they are still not well established.
- Higher education institutions, including the polytechnics have not developed a consistent strategy either in relation to the CETs or to lifelong education in general.
- Life-long learning is not sufficiently generalised.
- Business and industrial interests should promote and improve their relationship to higher education at various levels. Matching educational qualification with business needs should be monitored and improved.

#### **4. THE REGIONAL ROLE OF TERTIARY EDUCATION**

107. This chapter examines the regional dimension of higher education in Portugal and examines the policies that seek to help higher institutions respond to regional requirements.
108. In general, universities are considered to have a national role while polytechnics are assumed to have a more regional role. In the early 1970s, when higher education was expanding through the establishment of new institutions, universities and polytechnics, location was an important aspect to be considered. The location of these new institutions was based on a careful analysis of the population distribution and a number of new universities outside the traditional centres in Lisbon, Porto and Coimbra were created. Regional considerations were a major factor in determining the government's decisions.
109. Most new public universities established in the 1970s started their activity looking for market niches where they could avoid the direct competition from the older and more established universities. Newer universities such as Minho, Aveiro and Trás-os Montes e Alto Douro (UTAD), created in 1973, tried to conquer some market niches by addressing local or regional demands. Aveiro is located in a region with an old tradition in the industry of crockery, ceramics and glass and where the Portuguese PTT has installed one of its research units. Consequently Aveiro has developed study programmes such as Engineering of Glass and Ceramics and Engineering of Electronics and Telecommunications. On the other hand the University of Minho is located in the region where textile industry has been established and offers study programmes in Textile Engineering. The UTAD is located in a region with a tradition of forestry and agriculture, close to the Port wine vineyards and their offer includes study programmes in Agriculture, Animal Production, Forestry Production and Oenology.
110. However, as these universities established themselves, they have augmented their study programmes to more traditional fields. For instance Universidade do Minho now offers study programmes in Architecture, Economics, Law, Psychology, Sociology and Medicine. Aveiro offers Mechanical Engineering, Civil Engineering, Biology, Chemistry, Chemical Engineering, Economics and is now bidding for a new programme of Medicine. Therefore one may infer that after two to three decades after their foundation new universities are clearly developing a more national and international profile, while shedding some of their initial regional emphasis.
111. In the case of Polytechnics and in the wake of the World Bank's recommendations, vocationally oriented institutions were promoted. Student enrolment into scientific and technological and economic/business programmes was encouraged. It was assumed that this network would be able to ensure: increased equity of access to higher education; an answer to increasing demographic pressures resulting from enlarging the duration of compulsory education; stronger recruitment among vocational secondary education students; and establishment of regional preference mechanisms by quotas in favour of students resident in the area.
112. Polytechnics were expected to perform applied research and experimental development in the areas of technology, services and education, taking regional demand and needs of local industries into account. However, the academic career of polytechnic professors is not based on doctoral degrees and there is no research career associated to polytechnics. The emphasis was on the professional and technical characteristics of the polytechnics along with the regional and local economic role of their mission, embodying the political assumption that economic development is a more or less direct consequence of an adequate educational system.
113. The implementation of the Polytechnic higher education sub-system was regulated by Decree 513-L1/79 of 27 December. The decree states the main objectives of Polytechnic higher education: education with greater applied and technical emphasis and strong vocational orientation, for training intermediate level technicians for industries, service companies and educational units (first cycle of basic education).

114. The Polytechnic higher education programmes were based on three year training periods that would confer students a 'bacharel' degree. Higher Schools of Education were an exception because they could also confer a 'licenciatura' degree after a four-year programme allowing students to become teachers in the second cycle of basic schooling.
115. By the end of the 1980s however there was a proliferation of courses with diversified designations. Some courses offered well-defined professional profiles corresponding to a narrow spectrum of specialised training. In many cases, these different designations covered an array of disciplinary and technological areas of knowledge that coincided with the initial training programmes of the new universities or of the schools of engineering and management/economics of the more traditional universities.
116. Polytechnic Institutes have followed, at least partially, the philosophy of the new universities' curricular organisation, particularly in relation to curricular flexibility and a discourse addressed at closer connections with local communities. Despite this, many of the initial training programmes of the Polytechnics have gone beyond what can be considered a regional labour market to assume a role in the national labour market.
117. The Comprehensive Law of the Educational System (Law 48/86) helped consolidate the new polytechnic network. Besides the declaration of intentions on the technical and cultural educational tasks allocated to this sub-system and the new mission of developing capacities of innovation and criticism, the law reasserts the polytechnics' vocation to train human resources for professional activities by teaching based on the transmission of scientific knowledge, both theoretical and applied.
118. The regional role of public polytechnics emerges in their governance structure as the legislation gives regional authorities a role in their governance bodies. This contrasts with the participation of external stakeholders in university governance where the decision is left to the institution. In the case of the private sector there is no reference at all to outside stakeholders.
119. In the case of public polytechnics the participation of external representatives is compulsory for the election of the President and in the composition of the body of the General Council; it is however not required in the preparation and approval of the statutes. The General Council should include external (lay) members, but their number may not exceed the number of Schools in the Polytechnic. The external representation is therefore low, averaging 13.2% for the 16 polytechnics.
120. The regional distribution of vacancies in higher education institutions indicates a strong concentration in the most populated regions, namely in Lisbon and in the North region, which is mainly due to the large number of small private institutions. However, the network of public polytechnics has played an important role in the distribution of higher education across the country.
121. Initially the focus will be at the level of the Region (NUTS II), by comparing the number of vacancies in each region per 1,000 inhabitants. Figure 4.1 presents the overall distribution of vacancies as well as the distribution of the public and private sectors. The global country average is 8.09/1,000 inhabitants and that the Region of Lisbon is above the average (11.84), with North and Centre below average and quite smaller values for the islands of Madeira and Azores. When only the public sector is considered, the Centre is the most favoured region (5.72), closely followed by Lisbon (5.40), both above the national average (4.58). Alentejo and Algarve are slightly below the national average while the North is well below the national average.



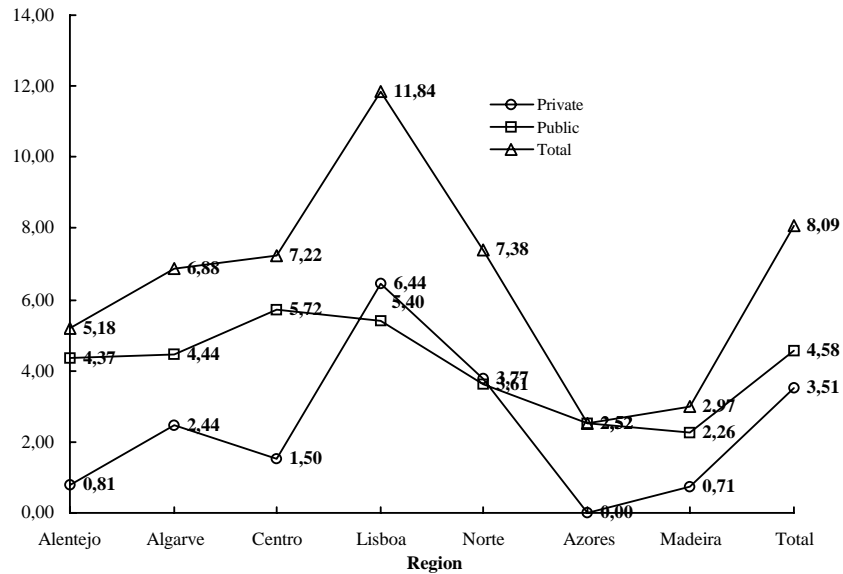


Figure 4.1 – The Regional distribution of total vacancies (2005-06). Source: OCES, 2005

122. The private sector has a more unbalanced regional distribution, with two regions, Lisbon and North above the national average. The Lisbon indicator is well above the national average, almost doubling the national value, while the North Region is only slightly above the national average, and all the other regions below the national average. The more favourable situation of Lisbon is mainly due to the contribution of the private sector that concentrates a large proportion of vacancies there. It is also interesting to notice the reduced presence of the private sector in Alentejo and the island of Madeira, and its absence in the Azores archipelago.
123. Figure 4.2 presents the regional distribution of vacancies by sub-sector separating university education from polytechnic education. There is an unbalanced regional distribution of university education that favours the Lisbon Region, almost double the national average. Polytechnics are more evenly distributed throughout the mainland than universities; only the Centre Region is slightly above the national average.

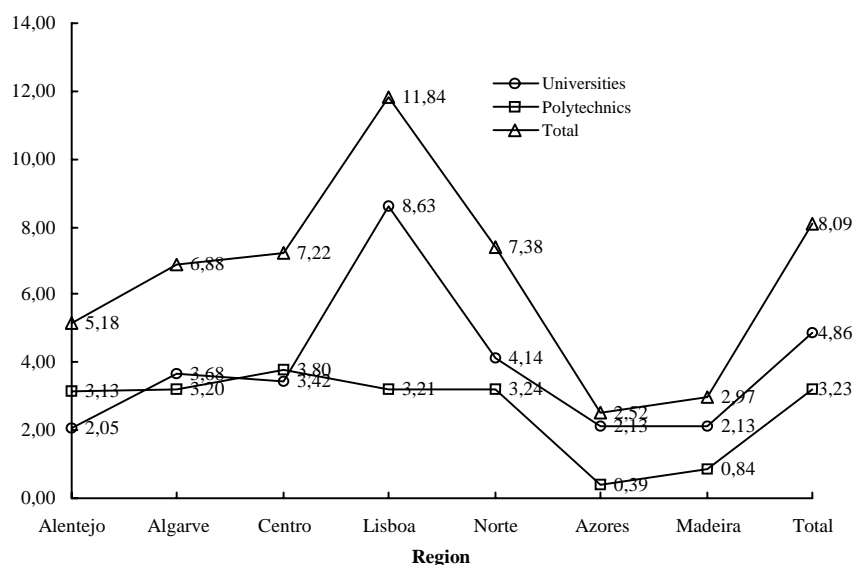


Figure 4.2 – The Regional distribution of vacancies – university/polytechnic education (2005-06) Source: OCES, 2005

124. Further analysis, at the level of the district (Figure 4.3), shows that most higher education is concentrated around the two main towns of Lisbon (32.7%) and Porto (20.1%), the third is Coimbra (7.6%).

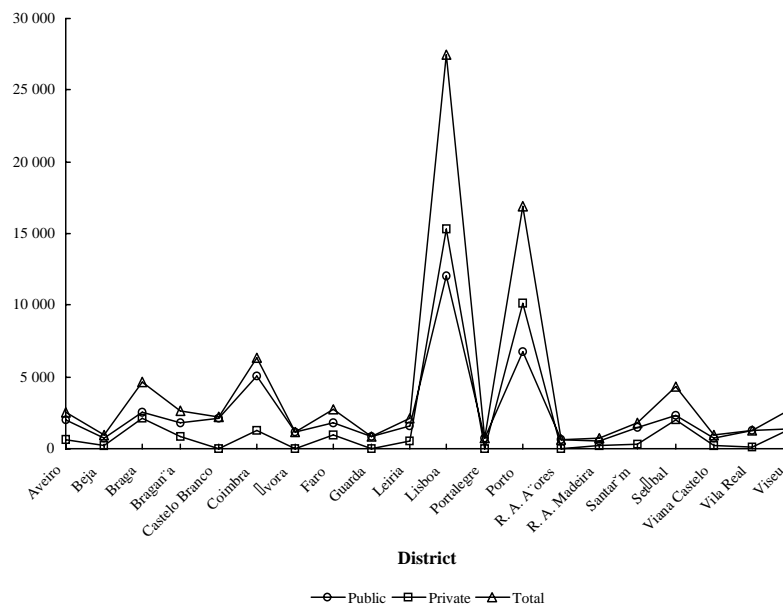


Figure 4.3 – The distribution at district level (public, private and total) (2005-06)  
Source: OCES, 2005

125. In the public sector Lisbon maintains 25.4% of the vacancies in higher education, Porto 14.2% and Coimbra 10.7%. The two districts with the two main cities correspond to 39.6% of the total public vacancies. In the private sector, Lisbon accounts for 42.3%, Porto for 27.8% and Coimbra for only 3.6%. In this case the two districts where the two main cities are located correspond to 70.1% of the total private vacancies.

126. The analysis of the regional distribution of enrolments and graduations by scientific areas indicates an interesting pattern in choice of study programmes. Some fields of study represent a small percentage of total enrolments, such as Computer Sciences (below 3.5% in all regions and only 0.2% in Madeira), Physical Sciences (below 2.6% in the mainland and only 0.3% in Azores), Mathematics and Statistics (below 1.5% in all regions except Madeira where it represents 4%) and even Life Sciences has a maximum of 7.7% in Azores followed by Madeira with 5.7%, Alentejo with 4.6%, with all the other regions below 3.5%. The most attractive fields are Entrepreneurial Sciences with 15.1% of all enrolments, followed by Engineering with 13.0%, Health with 12.1% and Social Sciences with 9.7%.

127. Comparing the different regions one observes a heterogeneous landscape. Some areas such as Entrepreneurial Sciences or Health present a quite uniform percentage of enrolments across the country; other areas such as Teacher Training (20.0% in Azores and 6.0% in Algarve) or Engineering (16.4% in the Centre and 1.2% in Azores) present a very wide variation. Some data is quite surprising, such as the low value of Social and Behavioural Sciences in the Centre (only 6.1%) while others can be explained by the regional characteristics such as the high values for Agriculture in Alentejo (8.6%), for Building Industries in Algarve (10.9%) and for Personal services in Madeira (9.4%).

128. Public policies helped develop the network of public polytechnics. Access policies were combined with large investments in new buildings and equipment and an academic career progression more attractive (less demanding) than a university one to promote the development of the polytechnic sector.

129. Although there are still more students enrolled in public universities than in public polytechnics, the development of the public polytechnic sector has been impressive. The available data also show that over the period 1980–98 vacancies in the public university sector increased at a yearly average rate of 5.21% compared to 17.17% for public polytechnics. This demonstrates that the government policies were effective in increasing enrolments in polytechnics.
130. The Ministry of Science, Technology and Higher Education utilizes a formula for funding higher education that takes into account the insularity factor of the Azores and Madeira islands. Thus the islands are funded at a higher rate (+2%) of the personnel cost factor than the Mainland.

## **5. THE ROLE OF TERTIARY EDUCATION IN RESEARCH AND INNOVATION**

### **5.1. Introduction**

131. The purpose of this chapter is to provide information on the role of higher education in research and innovation, and on the mechanisms and policies that the government uses to support and strengthen this role.
132. In the late sixties, JNICT - the National Committee of Scientific and Technological Research, was created to support and finance Portuguese research. For over thirty years JNICT financed and supported Portuguese research activities. In 1997, JNICT gave way to the Foundation for Science and Technology, created subsequently to the new Ministry of Science and Technology in 1995. Profound institutional changes resulted in the public institutions associated with science and technology and the scientific and technological system was stimulated within the framework of a deep reform in the evaluation of R&D institutions.
133. The Foundation for Science and Technology is currently dependent on the Ministry of Science, Technology and Higher Education and its mission is to promote the advancement of scientific and technological knowledge in Portugal, exploiting and fostering opportunities with the potential to meet the highest international standards for the creation of knowledge in different domains.
134. FCT's mission centres on certain key areas of intervention established in keeping with five main guidelines. These are: promotion of advanced human resources training, through the continued funding of postgraduate awards, mainly for the preparation of doctorates and post-doctoral research; funding of scientific research and technological development projects in all scientific areas; support for the development and management of R&D infrastructures; promotion of the mobility of researchers; and the promotion of scientific communication through the funding of a series of activities aimed at promoting communication between scientists and disseminating the national scientific production. This includes support for participation at scientific meetings, production of scientific periodical and non-periodical publications and funding of scientific societies.
135. FCT's mission is mainly carried out through the award of funding, decided upon after considering the merits of the proposals submitted for its approval, which are usually promoted by scientific institutions, research teams or duly qualified citizens. Such a process normally takes the form of public tenders specifically requested for this purpose. Consideration is also given in this area to other forms of support in partnership with both public and private institutions.
136. Further considerable changes occurred with European integration in the second half of the eighties. Portuguese participation in the framework programmes of research and development has increased significantly, and helped foster European cooperation and collaboration in research and innovation. Both national and European R&D policies have sought to reinforce research practices and integrate knowledge in societal practices.

### **5.2. Teaching and research in higher education**

137. The role of higher education institutions in research activities is very heterogeneous and depends on the different sector of higher education. The research institutions financed by the Ministry for Science, Technology and Higher Education (MCTES) are structured in "Research Units" and "Associated Laboratories". Research units have different designations (Centros, Institutos, Unidades, etc.), but most of them are associated to public universities (Table 5.1).

Table 5.1 – Research centers supported by FCT, 2004

Type of institution	Centers
Public universities	384
Public Polytechnics	8
Catholic University	14
Private universities	7
Other private institutions	20
Total	433

Source: OCES

138. Most research activities are carried out in research centers or laboratories affiliated to public universities. The number of Ph.D. researchers working in Portuguese research units associated with universities has increased since the second half of the 1990s but it still remains low by comparative standards. Few polytechnics work within the research units of public universities. Most private institutions are primarily teaching-only institutions, although there are exceptions. Most researchers working in the centres or in the associate laboratories are public university professors and hence their salaries are paid by the university. The research activities undertaken with the centre or the lab are in addition to their university activities and there is no in-built flexibility in the career structure to buy teaching time and thereby reduce teaching obligations.
139. The regularly produced international evaluation reports of R&D units over the last ten years have helped identify strengths and weaknesses of the research units, and in their relationship with universities. Some current concerns include: weak articulation between education and research; relative ageing of research and university personnel; insufficient and unstable support structures; weakness in university-industry linkages. Given the regional distribution of polytechnics they are in a position to undertake more applied research at the local or regional level.
140. The government programme has explicitly identified a number of targets that seek to improve and increase the number of researchers, the public and private investment in R&D and to create a number of new R&D posts and positions.

### 5.3. Research funding and expenditure

141. Overall expenditure in research and development in Portugal has been low. In 1995 it was below 0.6% of the GDP, it reached 0.85% in 2001, when the European average for EU<sub>15</sub> (Table 5.2) was 1.98%.

Table 5.2 – Gross expenditure on research and development (GERD, %) as a fraction of GDP, for EU<sub>15</sub>, Portugal and some selected countries

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EU <sub>15</sub>	1.89 <sup>s</sup>	1.88 <sup>s</sup>	1.87 <sup>s</sup>	1.87 <sup>s</sup>	1.87 <sup>s</sup>	1.92 <sup>s</sup>	1.94 <sup>s</sup>	1.98 <sup>s</sup>	1.98 <sup>s</sup>	1.97 <sup>s</sup>	1.95 <sup>ps</sup>
Greece		0.49		0.51		0.67		0.64		0.62 <sup>p</sup>	0.58 <sup>p</sup>
Spain	0.81	0.81	0.83 <sup>e</sup>	0.82	0.89	0.88	0.91	0.92	0.99	1.05	
Ireland	1.31 <sup>e</sup>	1.35 <sup>e</sup>	1.32 <sup>e</sup>	1.27 <sup>e</sup>	1.23	1.18	1.13	1.12	1.1 <sup>f</sup>	1.16 <sup>f</sup>	1.2 <sup>f</sup>
Finland	2.29	2.26	2.52	2.69	2.86	3.21	3.38	3.38	3.43	3.48	3.51 <sup>f</sup>
Portugal*	0.59	0.57	0.60	0.62	0.69	0.75	0.80	0.85 <sup>e</sup>	0.80	0.78	

s – EUROSTAT estimate ps – Provisional value; EUROSTAT estimate e – Estimated value  
r – Revised value f – Forecast Source: EUROSTAT; 2003 is the last year available) (see Heitor and Horta, 2004) \*Sources: OCES, Inquérito ao Potencial Científico e Tecnológico Nacional; OECD, Main Science and Technology Indicators, 2005(1) – Database

142. Both business and public funding for R&D activities in Portugal, taken as a proportion of the GDP, have grown, although not always steadily, since the mid-1980s Public funds still account for the higher share of the research expenditure than do private funds from the industry (Table 5.3), while funds from abroad are below the European average.

Table 5.3 – Gross domestic expenditure on R&D (GERD) by source of funds (%)

		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Government	EU15			36.8 <sup>s</sup>	35.9 <sup>s</sup>	35.5 <sup>s</sup>	34.1 <sup>s</sup>	33.8 <sup>s</sup>	33.7 <sup>s</sup>	33.7 <sup>s</sup>	34.7 <sup>s</sup>
	Portugal	59.4 <sup>e</sup>	65.3	66.9 <sup>e</sup>	68.2	69.1 <sup>e</sup>	69.7	64.8 <sup>e</sup>	61	60.5 <sup>e</sup>	60.1
Industry	EU15			53.4 <sup>s</sup>	53.6 <sup>s</sup>	54.2 <sup>s</sup>	55.5 <sup>s</sup>	55.5 <sup>s</sup>	55.6 <sup>s</sup>	55.3 <sup>s</sup>	54.6 <sup>s</sup>
	Portugal	20.2 <sup>e</sup>	19.5	20.5 <sup>e</sup>	21.2	21.3	21.3	27.1	31.5	31.6 <sup>e</sup>	31.7
Abroad	EU15			7.7 <sup>s</sup>	8.2 <sup>s</sup>	8.2 <sup>s</sup>	8.2 <sup>s</sup>	8.4 <sup>s</sup>	8.5 <sup>s</sup>	8.7 <sup>s</sup>	8.5 <sup>s</sup>
	Portugal	15.0 <sup>e</sup>	11.9 <sup>b</sup>	8.7 <sup>e</sup>	6.1 <sup>b</sup>	5.7	5.3	5.2	5.1	5 <sup>e</sup>	5

s – EUROSTAT estimates; e – Estimated value; b – Break in series; Source: EUROSTAT, 2005

143. The lack of a stable science policy has had a negative impact on the research community. Between 2003 and 2004 expenditure in research and development decreased to below 0.8% of the GDP.
144. Two main basic public funding categories for S&T were implemented in Portugal since 1996, namely: core funding, which corresponds to a specific allocation to C&T institutions by FCT, based on periodic evaluations (every 3 years), including two components: basic funding in terms of number of researchers and level of evaluation; and programmatic funding, for specific actions to be defined by evaluators; and competitive funding, which comprises other funds, including: individual scholarships and advanced training of human resources; research and development projects; prizes; other funds, including funding and cooperation models.
145. Table 5.4 presents the distribution of R&D funding by the Foundation for Science and Technology (FCT) by scientific field. More specific distribution of the FCT funding is available in the Annex.

Table 5.4 - Distribution of total FCT funding for R&D by field (2003-2005)

	2003	2004	2005
Biology and Biotechnology	16%	12%	12%
Engineering Sciences	22%	26%	25%
Health Sciences	15%	15%	16%
Earth and Space Sciences	3%	3%	4%
Marine and Environmental Sciences	7%	6%	7%
Exact Sciences	16%	18%	16%
Social Sciences and Humanities	21%	21%	20%
Total	100%	100%	100%

146. Table 5.5 presents R&D expenditure by sector of activity demonstrating the weak level of industry's contribution, with the state as responsible for over 70% of total expenditure.

Table 5.5 – Expenditure in R&D for each sector, constant prices<sup>1</sup> (1990-2001)

Sector	1990		1995		1999		2003	
	1 000 €	%	1 000 €	%	1 000 €	%	1 000 €	%
Industry	117 216	26.1	113 875	20.9	191 197	22.7	302 193	33.2
Government*	114 236	25.4	147 111	27.0	235 557	27.9	153 802	16.9
Higher Education	161 757	36.0	201 683	37.0	325 252	38.6	350 252	38.4
Private Non-Profit institutions**	55 723	12.4	81 733	15.0	90 958	10.8	105 219	11.5
Total	448 933	100.0	544 404	100.0	842 966	100.0	911 467	100.0

<sup>1</sup> GDP Implicit deflators (2000=1), Main Science and Technology Indicators, OECD, 2005(1) –

\*Excluding higher education. \*\*Many associated to universities. Source: OCES, Inquérito ao Potencial Científico e Tecnológico Nacional; OECD, Main Science and Technology Indicators, 2005(1) – Database

147. However, there are signs of progress as in the second half of the 1990's the number of companies' active in R&D doubled in Portugal. These companies no longer compete internationally with low salaries, but with more qualified human resources, R&D and innovation, marketing, design, training and quality, co-operating with S&T institutions. In spite of government supported programmes to encourage firms to hire PhDs, the number of PhDs working in industry remains very low as can be seen in Table 5.6.

Table 5.6 – Employment in knowledge-intensive service sectors (share of total employment, %) for EU<sub>15</sub>, Portugal and some selected countries

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EU <sub>15</sub>		6.33 <sup>s</sup>	6.29 <sup>s</sup>	6.24 <sup>s</sup>	6.32	6.29	6.28	6.17	6.07	5.89 <sup>s</sup>	5.7 <sup>s</sup>
Greece	2.13	2.12	2.08	2.01	2.21 <sup>b</sup>	2.000	1.97	1.99	1.91	1.75	2.05
Spain	4.79	4.67	4.61	4.84	4.92	4.85	4.78	4.92	4.87	4.55	4.34
Ireland	4.45	4.30	4.35	4.40	3.94 <sup>b</sup>	4.05	3.53	3.71	3.69	3.38	3.77
Finland		5.17	5.28	5.11	5.27	5.18	5.25	5.25	5.38	5.09	4.85
Portugal					3.14	3.17	3.14	3.05	2.91	2.87	3.08

s – EUROSURAT estimate f – Break in series Source: EUROSTAT, 2005)

Table 5.7 – Number of researchers with a PhD working in industry\*

Year	Number of PhDs
1995	41
1997	94
1999	104
2001	113
2003	189

\* includes those with equivalence to a PhD

Source: OCES, 2005

148. Table 5.8 presents the evolution of the total expenditure in R&D at constant and at current prices, as well as the GERD, showing a significant progress. It is also important to recall that higher education plays the more important share of the expenditure in R&D and, that most non-profit institutions are also associated to universities. Higher education represents almost 50% of total expenditure.

149. Comparatively with EU average, Portugal manifests certain shortcomings in R&D funding. In 2001 the government expenditure in EU countries amounted to around 56% of total R&D activities, while it represented 61% in Portugal. The private sector is in the leading position in the contribution to the R&D execution in most industrialised countries. Private expenditure in the European Union accounts for almost 64% of the overall expenditure whereas it represents only 32% in Portugal.

Table 5.8 – Total expenditure in R&D, 1982-2003

Year	Current prices	Constant prices <sup>1</sup>	t.m.c.a. <sup>2</sup>	PPCC <sup>3</sup>	GERD
	1 000 €	1 000 €	%	(Millions US\$)	%
1982	32 627.4	196 745.5	-	185.3	0.30
1984	56 402.1	218 927.1	5.5	222.4	0.34
1986	99 099.2	262 331.1	9.5	280.8	0.38
1988	149 194.4	322 691.9	10.9	367.1	0.41
1990	259 535.5	448 933.2	17.9	550.6	0.51
1992	401 022.5	565 400.6	12.2	734.2	0.61
1995	460 037.1	544 404.2	-1.3	753.5	0.57
1997	576 882.9	638 583.2	8.3	907.6	0.62
1999	814 746.7	842 966.2	14.9	1 255.1	0.75
2001	1 038 431.7	995 909.8	8.7	1 578.4	0.85
2003	1 019 581.0	911 467.1	-4.3	1 527.3	0.78

Notes: 1 GDP Implicit deflators (2000=1), Main Science and Technology Indicators, OECD, 2005(1) - Database; 2 Average yearly growth rate at constant prices; 3 PPPs at constant prices, OECD (*ibid*); 4 GDP values published by OECD (*ibid*).

150. Table 5.9 presents data on the personnel working in R&D activities from 1990 to 2003, indicating a significant increase in the number of researchers and in total R&D personnel.

Table 5.9 – Personnel working in R&D (1990-2003)

Type of personnel in R&D	1990	1995	1997	1999	2001	2003
Total researchers						
Headcount	12 675	18 690	22 355	28 375	31 146	35 855
FTE	7 736.3	11 599.2	13 642.3	15 751.6	17 725.1	20 242.0
FTE/Labour Force <sup>1</sup> (%)	1.6	2.4	2.8	3.0	3.3	3.7
Total personnel in R&D						
Headcount	18 953	25 024	29 413	36 872	39 163	44 036
FTE	12 042.6	15 465.3	18 034.8	20 805.7	22 969.6	25 529.4
FTE/Labour Force <sup>1</sup> (%)	2.4	3.3	3.7	4.0	4.3	4.7

1 Labour Force values published in OECD, Main Science and Technology Indicators, 2005(1) – Database Sources: OCES; Inquérito ao Potencial Científico e Tecnológico Nacional; OECD, Main Science and Technology Indicators, 2005(1) – Database

#### 5.4 The assessment of research

151. Quality assessment of research centres and their activity has been carried out by independent panels of international experts since the mid 1990s. It is generally recognised that these assessment exercises have played and continue to play a very important role in the development of the sector and have had a significant impact on the quality and productivity of research.



152. The implementation of this new model for funding and assessment of R&D units started in 1996, with the evaluation and assessment of all 270 research units existent at the time. International expert panels rated units in a five degrees scale from 'poor' to 'excellent', and made recommendations for strategic orientation, future investment and activity plans. Quality assessment takes into account research performance by international standards, including publications in international journals and patenting activity, where appropriate. Subsequent evaluations take into account the compliance to the recommendations and the good use of the previous funding, besides R&D performance, and publications. Following the assessment exercise, funding for units classified as Poor was discontinued. The remaining 257 units with classifications above "poor" received base funding per post-doc, with the level of funding based on the assessment.
153. The second assessment exercise was carried out in 1999-2000. It included the units assessed in 1996 and funded by the FCT under the Multi-year Funding Program for R&D Units, covering a total of 263 units and 4068 PhDs, and included new units created or the result of mergers of units assessed in 1996. The exercise involved 160 foreign scientists, organized in 21 separate panels, and included the analysis of reports and activity plans, as well as site visits to the research units.
154. The third assessment exercise took place in 2002-2004. It involved the research units financed through the Pluriannual Financing Programme of the FCT, including those resulting from the partition or merger of units previously evaluated. It focused on the activities carried out in the period 1999/01, as well as on the activity plans. One hundred and eighty international experts including some Portuguese experts working in foreign institutions made up the panels responsible for the evaluation.
155. The reports produced by the assessment panels and the units' replies are all made public through the Internet. Funding by the FCT continues to be based on the assessment evaluation and the rating attributed to the unit. These international evaluations have had a major structuring effect upon the research scene permitting visibility, openness, encouraging improvement and excellence which is then ensured through follow-up. This exercise has been generally well received by the research community.

### **5.5 Policies for Science and Technology and restructuring of the R&D Sector**

156. The Lisbon Strategy defined recommendations towards a European knowledge-based society that identified three complementary axes: to stimulate R&D and innovation; to promote and stimulate access and use of IT; to increase efforts on education and training. These three axes have oriented Portuguese policies on R&D and Innovation and Information and Communication Technologies, as can be seen through the funding instruments, namely POCTI (Operational Program for Science, Technology and Innovation) (2000-2006) and POSI (Operational Program for Information Society) (2000-2006).
157. Public funding objectives aim to increase R&D activities by investing in advanced training of human resources, by funding competitive based research projects, by strengthening R&D institutions and their internationalization.
158. Fellowship and scholarships for initial (graduate) and advanced (postgraduate: MA, PhD and Post-doc) training and start of scientific careers have been heavily financed and supported. Similar measures are contemplated for advanced human resource training and research targeted to ICT.
159. Project funding is dependent on team and project quality assessment by independent evaluation panels. Application for funding is opened yearly by the FCT for all fields and areas of

knowledge. Beneficiaries can be research teams in public or private institutions with R&D activities, and/or business enterprises in consortia with R&D institutions or engaging in integrated R&D programs. Since the aim is to develop the general science base, there is no thematic prioritization in the general funding programme. Project selection is based on project and team quality assessment.

160. Dedicated thematic programmes are also opened on issues of public interest (e.g. forest fires, marine science, ethnic minorities, protection of natural environments, drug addiction) and for participation in international R&D institutions of which Portugal is a member (EMBL, ESO, ESRF, ESA, CERN, ESO). Evaluation parameters and procedures are similar to those of the general programme. In the context of Information Society policy, new R&D programmes were set up under POSI (2000-2006), targeted at ICT and their use in social and economic context, and computational processing in Portuguese language.
161. An international evaluation of the state laboratories was also carried out. Its guidelines included: emphasis on public uses of R&D activities; better use of existing competencies and assimilation of new ones into the government laboratories, incorporation of post-doc and PhD scholarship students, promotion of stronger collaboration with university teams, and attraction of new and young PhDs. The reform program followed a principle of double funding. This means that funding has two components: base funding from the respective Ministry; and contract funding for R&D programmes negotiated on the basis of specific R&D mission projects and subject to regular evaluation.
162. The evaluation report of the State Laboratories (2000) identified a heterogeneous situation with a general need to strengthen links to society, especially to companies and industry. It also identified the need to associate their activities with important national priorities, including the need to foster institutional reform and to promote flexible institutions. In June 2006 the Government (Resolution n° 89/2006) defined the measures for the reform of the State Laboratories and established a period for public consultation.
163. The reform of the State Laboratories is a further step in the reform of the R&D system. Some of the measures include the change in juridical regime of the state labs to make them more flexible; clarification of the mission and reorganisation of the network to facilitate mergers and create and relocate R&D consortiums; creation of a new selection process of directors and introduction of a mobility programme.
164. The network of associated laboratories created by the Ministry of Science and Technology should play an important role. Through public competition R&D institutions with strategic orientations and missions considered of public utility contracted with the Ministry. The status of associated laboratory was conferred for a period of up to ten years, through a contract that specifies the amount of public funding and the missions that it is committed. These laboratories had an initial funding for five years that is extended to ten years after a positive evaluation.
165. At present, there are 21 associate laboratories involving 38 R&D institutions and units in Physics, Chemistry, Earth and Space Sciences, Marine Sciences, Geological Sciences, Health Sciences, Materials Sciences and Engineering, Chemical and Biotechnological Engineering, Electrical and Computational Engineering and Social Sciences. These laboratories include 41 research units, 2,200 researchers of which 1,452 hold a PhD and with funds totaling € 268 Million for the first 10 years.
166. An important infrastructure in the networking of R&D institutions has been the creation of a network (**RCTS**), linking universities and research centres, libraries and elementary and secondary schools by broadband. All linked institutions were provided sub-domains, e-mail accounts and space for web pages. The R&D network was developed under POSI 2000-2006. One of its developments is the creation of a Network Science and Technology Library

connecting all adherent institutions to common library resources online and to international databases. The first step towards the creation of this Science and Technology Library has already been taken through an agreement with the Institute for Scientific Information, making ISIs' databases available online to all Portuguese research institutions.

167. New policies to foster the public understanding of science and technology have been initiated. The *Ciência Viva* programme was introduced in the mid 1970s to encourage public understanding of science, to promote dissemination activities and support research in schools. The programme has been very successful. Technology development has been discussed throughout several disciplines and activity centred on the need to stimulate the active participation of society in questioning the future through scientific knowledge and continuous discovery and learning.
168. These policies have resulted in a continuous increase in the number of doctorates, especially when considering European and international figures, a fact that was systematically referred to by the generality of the evaluation panels as a decisive factor to guarantee the critical mass essential for scientific development. Table 5.10 shows that there has been considerable progress in this area.

Table 5.10 – PhDs awarded and recognised in Portugal

	1970-79	1980-89	1990	1991	1992	1993	1994	1995	1996
Portugal	293	1.247	250	223	245	378	319	432	459
Abroad	477	818	87	96	106	115	133	137	149
Total	770	2.065	337	319	351	493	452	569	608
	1997	1998	1999	2000	2001	2002	2003	2004	Total
Portugal	467	480	575	693	699	799	836	926	9 321
Abroad	120	236	196	161	206	175	174	142	3 528
Total	587	716	771	854	905	974	1 010	1 068	12 859

Sources: OCES: PhDs in Portugal, July 2005; Diário da República (II Série): Half-yearly list of recognised foreign PhDs; DGES: Registered PhDs awarded by the Florence European University Institute.

169. Progress is also visible at the level of scientific productivity. When analysing the effects of research internationalisation policies on the national R&D system, it is also worth mentioning the evolution of the Portuguese scientific publications by field of science between 1990 and 2002 (Figure 5.1) and total (Figure 5.2).

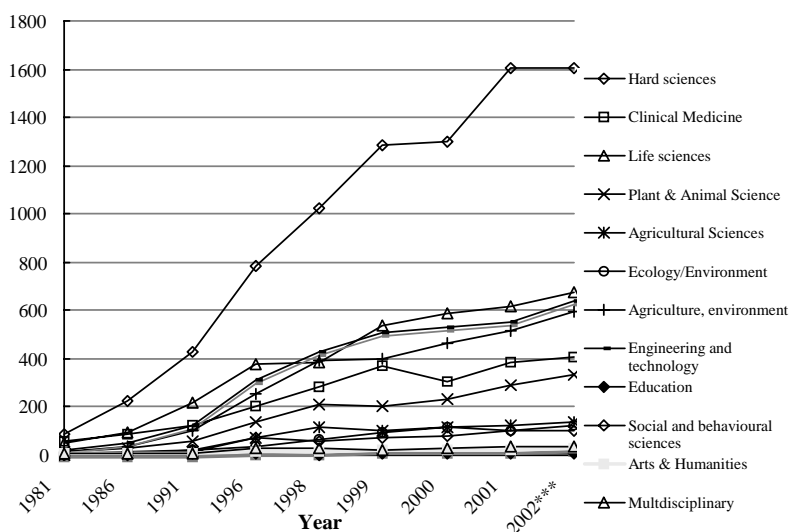


Figure 5.1 – Number of Portuguese scientific publications by field of study, 1990–02  
 \*\*\* Estimated values Source: OCES, 2005

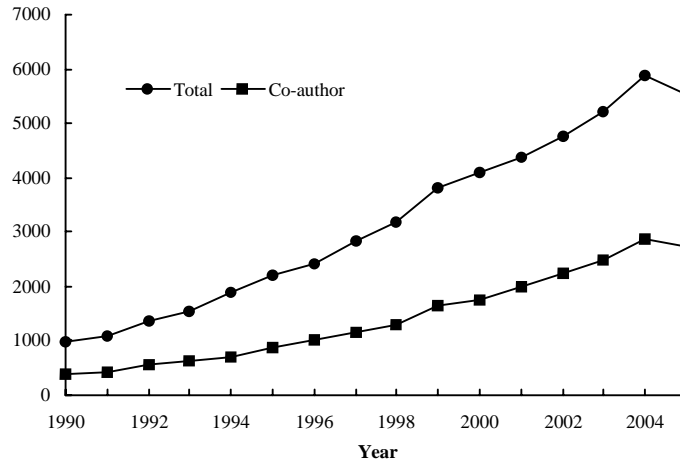


Figure 5.2 – Number of Portuguese scientific publications, 1990 to 2005

Source: OCES, 2006 Values obtained by fractional counting from the NCR – Institute for Scientific Information, National Citation Report 1981/2002; NSI – Institute for Scientific Information, National Science Indicators 1981/2002; 2002 – Provisional values Source: OCES, 2005

170. Figure 5.2 also presents the evolution trend of the total number of Portuguese scientific publications and of those publications in co-authorship with institutions of foreign countries. The major percentage of these publications (considering the total number of them since 1981 until 2001) is done with institutions from England, USA and France.

171. The growth of the research sector can be seen in the number of research collaborations at European level. The pie chart (Figure 5.3) indicates the relative strength of Portuguese participation in the 6<sup>th</sup> Framework Programme by scientific field.

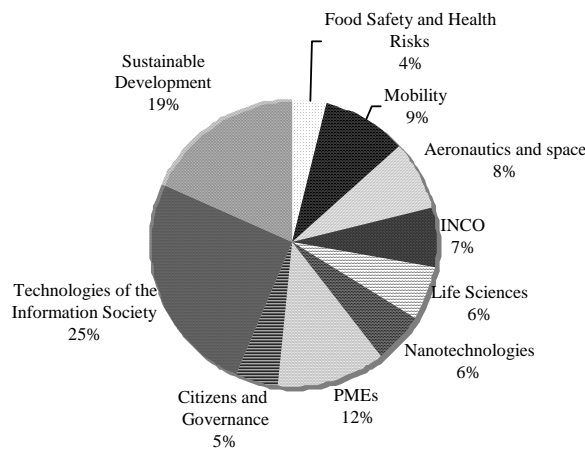


Figure 5.3 – Number of projects (%) with Portuguese participation in the EU 6<sup>th</sup> Framework Programme, by scientific area

## 5.6 The relationship between higher education and industry

172. Promoting links between university R&D units with industry has been difficult to establish due to the predominance of small and very small enterprises, which generally do not perform research.
173. Analysis has shown that there are two main, inter-linked sources of restrictions to the kind of financing R&D and innovative activities receive from the business sector in Portugal.
174. The first of these sources has to do with the relatively low levels of in-house R&D done by most Portuguese industrial firms, which are particularly small in size, as well as with their concentration in activities that are mostly into mature stages of their life cycles. The largest companies (namely in the energy, telecom, transports and construction sectors) invest small amounts of resources in R&D.
175. This leads to a second source of restrictions: since Portuguese firms are unable to absorb, and therefore finance the development of a large part of the R&D results generated by universities and research institutions, new firm start-ups and technology-based entrepreneurship need to assume a stronger role in introducing new innovations to the market, and creating jobs. While Portugal has a large proportion of SMEs, entrepreneurial activity (i.e. the proportion of people engaged in new firm start-ups) is relatively low, and concentrates mostly on micro-firms (less than 10 employees) that are unable to grow significantly.
176. Furthermore, as the industrial base in Portugal is mostly composed of small enterprises and many micro enterprises, this tends to correspond to quite low levels of education of many entrepreneurs. Expecting these firms to interface directly with Higher Education Institutions may not be very realistic, hence the need for go-betweens, represented by the Professional Technical Centres.
177. An additional point worth addressing is that many evaluation panels that visited Portugal noted that direct funding from industry was on a small scale, and that it has had no significant impact on the quality of research and has been used almost exclusively for short-term goals and for technological development. Examples of actions suggested by the evaluation panels include the establishment of: i) monitoring committees for research centres and state laboratories, to include representatives from the business world; ii) cooperation networks, supported by public funding; iii) exchange mechanisms for teachers, researchers and students.
178. Questions associated with the Portuguese private sector R&D deficit when analysed in the international context can be better understood through the analysis of a recent study developed in the United Kingdom (DTI 2004). This study identified the critical role of the great multinational corporations in Europe, as well as the importance of research and development activities for their success. Nevertheless, it is worth mentioning that whereas a medium-sized multinational in the north of Europe invest more than 6% of its turnover in R&D, one of the largest Portuguese companies (for instance, in the car component sector), with a turnover 10 times lower, invests around 3%. This results in a ratio of 1 to 20 in terms of resources – but only 1 to 2 in terms of turnover allocated to research and development activities. As multinationals have not moved to Portugal in a way that might have increased the private sector R&D there is a need to rethink the relationship of the university with the private sector in Portugal.
179. The Innovation Agency (AdI) was created in 1993, and then restructured in 2002 with a mission to address some of the missing links between university-based R&D and industry. Its activity was co-coordinated with S&T policy, and its mission was to provide support for consortia of business and R&D institutions, for innovative research and the promotion of R&D results for

economic benefit. The Innovation Agency has achieved some promising results. Both business and public funding for R&D activities in Portugal, taken as a proportion of the GDP, have grown, although not always steadily, since the mid-1980s. In the second half of the 1990's, the number of companies active in R&D doubled.

180. Among those programmes one should refer the following:

- Doctors and Masters in Companies and Technology Centres, aiming at encouraging firms to recruit human resources holding a doctoral or a master degree, in order to strengthen company's R&D, technological innovation and competitiveness.
- IDEIA Applied R&D in Companies, aimed at supporting cooperative R&D projects involving companies and S&T organisations, in order to develop new products, process or services. The programme gives special emphasis on product innovation.
- Centres of Excellence – Competence building making use of ICT – is a programme aimed at supporting networking of companies, research centres, Universities, Polytechnic Institutes, Public bodies and business associations. The main goals are the following:
  - Encouraging the linkages between companies, research centres, high education and universities to develop networks
  - Promote the development of new and better services and new technologies
  - Orientate sector and regional S&T development toward key areas
  - Contribute to improve education curricula
- Support to the Creation of New Technology Infrastructures, a measure aimed at promoting the technological infrastructure in private and public organizations, by strengthening their scientific potential. Among these organizations are interface institutions linking University to industry. This measure also promotes new technology-based companies.
- NEST New Technology Based Companies, to provide financial support for the creation, launching and development of technology-based firms that have a close relationship with domestic S&T organisations and/or are expected to reach a high level of technological capacity.
- The NEOTEC Initiative is concerned with providing seed capital for the creation of new technology-based firms, by supporting them in the different stages, from the identification of market potential to the commercialisation. Its aims include encouraging the carrying out of research activities and the exploitation of its results and stimulating entrepreneurship and an innovation culture.

181. The protection of intellectual property rights is still an issue as difficulties persist in implementing intellectual property protection mechanisms as a way to promote scientific impact and ensure institutional integrity of the R&D units and the university. The main obstacle identified is a deficit in administrative competencies and technology commercialization. But it is above all related to the problem in encouraging and defining market strategies and connections with large companies that help launch new technology-based companies.

182. The Industrial Property Support Offices (GAPI) initiative is aimed at launching small units specialised on the provision of information and on the development of actions concerning the promotion of industrial property. The institutions responsible for this programme are together with the host of the GAPI, namely Universities, Technological Centres, Employers Associations and S&T Parks.

183. Figure 5.4 presents the results (accumulated values) of the programme “Doctors and Masters in Companies and Technology Centres” which is contributing to increase the number of people with a postgraduate degree in industry.

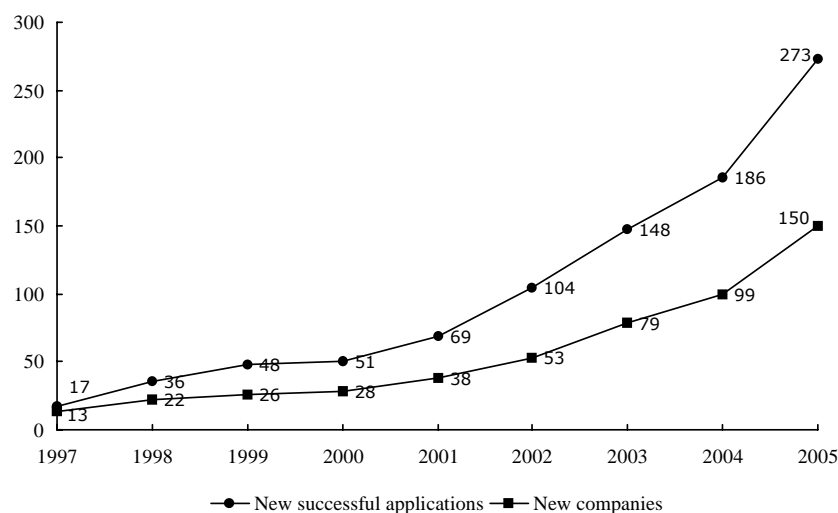


Figure 5.4 – Number of successful applications and of new companies in the programme “Doctors and Masters in Companies and Technological Centres”. Source: AdI, 2006

## 5.7 Final comments

184. The European process of integration and the government policies directly addressing the S&T system, especially in the second half of the nineties, can help explain some of the recent development of the Portuguese system. In spite of the registered progress, late development characterises Portuguese S&T development at the end of the twentieth century, in comparison with its European counterparts.
185. The Portuguese R&D context reveals fast progress and development in some areas and some weaknesses and shortcomings in other areas. The data show the increase in the national scientific community but weaknesses remain in terms of meeting advanced training needs. The rapid increase in the number of researchers in Portugal has been linked to the implementation of specific programmes. The CIÊNCIA programme in the beginning of the nineties and later on to the programme of advanced training scholarships sponsored by the Foundation for Science and Technology were responsible for the increase in the number of PhDs.
186. The average funding per researcher in Portugal is still one third of the European average in the beginning of the twenty first century, even considering Europe as a 25-nation bloc. In 2002 the Portuguese overall R&D funding per inhabitant was barely 39% of the respective EU-25 average (and only around 74% in comparison with Spain). In terms of number of researchers (FTE) per 1000 labour force Portugal compares better, holding 67% of the EU-25 average value. However, in 2003, the number of researchers (FTE) in terms of the active population was still below the European average (3.7 and 4.9, respectively for every thousand inhabitants).
187. The implementation of the international peer reviewed assessment of R&D units allowed an examination of the scientific performance of the country beyond (or “inside”) averages, revealing the existence of excellent scientific performance across a large array of disciplines.
188. In conclusion, the strategic responsibility of the Ministry of Science, Technology and Higher Education is to ensure the achievement of the objectives of the national policy for Science and Technology, keeping with a perspective of consolidation, growth, sustainability and the

international affirmation of the skills and capacities of the Portuguese scientific and technological community.



## 6. ACHIEVING EQUITY IN AND THROUGH TERTIARY EDUCATION

189. The purpose of this chapter is to identify the policies through which the higher education system helps advance national equity objectives and to provide evidence on the link between the system and equity goals. It starts with a description of the socio-economic origins of the student body, followed by enrolment in different sub-sectors of higher education. The costs and expenditures of higher education are examined, followed by the presentation of the existing social support system.

### 6.1 The socio-economic origins of the students

190. Until the 1970s enrolments were low, the number of candidates being restricted by the low literacy levels of the population. Those few students graduating from secondary education and struggling to remain in the system faced adversity, as families were unwilling or unable to invest in their children's education and employment opportunities for highly skilled labour were rare due to the low technological level of the economic system.

191. The expansion of higher education began during the 1960s associated with economic transformations. Throughout this period there was an acceleration of economic growth and increasing pressure for liberalisation of the Portuguese economy, which was largely used to mitigate forms of excessive capitalist competition. It was also the product of the emergence of a younger generation of politicians favouring industrialisation and a modernising agenda to replace traditional conservatism. Those changes unleashed an expansion of higher education that would raise the expectations of the population, eventually challenging the system's elitist nature.

192. The student population in the 1960s had a high proportion of students whose father had a higher education degree, or at least some secondary education. Bearing in mind the low levels of literacy of the overall population this shows remarkable over-representation of those groups with higher cultural capital and an under-representation of those from more deprived backgrounds. In the following decades this picture changed, with increasing access for students from families with limited qualifications. However, the families with formal qualifications well above the average still retained their traditional prominence.

193. The changes in the social composition of the student population were not homogeneous across the sub-sectors (see table 6.1). Differences persist although there has been improvement in the last years as access and enrolment in higher education increased.

Table 6.1 – Distribution of enrolments by level of schooling of the households (%)

Level	63/64	91/92	1997				2004			
			Public univer.	Public polytech.	Private	Total	Public univers.	Public polytech.	Private	Total
Illiterate/	35.2	25.3	39.3	53.3	47.2	45.0	30.0	50.0	27.2	34.9
Secondary	27.4	19.2	35.7	36.3	34.4	35.4	29.2	29.6	29.4	29.4
Voc. degree	8.7	8.1				6.5	–	–	–	–
Higher	27.5	18.1	24.7	10.4	18.3	13.1	40.8	20.4	43.4	35.7
Other/NA	1.2	27.1					–	–	–	–

a – level of schooling of the parent with highest income

Source: Vieira 1995; CNASES 1997; Martins et al., CIES-ISCTE, 2005

194. The analysis of enrolments by level of income mostly confirms the influence of social and cultural capital on enrolment patterns (see table 6.2). Public polytechnics are more socially

inclusive than public universities. In terms of the students' economic level there are no major differences between public universities and private institutions.

Table 6.2 – Enrolments by level of household income, 2004

Household income €	Public university %	Public polytechnic %	Private institution %	Total %
Less than 720	13.6	20.1	11.2	14.8
721–1440	28.5	38.8	26.0	30.7
1441–2160	21.6	22.2	19.3	21.1
2161–2880	15.2	10.9	16.9	14.5
More than 2880	21.1	8.0	26.6	18.9

Source: Martins *et al*, CIES, ISCTE, 2005

195. There are indications of a relationship between the social, economic and cultural characteristics of university students and their study programmes (see Table 6.3), enrolments showing a socio-economic pattern. Students from working class families enrol mainly in study programmes from humanities (24.6%), engineering (23.4%) and sciences (14.9%), with low enrolments in areas such as architecture (0.9%), medical sciences (1.2%), psychology and education sciences (1.5%) or pharmacy (1.8%).

Table 6.3 – Socio-economic origin of students by field of study (1995)

Class	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	Total
Upper & Middle-Upper	11.5	32.2	18.7	19.2	19.7	33.4	33.3	22.6	38.5	23.4	28.6	29.0	22.9
Middle & Low middle	58.2	46.5	68.8	58.0	54.6	47.3	61.9	63.0	59.0	54.5	50.4	60.9	54.5
Working Class	20.8	13.1	9.4	16.7	18.5	8.3	2.4	11.3	0.0	13.9	14.6	5.3	15.4
NA	9.6	8.2	3.1	5.9	7.1	11.1	2.4	3.2	2.6	8.2	6.4	7.9	7.2

Cabrito, 2002. A1-Humanities; A2-Juridical Sciences/Law; A3-Psychology and Education Sciences; A4-Sciences; A5-Engineering; A6-Pharmaceutical Sciences; A7-Medical Sciences; A8-Earth Sciences; A9-Architecture; A10-Social Sciences; A11-Economic and Management Sciences; A12-Sport Sciences.

## 6.2 Students' social support system

196. The Portuguese higher education student support system was set up to mitigate the economic difficulties faced by students from disadvantaged social backgrounds. This is particularly important since the last decade was characterised by increasing cost-sharing both by raising the level of tuition fees in public institutions and by expanding full-cost fee private institutions.
197. Table 6.4 quantifies the type of expenses supported through the overall budget devoted to social support services and shows that direct student support through scholarships accounts only for about 53% of the overall budget. The new funding methodology adopted in 2006 aims to increase that value by increasing those services that maximize direct support to students.

Table 6.4 - Allocation of the state budget for social support services in 2006

Type of Expenses	Funding (€)	% / Total
1. Current Expenses	108.686.100	85,1%
(a) Personnel	33.800.172	26,5%
(a) Student Grants	67.788.505	53,1%
(b) Other Expenses	7.097.423	5,6%
2. Capital Expenses	104.000	0,1%
3. Nursing and Health Technologies Schools	3.280.681	2,6%
4. Common Endowments	15.639.319	12,2%
<b>Total Funding to Public Institutions (1+2+3+4)</b>	<b>127.710.100</b>	<b>100,0%</b>

198. Public expenditure in education increased from 1.5 % of the GDP in 1974 to 4.0% in 1988 and 5.5% of the GDP in 2001. From 1988 to 2001, public expenditure in education and higher education increased from 0.46% to 1.13% of the GDP. The expenditure in students' social support increased faster than the expenditure in higher education, the latter increasing also faster than the expenditure in education (in 2001 higher education represented about 20% of the public expenditure with education).

199. About 24% of higher education students receive direct public support in the form of a grant. Figure 6.1, indicates that this represents a fraction similar to that in Spain and Germany and considerably higher than that of Italy, but still significantly smaller than those of northern European countries. Portuguese grants are provided through the system of social support operating at full expenses.

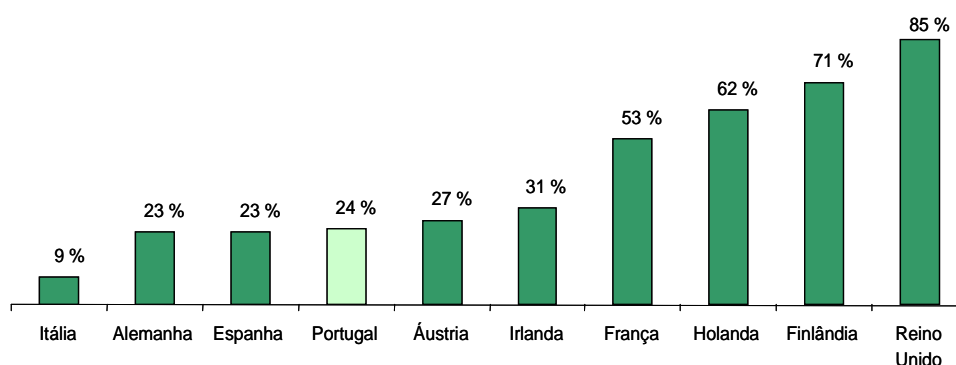


Figure 6.1 Overall percentages of students receiving direct public support, 2004

Source: CIES-ISCTE, EUROSTUDENT 2005

200. Public universities have a higher percentage of their students with grants when compared to students from public polytechnics and private institutions (Figure 6.2). However, the tendency is for convergence to a more equitable distribution, eliminating the distortion in the public social support for each sub-system (public and private, university and polytechnic).

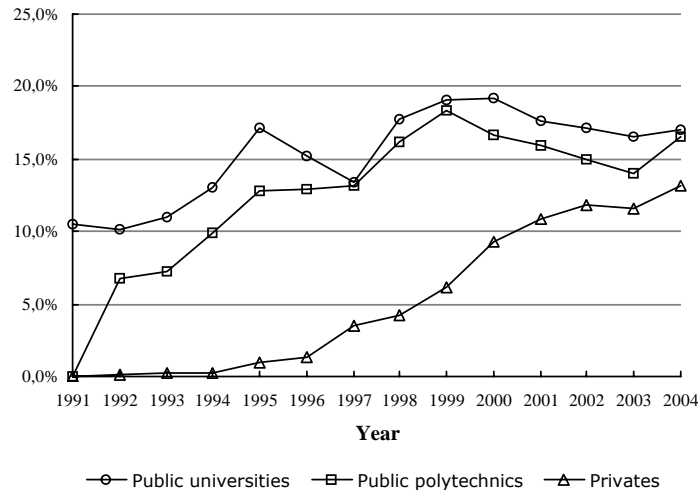


Figure 6.2 – Percentage of students with grants in public universities, public polytechnics and private institutions (Source: DEPGEF, FAE, DGE SUP and DSAT).

201. To overcome the differences between the private and the public sub-systems, the government extended the grant system to the private sub-sector in 1997 but with an extra allowance to compensate for the higher fees in the private sector. Nevertheless, a limit was established to the amount awarded for tuition fees, to deter private institutions from excessively increasing their fees.
202. Throughout the 1990's the inherent bias of social support to the different subsystems was significantly reduced. In 1990, private institutions enrolled 29% of students and benefited with 3% of the social support; in 2001 the private sector continued to host 29% students enrolled in higher education but now obtained 22% of public social support.
203. Nevertheless there are still significant differences between the public and the private sub-systems. Grants have become on average higher for students enrolled in the private sector, and that explains why the budget for the private sector already exceeds the budget for public polytechnics. Many students in the public sector receive a grant equal to the fee they have to pay, which explains the low average annual values of grants in public universities and polytechnics.
204. Student social support in private higher education is almost limited to grants (mainly helping to pay tuition fees), while public higher education students benefit from other schemes, such as subsidised meals, housing, and sport activities.

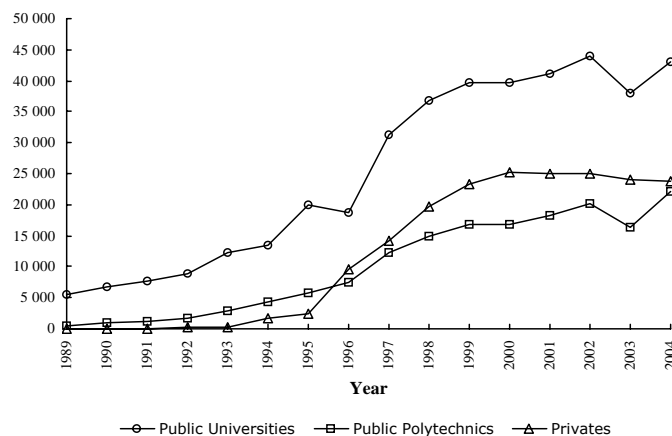


Figure 6.3 – Total expenditure in student support per sub-system (DGES 2005)

Table 6.5 – Average annual values of grants (€)

Year	Public education		Private education
	Public universities	Public polytechnics	Private institutions
1997	1 580	1 441	3 334
1998	1 373	1 265	3 829
1999	1 335	1 147	3 218
2000	1279	1121	2281
2001	1387	1118	2003
2002	1491	1129	1892
2003	1329	1028	1878
2004	1481	1201	1698

(Sources: DGES, 2005).

205. The public budget for student social support was raised at a slightly higher rate than higher education total expenses; in 1990 it represented 9.5% of the expenses and in 2004 about 11%.
206. In 1997, 88.6 M€ were invested in social support, of which half was attributed in scholarships (44.8M€). In 2002 social support expenses totalled 146.6M€ with about 96.8M€ for scholarships in higher education. Private institutions also had their social support contribution increased (scholarship grants) from 13.6M€ in 1997, to 27M€ in 2005.
207. Examining the expenses of social support by specific activities reveals some interesting developments. In 1997, 33.5M€ of the social support services within universities and 5.0M€ within polytechnics went for lodging and food expenses. In 2005 the same actions represented 32M€ for universities and 9.5M€ for polytechnics. The social support for lodging and food has remained stable or slightly decreasing for universities and almost doubled for polytechnics.
208. The ratio of financing per student in public higher education was, in 2005, of 447€, without taking into account the investment in infrastructures, that is, taking into account the public budget financing in social support just for current expenses.
209. There have been substantial differences in the attribution process of grants, which currently is made in two ways: by the public social support services of each university and polytechnic regarding their own students; and by the Directorate General for Higher Education through the Social Support Fund regarding all students in non public institutions. These two methods have showed some discrepancies in the application of the rules and technical procedures, not only between systems, but mainly between subsystems. In public higher education, in 2005, the variation between student population and scholarship had a range of 38% to 12% between institutions. Approval rates of candidates range from 87% to 63%. In private higher education the national average approval rate is 64% for 2005- 2006.
210. Also an adjustment would be desirable in the distribution of scholarships in per capita intervals; in 2005 the number of students with scholarships in the first interval is about 1% of the total grants while in the last interval there's about 40% of the total scholarships awarded.
211. Private higher education registered an almost residual number – 213 students with grants (to cover tuition fees) in 1993. Ten years later in 2005 – 2006 the number of grants attributed in the private sector had risen to 13.180 scholarships. Contrasting the private to the public higher education institutions for the same period we find significantly higher numbers of grants attributed. In public higher education there were, in 1993, 16.452 scholarship grants, 10 years

later that number more than doubled, and today there are more than 52.000 students with scholarship. This corresponds to 16.4% of the student population in 1993 and about 25% in 2005.

212. Regarding social support infrastructures the investment is also significant - from 7.922 beds in 1998 provided by social support services facilities to 13.309 in 2005. Moreover, a forecast of 16.103 beds until the end of 2006 is expected. In average, maintenance of each bed costs the State 164€ per month.
213. The number of meals in student supported canteens has risen from 23.540 in 1998 to 37.708 in 2005, resulting in more than 11 million meals served a year. Each meals costs, on average, 4.6€ for which the State contributes with an average amount of 2.7€ and the students pay 1.9€.

#### 6.4 The characterisation of grant-holders

214. Student mobility in Portugal is rather low and the percentage of students living with parents remains high (Table 6.6). In a similar way, occupancy of student residences covers only about 4% of the overall population in higher education and, therefore, is still comparatively lower than in most European countries (Figure 6.4).

Table 6.6 – The residence of higher education students

Students	Age groups			
	< 20 years old	20-23 years old	24-27 years old	>28 years old
Parents/relatives	56.6%	59.0%	51.0%	25.8%
Own house/apartment	5.7%	7.3%	12.9%	53.3%
Rented house/apartment	16.8%	15.4%	14.4%	11.6%
Individual rented room	11.9%	12.2%	14.6%	5.8%
Shared rented room	3.7%	2.4%	3.3%	1,2%
Student residence	5.3%	3.7%	3.8%	2,3%

Source: CES-ISCTE, Eurostudent, 2004.

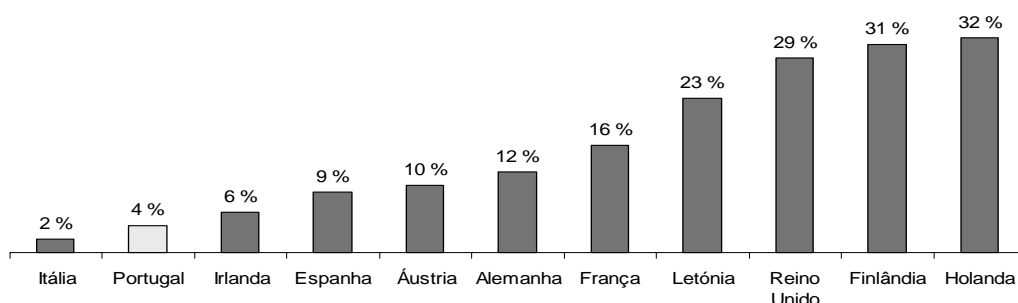


Figure 6.4 Overall percentages of students staying at student residences, 2004

Source: CIES-ISCTE, Eurostudent 2005

215. Grants are means-tested, depending on the families' *per capita* income. Table 6.7 presents the monthly income of students receiving grants, where one can see that 3.4% of the grant-holders belong to families with a monthly income above € 2,880, and 33% have an income below € 720.

Table 6.7 – Parents' net monthly income of students receiving grants (€)

<b>Income</b>	<b>%</b>
< 720 €	32.9%
721 € – 1440 €	47.1%
1441 € – 2160 €	11.6%
2161 € – 2880 €	5.0%
> 2880 €	3.4%
<b>Total</b>	<b>100.0%</b>

Source: CIES-ISCTE, Eurostudent, 2004

216. Table 6.8 characterises the families of grant-holders in terms of their socio-professional category and level of educational attainment. It reveals that 73.5% of grant-holders' families have completed basic education, whereas 7.5% of grant-holders belong to families of "entrepreneurs, top management and liberal professionals" and 20.3% belong to families of "executives and specialised professionals".

Table 6.8 – Characterisation of the parents of undergraduate students with grants

<b>Household of origin</b>	<b>%</b>
<b>Socio-professional categories</b>	
Entrepreneurs, top management, liberal professionals	7.5
Executives and specialised professionals	20.3
Independent workers	8.2
Independent workers, > 1 activity	7.2
Administrative employees	17.0
Blue collar workers	21.2
Salaried workers, > 1 activity	18.6
<b>Total</b>	<b>100.0</b>
<b>Education</b>	
Not more than basic education	73.5
Upper secondary education	13.8
Tertiary education	12.7
<b>Total</b>	<b>100.0</b>

Source: CIES-ISCTE, Eurostudent, 2004

## 6.5 The private costs of higher education

217. The Eurostudent Report (2004) provides a wealth of comparative data on family expenses with higher education.
218. Table 6.9 shows that there is a significant contribution from both families and students to the costs of attending higher education at undergraduate level. Some 15.5% of all undergraduates contribute to the costs of higher education through their work revenues. For post-graduate education the annual expenditure is much higher than for undergraduate studies and the contribution from the state, although more generous in absolute terms, maintains its proportion

of the total costs, while the percentage of students contributing with their work revenues increases very substantially to over 70%.

Table 6.9 – Sources of income (monthly average in € and in %)

Sources of income*	€	%
<b>All students</b>		
Family (money)	337	85.3
Family (intangibles)**	251	61.4
State	195	24.3
Work	625	18.1
Others	263	4.1
<b>Undergraduate studies</b>		
Family (money)	320	87.7
Family (intangibles)	250	62.8
State	155	24.4
Work	490	15.5
Others	214	4.0
<b>Post-graduate studies</b>		
Family (money)	1 173	37.1
Family (intangibles)	299	32.2
State	1 055	22.4
Work	1 213	70.6
Others	822	7.0

\* The calculated average only takes into account students with income from this source. The percentages refer to the proportion of students who in each sub-group state that they receive money from that source.

\*\* Intangible income refers to transfers in kind or direct payments made by their parents

Source: CIES-ISCTE, Eurostudent, 2004

219. Tables 6.10 and 6.11 present the monthly average expenditures of students with different items taking into account the type of accommodation (Table 6.10) and the type of institution (Table 6.11). Accommodation is the most relevant item in the expenditures' list and varies from zero for students living with their parents to an average of € 296 for those living in rented rooms, apartments or houses.



Table 6.10 – Expenditure items and monthly average costs by type of accommodation

Monthly expenses*	All students		Type of accommodation							
			Parents' home		Own or rented		Rented room		Student	
	€	%	€	%	€	%	€	%	€	%
Accommodation**	252	89.6	–	–	296	87.3	201	98.8	142	71.3
Food	108	89.1	85	81.4	146	91.4	110	93.9	116	93.9
Clothes/hygiene	68	72.0	67	62.9	81	76.4	52	79.3	47	84.3
Payments to	147	55.4	154	51.1	158	57.5	123	52.0	81	66.1
Study	54	83.4	54	76.5	59	84.1	49	88.1	49	89.6
Transport	59	82.5	59	78.0	66	81.3	51	84.1	39	86.1
Computers/Internet	41	43.7	46	41.8	40	45.7	31	38.9	24	33.9
Other expenses**	179	56.4	68	24.8	195	51.0	123	56.2	145	49.6
Total	575	97.0	430	95.8	720	97.5	521	100.0	472	99.1

\* The calculation of the average only takes into account students with income from this source. The percentages refer to the proportion of students who in each sub-group state that they receive money from that source.

\*\* Including intangible income, this refers to transfers in kind or direct payments made by their parents. Source: CIES-ISCTE, Eurostudent, 2004

220. Table 6.11 shows that students in private institutions spend more, in absolute terms, than their colleagues in public institutions. The major difference is the significantly higher tuition fees paid to private institutions. Among public institutions, students from polytechnics spend less than those from universities, which is consistent with public polytechnics as more socially inclusive than universities. The item “other expenses” also presents a significant difference between types of institutions. It is higher for students enrolled in private institutions as these are more concentrated in Porto and Lisbon where living costs are higher.

Table 6.11 – Expenditure items and monthly average by educational sector

Total monthly expenditure <sup>1</sup>	All students		Public universities		Public polytechnics		Private	
	€	%	€	%	€	%	€	%
Accommodation	190	28.3	199	31.6	161	31.8	212	19.7
Accommodation <sup>2</sup>	216	53.7	201	56.4	181	50.6	317	5.0
Food	108	86.4	115	88.6	92	88.1	112	81.4
Clothes/hygiene	68	69.8	69	68.8	56	72.7	78	68.6
Tuition fees	147	53.7	102	52.3	68	51.9	283	57.9
Study	54	80.9	52	82.5	40	83.5	75	75.8
Transport	59	80.0	57	81.4	57	80.8	65	77.0
Computers/Internet	41	42.4	37	43.4	30	42.6	61	40.6
Other expenses <sup>3</sup>	179	54.7	157	53.0	107	57.6	291	54.4
Total <sup>4</sup>	495	97.0	465	97.5	370	62.2	672	95.2

<sup>1</sup> The calculation of the average only takes into account students with monthly expenditure for the item. The percentages refer to the proportion of students who in each sub-group state that they made expenses on that item in relation to the total number of students in the same sub-group.

<sup>2</sup> Intangibles, corresponding only to values declared by students not living with their parents; percentage of students with this type of expenditure in relation to the total of those living independently in each sub-group. <sup>3</sup> Including intangibles. <sup>4</sup> The average figures for total expenditure on each sub-group do not include payments made directly by the family for accommodation and associated services. Source: CIES-ISCTE, Eurostudent, 2004.

221. The rather small percentage of students that mention expenditure with “accommodation” (31.6% for public universities, 31.8% for public polytechnics and only 19.7% for privates) confirms that most students live with their family and that mobility is low. The lower value for

the private institutions is consistent with the idea that their student body is localised, as students will tend to not add the higher costs of the private tuition fees to the costs of travel to and accommodation in another city.

222. Despite the evolution of the student support system in the last decade it is still a system with a rather limited impact in promoting equity in higher education. Recent data confirm that the pattern has not changed significantly. The structure of income of Portuguese higher education students remains largely the same. Their main source of support continues to be overwhelmingly the family, which provides almost three-quarters of their total income. The financial support provided by the state remains very limited. The main change seems to be growing relevance of student income and its relative importance is on average more than double the state support.

### **6.6 Loans and grants**

223. There is a legal framework for student loans but such a system has yet to be implemented through the approval of legal regulations and funding. Some students have obtained loans on the available commercial banking system but their number is extremely limited. The available data lists only 397 students having bank loans for studying in higher education, 318 of them for undergraduate studies (0.6% of total enrolment) and 79 for post-graduate studies (1.3% of total enrolment).
224. The main questions associated with a generalised loan service have been discussed extensively by the Government, and will require a large public investment to be made before the system attains equilibrium. A universal loan system will require a public investment that is hardly compatible with the EU rules on public budget deficits. A loan system for 100 000 students with an individual debt limit of € 20,000 and repayable in 15 years would represent a public investment of almost 1.7% of the GDP before equilibrium is attained. At present the government is to analyse the possibility of creating a limited loan system on an experimental basis.

### **6.7 Concluding remarks**

225. Data has provided the general characteristics in the social make-up of the student population and some information on the particular difficulties faced by certain groups in entering and completing their studies. More information is needed on the success or failure in narrowing the equity-gap between social groups as social discrepancies continue to limit the opportunities of higher education.
226. The efficiency of the system of student support requires further attention and improvement in dealing with cases of exclusion and assessing the equity of its procedures. Higher education institutions need to pay further attention to post-secondary courses and life long learning.
227. The objectives of increasing access to higher education and widening the scope of State intervention in the area of information and knowledge society has been defined as a government priority.
228. Women are the majority of students and graduates in all sub-systems of Portuguese higher education. In 2004 they represented 55.8% of all the registered Portuguese higher education students. Feminisation of the student population has significantly contributed to increase enrolment rates.
229. The establishment of virtual campuses in institutions of higher education and the promotion of the involvement of teachers and students has been encouraged. This includes the development

of tools for distant collaboration and bilingual education to encourage the networking between national and international institutions. Moreover, policies have been promoting the development and use of ICT for citizens with special needs.

230. Admitting more working students and facilitating part-time study is part of the policy of promoting access and equal opportunities. To this effect, the government has reduced the age criteria for adults who had not completed secondary education and sought to enter higher education from 25 to 23 years (Comprehensive Law of the Educational System, August 2005). The impact of this measure is expected to be considerable. The number of new entries to higher education for 2006 is expected to be over four thousand new students.

Table 6.12 - Predicted number of new entries (over 23 years) in Higher Education for 2006-2007

	Predicted Number of Students over 23 in 2006-2007
<b>TOTAL</b>	<b>4 388</b>
<b>UNIVERSITIES</b>	<b>1 182</b>
<b>POLYTECHNICS</b>	<b>3 206</b>

231. Encouragement has been given to higher education institutions to expand post-secondary education, from the perspective of promoting cooperation between the secondary school system and higher levels of education and accreditation, and for promoting further studies through training provided by post-graduate specialisation courses.
232. So far, continuing education has not yet been organised on a widespread scale, and little has been developed in the way of structures or mechanisms to fulfil this objective. In particular, analysis has shown that higher education institutions, including public polytechnics and universities, have not yet focused their attention to post-secondary education. It is possible that the difficulties created by the declining number of traditional students will force institutions to assume an increasing role in the 'less traditional' educational market, including continuing education.

Table 6.13 – Number of people participating in education and training activities

Year	Number of people			Years of formal schooling					
	Total	Men	Women	< 4 years	4 years	6 years	9 years	12 years	>12
2000	<b>43 260</b>	22 877	20 383						
2001	<b>35 765</b>	19 094	16 671						
2002	<b>37 652</b>	20 633	17 019						
2003	<b>50 802</b>	27 077	22 276						
2004	<b>55 520</b>	30 275	25 245	206	4 498	10 248	16 836	12 352	11 380
August 2005	<b>34 917</b>	19 403	15 514	46	2 962	6 780	10 975	7 398	6 756

Source: Ministry of Work and Social Solidarity, 2005

233. Most of the activities oriented towards continuing education and lifelong learning were to a large extent the results of expectations or demands from the European Union. In this respect too, Portugal's entry to the European Community in 1986 can be seen as a turning point in the country's participation in lifelong learning, mainly as a result of activities developed with support from the European Social Fund (ESF). This has become the main source of finance for

training systems, and indeed the main inspiration behind the organisation of national training policies. In addition to European resources, national programmes, private companies and the students themselves have also financed continuing education, but up to now, all of these latter resources have played a less visible role.

234. Table 6.14 shows that “Technological Specialisation Courses” - CET offered through higher education institutions, supported by the Ministry of Science, Technology and Higher Education, have involved only 1302 students in 2005. These CETs were offered by 13 public and 8 private institutions of higher education and represent only 24% of the total number of programmes. The forecast of student enrolment in CET courses for 2006 is expected to be over five thousand students.

Table 6.14 – Number of students enrolled in "Technological Specialisation Programmes", CET's, publicly funded through MCTES in 2005

Type of courses	
Computer Applications to Management	79
Automation, Robotics and Industrial Control	14
Building Work Management	50
Irrigated Cultures	25
Project and Design of Mechanical Constructions/ moulds	59
Development of Multimedia Products	149
Design of footwear and morocco	10
Furniture Design	20
Documentation and Information	15
Electronics and Telecommunications	20
Automatic Manufacture – Design an Manufacture of metal-mechanic products	27
Quality Management	25
Management of Tourist Activity	46
Network Management	36
Installation and Maintenance of Computer Networks and Systems	162
Industrial Maintenance	20
Work Organization and Planning	59
Mechanic Production	20
Food Quality	63
Environment Quality	55
Industrial Chemistry	14
Social service and Community Development	54
Tourism Management Techniques	20
Hotel Management Techniques	36
Food Technology	23
Mechatronics Technology	36
Information Systems Technologies and Programming	123
Telecommunications and networks	42
Total	1302

Source: MCTES, 2006

235. Both the increase in enrolment resulting from new admissions of those over 23 year old and those attracted to the CET courses for the next academic year (2006-2007) reveal the importance of orienting access policies towards new publics. These policies present a possible route for attracting new publics to higher education and to addressing equity issues.

## 7. RESOURCING THE TERTIARY EDUCATION SYSTEM

### 7.1 The public university and polytechnic academic staff

236. There are two distinct career paths for public university and public polytechnic academic staff. The systems were created under different circumstances and the career structures differ.
237. The public university career follows a five stage progression – Teaching assistant (assistente estagiário), Assistant (assistente), Auxiliary professor (professor auxiliar), Associate professor (professor associado), and Full professor (professor catedrático). The PhD is the basic academic requirement in the university system.
238. Career advancement within the university system is regulated by law (Decreto-lei nº 448/79; D-L nº 19/80; D-L nº 381/85; D-L nº 370/86; D-L nº 392/86; D-L nº 392/86) and the rights and responsibilities are defined and detailed for each category, as are the recruitment processes and promotion requirements.
239. The polytechnic system was created in the early 1980s and the rules that govern the polytechnic staff were created by Decree 185/81. The academic career of the polytechnic staff follows a three stage progression: Assistant (assistente) with 2 levels, Adjunct professor (professor adjunto) and Co-ordinating professor (professor coordenador). An adjunct professor at the polytechnic institute is required to have completed some post-graduate studies or a Masters degree and to have at least three years teaching experience. A PhD degree is not essential in the polytechnic system.
240. Academic staffs in public universities and public polytechnics are civil servants. Civil servants have their salary levels collectively set and never individually negotiated. Financial incentives or benefits such as bonuses are not available. Reward systems are quiescent and competition reduced to limited promotion opportunities at the higher levels of the career structure. To become a tenured faculty it is necessary to be hired in the academic career, to hold a PhD degree (universities) or a master degree (polytechnics), and to have some professional activity (usually 5 years) in teaching and research activities.
241. Polytechnic teachers have more hourly teaching requirements (9 to 12 hours a week) than university staff (6 to 9 hours a week), and there are no transferability schemes between sub-systems for the academic staff. Students, however, can transfer from one sub-system to the other. Much discussion has taken place on whether the two distinct career paths should be maintained or a single career structure should be implemented.
242. The number of academic staff in universities and in polytechnics holding a PhD has been steadily increasing. Between 1993 and 2004 the number of PhD holders increased by 126% while the percentage of PhDs in the academia increased from 32.3% to 58.1% in the same time period. Much of the growth in PhDs has been the result of “in-house” training programmes and resulted in in-breeding. A study of the two main engineering schools in Lisbon and Porto revealed in-breeding rates of between 60 and 80% at the Assistant Professor level between 1990 and 2003. In-breeding does not allow for structural change, nor does it allow new approaches to scientific research and educational problems. The in-breeding phenomenon raises numerous questions about the need to promote mobility of researchers and professors, as well as the need to rethink doctoral and post-doctoral programmes, and how to expand the recruitment base.
243. The qualification of the polytechnics’ academic staff has been increasing as well – over a thousand PhDs in 2004 representing 24% of the staff in the academic career (FTE) or almost 10% of the staff (head count). Since polytechnics cannot attribute PhDs, in-breeding is not raised as an issue.

244. The percentage of academic staff with a PhD is still low by international standards. Table 7.1 presents the teaching staff in higher education and their academic qualifications. Public universities have 55% of teachers with a PhD while the public polytechnics staffs with a PhD are still a limited percentage (10%) of the total academic staff.

Table 7.1 - Teaching staff involved in higher education in Portugal  
(Head counts, December 2004)

		Academic qualifications				Total
		PhD	Master	"Licenciatura"	Other	
PUBLIC UNIVERSITIES	Number of teachers	8029	3499	2779	239	14546
	%	55,2	24,1	19,1	1,6	
PUBLIC POLYTECHNICS	Number of teachers	1002	4033	4664	528	10227
	%	9,8	39,4	45,6	5,2	
PUBLIC MILITARY SYSTEM	Number of teachers	114	131	323	21	589
	%	19,4	22,2	54,8	3,6	
PRIVATE UNIVERSITIES	Number of teachers	1177	1372	1688	53	4290
	%	27,4	32,0	39,3	1,2	
OTHERS PRIVATE	Number of teachers	994	2236	3707	213	7150
	%	13,9	31,3	51,8	3,0	
Total	Number of teachers	11316	11271	13161	1054	36802
	%	30,7	30,6	35,8	2,9	

Source: OCES-MCTES

245. The slight progress in the career structure of the public polytechnic staff can be offset by the difficulty in updating the number of places ("quadro") for hiring academic staff. This can also explain that, contrary to public universities, the personnel hired under special contracts plays an important role, representing over 50% of the total staff. Between 1993 and 2003 the percentage of Co-ordinating professors increased from 5.4% to 7.4%, the percentage of aggregate professors increased from 17.8% to 25.3%, the percentage of assistants decreased from 24.7% to 13.4%, while the percentage of specially hired staff has only slightly increased from 52.1% to 54.0%. This means that the intake of younger people (assistants) has slowed down, while a number of teachers have completed their master's degree and become aggregate professors.

## 7.2 The private university staff

246. Since 1979, Law 9/79 of March 19 established the Basic Legal Framework for the Private and Cooperative Education and the possibility of creating private higher education institutions. The development of private institutions was initially rather slow and at time ambiguous due to the lack of legislation and/or tradition. The Statute for the private and cooperative higher education was published only in 1989, ten years after the institutional framework. The conditions for the creation and operation of private higher education were established in the Private and Cooperative Higher Education Act (Decree-Law 16/94).

247. Enrolments in private institutions in 1982–83 (including the Catholic University, established in 1971) were about 11% of total enrolments. The pace of student enrolment increased after the mid-1980s. Academic staff with higher qualifications began to be contracted.

248. Table 7.3 presents the available recent data on the qualifications of the academic staff of some private universities and the percentage of staff holding a PhD, as well as the student/staff ration for undergraduate studies, which varies between 8.4 and 24.4. Better-qualified academic staff in the private sector often includes retired professors from the public sector.

249. Overall student/academic staff (head counts) is calculated as 10.4 for the whole system, with ratios equal to 11.6 for public universities, 10.4 for public polytechnics and 8.8 for the private sector. These results should be read with caution as the numbers of students and academic staff

is expressed in head counts, not in FTEs. However, even taking this in consideration it seems that the private sector ratios are quite favourable.

Table 7.2 – The number of academic staff members (FTE), private universities (2005)

	Ph.D.	Masters	No P.G.	Total (1)	%Ph.D.	Students (2)*	Ratio (2)/(1)
Católica	405	338	412	1155	35.1	8974	7.8
Autónoma <sup>a</sup>	53	91	152	297	17.9	3785	12.8
Internacional <sup>a</sup>	2	7	8	17	12.0	187	11.2
Internacional <sup>b</sup>	4	8	18	30	12.0	539	17.8
Lusíada <sup>a</sup>	50	96	104	249	20.0	4935	19.8
Lusíada <sup>b</sup>	49	72	68	190	25.8	4639	24.4
Lusíada <sup>c</sup>	24	29	14	66	35.7	1115	16.8
Portucalense <sup>e</sup>	28	45	32	104	26.8	2382	22.8
Independente <sup>a</sup>	31	31	66	128	24.3	3046	23.8
Atlântica <sup>a</sup>	5	7	7	19	27.1	222	11.4
F. Pessoa <sup>c</sup>	119	73	57	249	47.7	2827	11.4
F. Pessoa <sup>g</sup>	10	11	10	31	31.2	262	8.4
Lusófona <sup>a</sup>	148	182	241	571	26.0	9412	16,5
Moderna <sup>a</sup>	21	26	26	73	29.1	989	13.6
Moderna <sup>c</sup>	9	30	18	57	15.9	937	16.4
Total	957	1045	1234	3236	26.5	44275	13.7

a – Lisboa; b – Figueira da Foz; c – Porto;

d – Vila Nova de Famalicão; g – Ponte de Lima. Source: OCES, 2005; DGES, 2005

### 7.3 Financing of higher education

250. In 2001 Portugal spent 5.9% of the GDP in education, compared to 5.1% for EU25, 4.6% for Germany, 3.9% for Greece, 4.4% for Spain, 5.7% for France, 4.3% for Ireland, 5.0% for Italy and the Netherlands, 5.9% for Austria and 4.7% for the UK (Eurostat, 2004). In this context, Figure 7.1 shows that public expenditure on higher education in 2001 was similar to that of the average Europe, EU15, and about 1.04% of GDP.
251. Also in 2001, the % of the expenditure with education relative to the total public expenditure was 12.8% in Portugal, compared to 10.8% for EU25, 9.7% for Germany, 8.2% for Greece, 11.1% for Spain, 11.2% for France, 12.9% for Ireland, 10.2% for Italy, 10.7% for the Netherlands, 11.2% for Austria and 11.9% for the UK (Eurostat, 2004).
252. However, when comparisons are made using absolute values of total *per capita* funding, i.e., per student total public and private expenditure, including families and others private agents, the results for Portugal are lower than for other OECD member states even with the PPS conversion. There are some reasons that help explain why this happens in Portugal. One reason is that total enrolments do not take into account the percentage of part-time students, which means that the calculated *per capita* funding is lower than if calculated using enrolments in FTEs. The second reason is that most research funds are directly allocated to research centres (except the percentage allocated as institutional overheads), which are financially autonomous, and not through the universities budgets, Last, reimbursable funds such as income contingency loans have not yet been used in Portugal, namely to support students expenses which also helps to explain major differences in relation to other northern European and OECD countries.

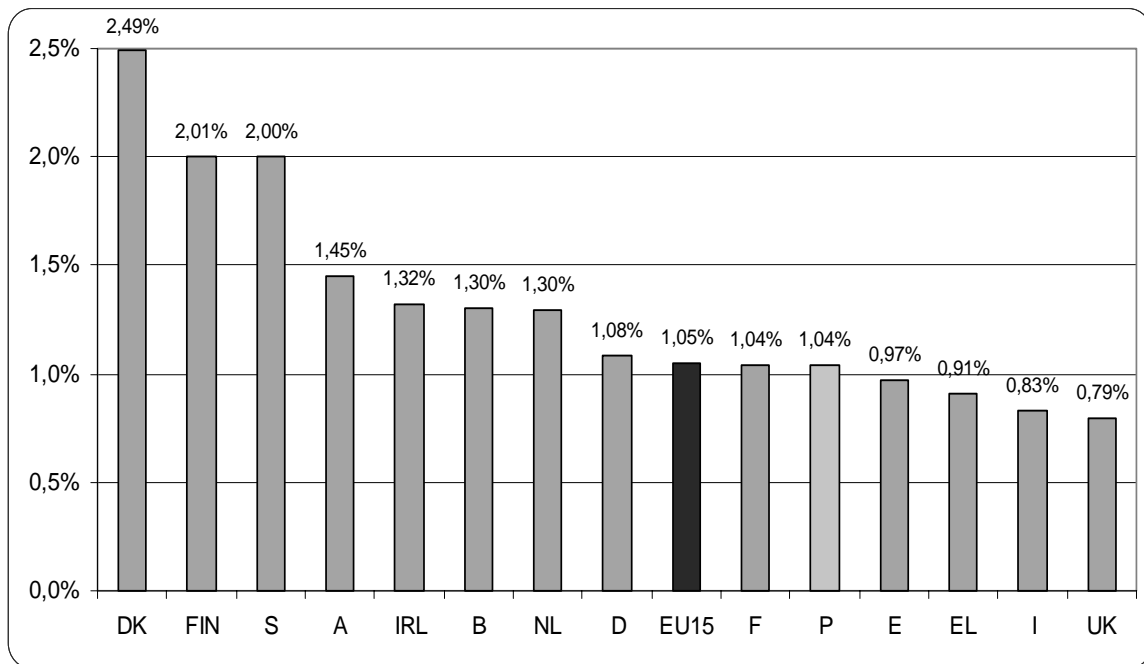
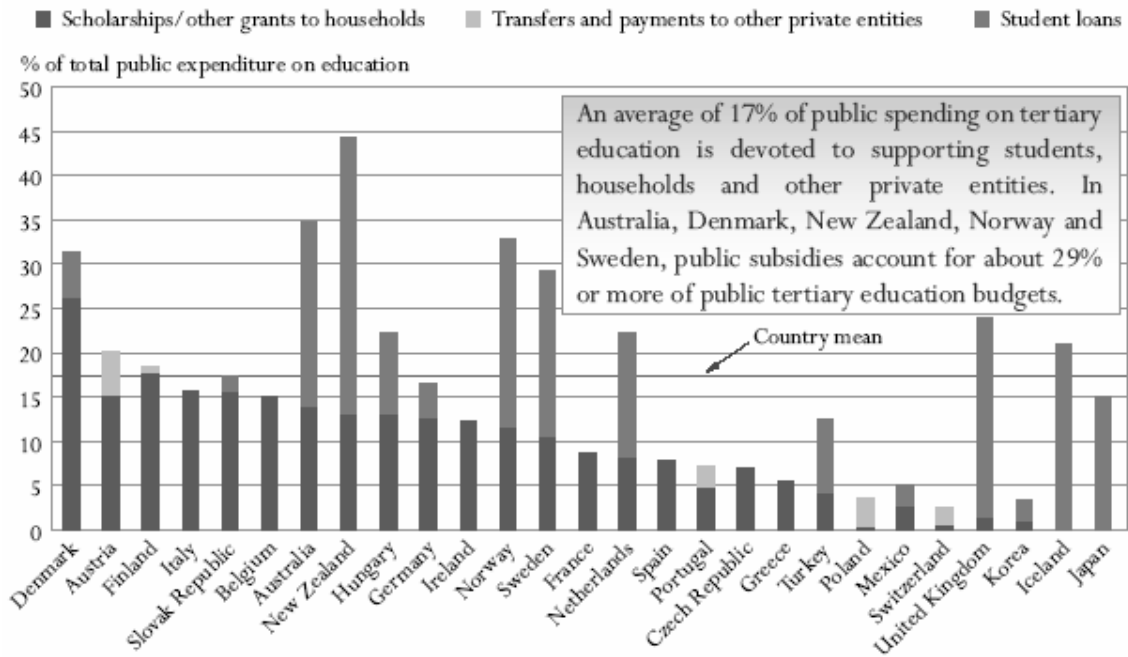


Figure 7.1 – Public expenditure on higher education, as a fraction of GDP (%)  
Source: “Education across Europe 2003”, Eurostat; data from last year available or 2000

253. Public funding for higher education teaching and research activities consists of two main mechanisms (Figure 7.3):

- Public funding for higher education institutions:
  - Direct basic funding to public institutions for teaching (through a funding formula)
  - Contractual funding to public institutions (through contracts for specific issues)
  - Direct funding to students (social support of individual grants)
  - Indirect funding to students (includes meals, accommodation, sports and healthcare).
- Public funding for science and technology, S&T:
  - Direct funding to institutions through R&D units based on periodic evaluation (through pluriannual funding of FCT, defined upon evaluations every 3 years)
  - Competitive funding for R&D activities (through projects)
  - Competitive funding for people (through individual grants for researchers)





Note: The chart presents different public subsidies for education to households and other private entities as percentage of total public expenditure on education, by type of subsidy. Public subsidies to households provide finance as grants or loans, and include: i) grants/scholarships; ii) public student loans; iii) family or child allowances contingent on student status; iv) public subsidies in cash or kind such as housing and transport; and v) subsidies to permit low-interest loans from private lenders.

Figure 7.2 – Public subsidies for education in tertiary education, 2002  
Adapted from: OECD, Education at a Glance 2005, Paris, OECD

254. Since the late 1980's the Ministry of Education allocates funding for the running costs or current expenditures of public institutions of higher education using a formula. Institutions negotiate funding for investments (new buildings and equipment) with the Ministry based on each institution's proposed development plans. The allocation of research funding has been analysed in Chapter 5.
255. Funding was related with the costs supported by higher education institutions in their activity namely in terms of the number of enrolled students. This formula varies according to the field of study, favouring degrees that need more experimental or laboratory classes, e.g., medical sciences and engineering. Funding takes into consideration the following aspects: the teacher/student ratio, the non-teaching staff/teacher ratio, the standard composition of the teaching staff, the expenditure (and structure) of central administration (based on central administration personnel/student ratio), and the budget structure expressed in the percentage composition of personnel costs and other operational costs. These indicators were defined as target values that should be attained through a gradual process, though this process has in practice been erratic.
256. It is interesting to compare the total funding (public and private) per student by the primary, secondary and higher level of education in Portugal. It is rather unusual to find that total funding for higher education is less than the financing per student at the secondary level. Comparatively across the Europe and the United States expenses are higher for higher education than for secondary education. This attests to the rather low level of financing higher education in Portugal. Table 7.3 also shows just how low the funding level per student of higher education in Portugal compares with the EU average and with the USA. The Portuguese higher education student is financed at almost half of the EU (25) average.

Table 7.3 - Total Financing (public and private) per student (€) in Europe and the USA by level of education, 2003

	Primary Education	Secondary Education	Tertiary Education
Portugal	3.609	5.086	4.450
EU (25)	4.330	5.731	8.060
Spain	4.121	5.478	7.632
United Kingdom	4.991	6.220	10.123
Finland	4.541	6.317	10.282
Netherlands	4.981	5.966	11.474
France	4.216	7.365	9.135
Germany	3.947	5.771	9.895
United States	7.124	8.226	20.649

Source: Eurostat, last update 07/2006

257. In 2003 the allocation rationale changed to become progressively performance-based. In the 2006 budget the Government adopted a new formula that progressively introduced criteria related to quality and performance. Under the current context of excess capacity, higher education institutions compete for students, so that the number of students represents some level of performance, at least in terms of the attraction capacity for each course/institution. The new formula (Table 7.4) is based on the overall number of students, but includes the following quality factors:

- Qualification of teaching staff, as measured by the fraction of PhDs in the total number of teachers of each institution
- Graduation rate, as measured based on two indicators:
  - the number of graduates in terms of the first cycle;
  - The number of master and PhD degrees awarded.

258. In addition, the formula includes the following two institutional factors to answer to specific characteristics of each individual institution and training area:

- Average personal cost for each institution, to account for the specific characteristics of the teaching and non-teaching staff of each institution
- Specific student/teacher ratio for each scientific area.

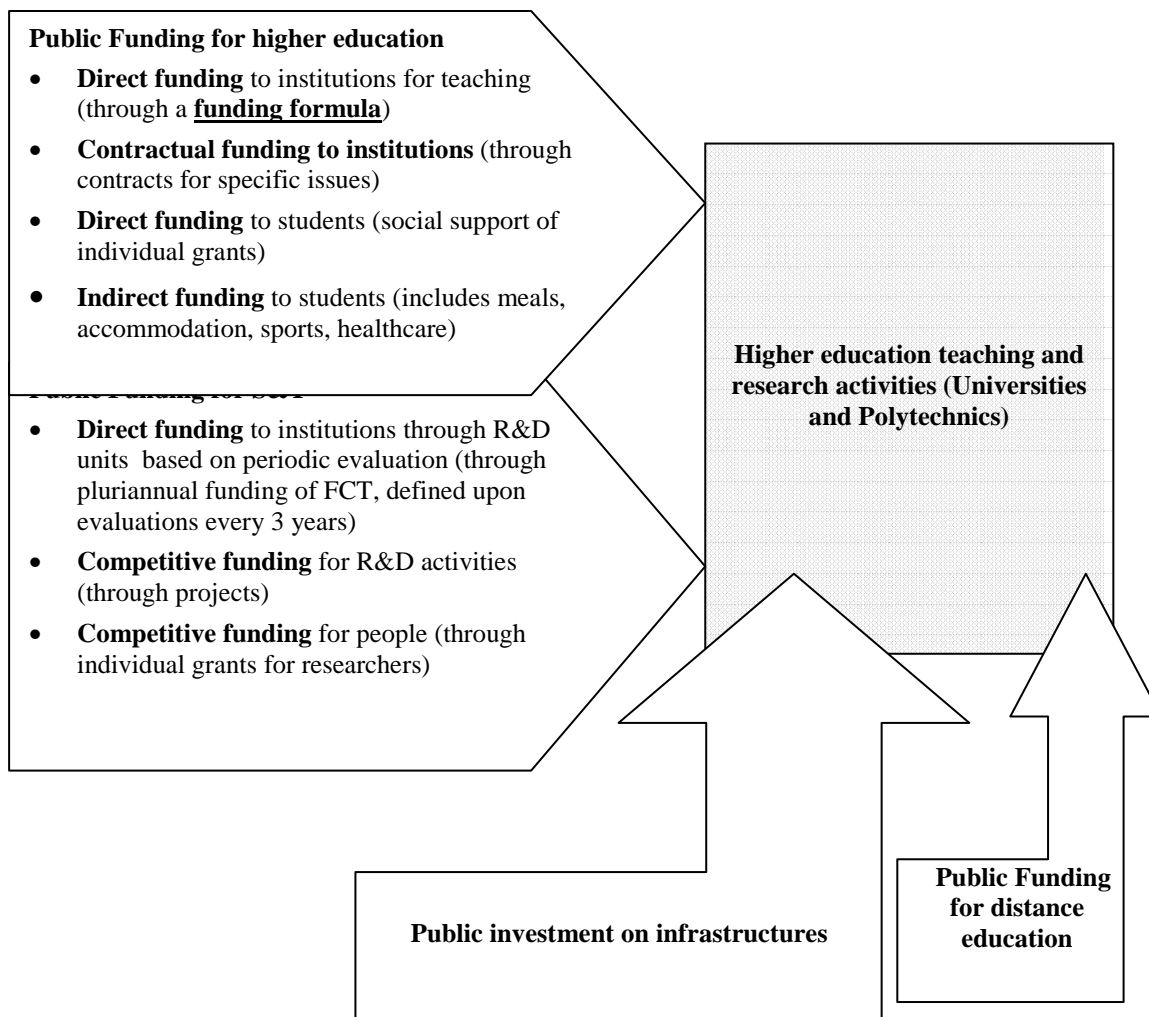


Figure 7.3 – Main funding mechanisms for public higher education

Table 7.4 – Criteria used in the Funding Formula developed for 2006

Terms in the new funding formula	Description
Overall number of students	Number of students for all the courses approved for public funding
Cost factor to allow considering specific institutional characteristics - as well as to differentiate areas of study	Staff average costs (indirect measure of qualification) Teacher/student ratios Teacher/non academic staff ratios Funding depends on reference costs calculated using the same criteria for every institution, using a predefined relationship between other current expenses and personnel costs (15/85)
Quality indicators	Level of the academic staff qualification (fraction of the academic staff holding PhDs) Graduation efficiency rate Post-graduation efficiency rates (masters and PhDs awarded)

259. The evolution of the funds available for the public sub-system indicates different trends according to the source considered. From 2001 to 2004 the increase in enrolments slowed down and there was an average annual increase of the overall budget equal to 3.39% (Table 7.5) at current prices. Public funds for investment decreased on average 5.37% over the same period, which means that confronted with increasing economic difficulties the government decided to slow down investments while concentrating efforts on the budget for current expenses which includes salaries.

260. Indeed, due to the large investments in infrastructures over the last decades and the decreasing number of candidates to higher education, it is possible that the existing physical capacity is not being fully utilised, which supports the decision of decreasing future investments. Therefore, it is necessary to implement rigorous criteria for further public investment on infrastructures after an overall evaluation of the capacity installed in all the public higher education institutions. Table 7.5 also shows an increase in the revenues from tuition fees (average of 21.62% over the 2001-04 period), which was due to the legislation allowing institutions to increase the level of fees. Besides fees, institutions have other sources of revenue (earned income), including the transfer of accumulated net balances and EU funds, which had an average increase of 8.18% over the same period.

Table 7.5 – The annual rate of change of the budget of public higher education institutions

	Income – annual variation rate				
	Public budget	Fees	Earned income	Investment	Total
2001-02	3.64	11.80	6.55	-0.30	4.46
2002-03	0.42	8.46	-0.28	1.17	0.85
2003-04	-1.77	44.59	18.26	-16.99	4.87
Average	0.76	21.62	8.18	-5.37	3.39

Source: GEFCEs, MCTES, 2005

261. Table 7.6 refers to the annual net balance of public higher education institutions, which presents a surprising annual rate of change equal to 26.13% despite the apparent economic difficulties.

Table 7.6 – The annual rate of change of the net balance of public HEIs

Net balance - annual variation rate	
2001-2002	50.06
2002-2003	20.63
2003-2004	7.69
Average rate	26.13

Source: GEFCES, MCTES, 2005

262. Table 7.7 presents the composition of the income budget of public higher education institutions. The composition of the overall funding structure of Portuguese public higher education institutions indicates that funding coming directly from the government is by far the largest funding source and it remained like that throughout the period analysed. Despite a slow steady decrease, the combined effect of public funds for current expenses and for investment still represented 63.9% in 2004 (it had been 70.7% in 2001).

Table 7.7 – The relative weight of different types of income

	Percentage of total income (%)				
	Public budget	Fees	Earned income	Investment	Total
2001	61.69	6.14	23.15	9.02	100.00
2002	61.20	6.58	23.61	8.61	100.00
2003	60.95	7.07	23.35	8.64	100.00
2004	57.09	9.75	26.32	6.84	100.00
Average	60.23	7.39	24.11	8.28	100.00

Source: GEFCES, MCTES, 2005

263. The second major source of funding is earned income (without tuition fees) and it also expanded throughout the period. This funding source has acquired a more prominent role in recent years and often contributes with about a quarter of the funds to many institutions, though its importance varies from institution to institution. Some of them, due to their location, prestige and disciplinary composition, are more successful in obtaining funds through this source.
264. The third source of funding in importance is provided by student fees, which presented a clear growth pattern in nominal terms in recent years, especially due to the changes in the funding law in 1997 and 2003. Student fees have clearly increased their role as a funding source in recent years, though they still play a small role for Portuguese public higher education institutions.
265. Overall, this means that although the Portuguese public higher education system has become slightly less reliant on governmental sources during this period, it is still largely dependent on this source as regards funding. If the system seems to be more proactive in terms of alternative fund-raising, this still has a limited visibility in terms of the funding structure.
266. The funds transferred by the government to public higher education institutions are given as a lump sum, according to a formula that essentially takes into account the number of students enrolled in each institution. It is up to the institution to decide how to distribute internally the money; nevertheless the big share of the money goes to academic and non-academic staff salaries. Some institutions have replicated internally the criteria defined in the national formula, whereas others have made some adjustments. There are also some important differences internally in terms of the degree of financial autonomy enjoyed by schools/departments in each institution.

267. The main category of expenditure for Portuguese public higher education institutions is clearly with salaries of academic and non-academic staff. Overall this normally represents more than 55% of the total expenditures. The other current expenses represent 20% of the overall expenditures of Portuguese higher education institutions, their relative importance being rather stable in recent years and across institutions. The third main category of expenditures refers to investment (capital expenditure). These include basically those expenditures with buildings, equipment, labs and others not included in the current budget due to their long or medium term nature. This is the most variable portion of the total expenditure. It normally represents less than 10% of the overall expenditures, but it varies among institutions due to the specificity of this type of investments that may be more present in certain years than in others. The relative importance of this category has been decreasing with time.
268. Table 7.8 presents the relative weight of the different categories of expenditure and Table 7.10 presents the annual rate of change of the different categories of expenditure. It can be seen that while personnel expenditures are still increasing all the other expenditure categories are decreasing, especially the investment expenditures.

Table 7.8 – The relative weight of different types of expenditure (public institutions)

	Percentage of total expenditure					Total
	Personnel	Others	Current expenses	Investments	Net balance	
2001	54.67	28.42	83.09	6.52	10.39	100.00
2002	55.70	23.68	79.38	5.70	14.92	100.00
2003	56.39	21.53	77.91	4.24	17.85	100.00
2004	55.00	23.68	78.67	3.00	18.33	100.00
Average	55.44	24.33	79.76	4.87	15.37	100.00

Source: GEFCEs, MCTES, 2005

269. The increase in personnel expenditure is not so much due to a changing ratio between staff and students, but rather to the growing qualification of the teaching staff. Traditionally most Portuguese higher education institutions had a high portion of their academic staff in categories below the Professorial level (i.e., without a doctorate degree) but this has been changing significantly in recent years. A large portion of academic staff has completed Master and Doctor Degrees in recent years and this often meant an automatic promotion in the academic hierarchy with clear consequences at the financial level, since Professorial categories are clearly better paid than assistant categories. This is confirmed by the fact that those institutions in which the portion of expenditures going to staff is higher are precisely the oldest ones and those with more qualified academic staff.

Table 7.9 – The annual rate of change of the expenditure categories

	Expenditure - annual variation rate			
	Personnel	Others	Investment	Total
2001-2002	6.41	-12.94	-8.74	4.46
2002-2003	2.10	-8.33	-25.02	0.85
2003-2004	2.29	15.34	-25.78	4.87
Average rate	3.60	-1.98	-19.84	3.39

Source: GEFCEs, MCTES, 2005

270. On the other hand, the increasing institutional responsibilities at the financial and administrative levels, associated with the strengthening of institutional autonomy has forced institutions to increase the qualification of the administrative staff, which means also increasing costs.

## **8. PLANNING, GOVERNING AND REGULATING THE SYSTEM**

### **8.1. Responsibilities for decision-making**

271. The purpose of this chapter is to describe the system of governance and regulation in higher education in Portugal. It also seeks to present significant policy measures that ensure the links between the parts of the system.
272. The government through the Ministry of Science, Technology and Higher Education is responsible for establishing the macro level policies for science, technology and higher education. The macro policies are defined in the government's programme that is presented to the electorate and to Parliament. A brief description of the role of the Ministry and the different agencies and institutions that address higher education was presented in section 2 while the main institutions that address science and technology were presented in section 5.
273. The Ministry has several policy tools to steer and manage the research and higher education system. The most important are the control over the distribution of resources (both the current yearly budget as well as the budget for investments in new buildings), the definition of research priorities, the power of decision about the establishment of new institutions (both public and private), the control of the number of the academic and non-academic staff of public institutions and the decision on new proposals for study programmes made by public polytechnics and the private sector. Lastly, the determination and setting of the "numerus clausus" system that allows for the control of the size of the system. Moreover, the academic and non-academic staffs of public institutions are civil servants and their salaries are negotiated collectively with the government at the national level.
274. Public institutions can determine study programmes including curriculum content, staff recruitment and promotion, the internal distribution of resources and have degree granting power. Public universities have additional autonomy as they can decide on the establishment of new study programmes although the Ministry can always refuse to finance the programme. Private institutions have complete discretion over their resources, staff recruitment including work and salary conditions.

### **8.2. Definition of priorities and planning**

275. The lack of effective regulation either by the state or by the market has been one of the major problems of the Portuguese higher education system. The system grew without adequate regulation, resulting in a network of institutions and study programmes that fall short of declared government priorities. Some of these priorities are to increase the number of graduates in key social and economic areas relevant for the country's development, to increase the diversity of higher education provision, to ensure a balanced geographical provision of higher education and to open the system to students from all socio-economic backgrounds.
276. The University Autonomy Act (1988) and the Polytechnics Autonomy Act (1990) granted significant levels of autonomy to the public higher education institutions, especially to universities. This has created some ambiguous situations in a system characterised as traditionally centralised and over-bureaucratic where steering the system at a distance creates some difficulties.
277. The definition of priorities and planning has been influenced by some of the major international trends. The search for guidance has created an opportunity for the intervention of international organisations. Until Portugal joined the EU in 1986, the OECD and the World Bank were the

main agencies playing this role. Henceforth, those institutions lost influence, and the European dimension gained prominence.

278. Prior to the 1974 Revolution initial efforts were devoted to the basic and secondary education systems, as a large number of young people, especially those from the lower classes, had not completed secondary education, or even basic education. Educational priorities determined policies aimed at answering the most pressing demands for universal basic education (6 years at the time, later 9 years), for reduction of the illiteracy rate (still high), and for increased access to secondary education (2 years at the time, later 3 years) while developing the vocational component of education to increase the students' employment prospects.
279. Higher education initially attracted neither the full attention of governments nor the level of investment needed to redress its weak development. However, the sharp increase in demand for higher education after 1974 combined with the restrictive access policies caused many young people to be excluded from higher education, without any adequate alternative, thus creating an acute social and political problem. This situation eventually gave rise to an environment favourable to the development of the private sector.
280. In 1977 the Portuguese government contracted with the World Bank on Portuguese educational policy, first as a consulting body and later financially, supporting some significant changes in the system.
281. The World Bank report (1977) considered that the country had paid scarce attention to the role of human resources and their impact in the process of economic development, and voiced a negative opinion in terms of income inequality. The Bank initially regarded teacher training, intermediate level technician training, and teaching methods and materials as intervention priority areas. In a second consideration, the Bank paid more attention to the selective improvement of teaching and research on higher education (especially natural sciences), the rationalisation of vocational and technical education, and non-formal programs of training and literacy.
282. The World Bank priority was to consolidate the system by emphasising quality rather than expanding it, which required a corresponding increase in financial support by the state. Thus, the Bank urged the Portuguese authorities to restrain enrolment quotas after the uncontrolled expansion of the recent past in which the number of students had increased by almost one-third in a few short years. Due to the budgetary difficulties of the Portuguese government, recommendations focused on better use of the available resources, rationalisation of the supply of higher education and improving management in terms of accountability, coordination, and efficiency. Future expansions should be better planned taking into account manpower needs, and demographic and enrolment trends. The report recommended a focus on regional needs and practical subjects. Accordingly, the report supported the binary system through the development of short cycle higher education (Decree-Law 422-B/77).
283. The World Bank supported the *numerus clausus* policy, the development of a binary system and the increased relevance of the system. The World Bank played an important role in the development of the polytechnic subsystem. Successive Ministers of Education regarded the development of the polytechnics as a priority of the higher education system. Access policies were combined with large investments in new buildings and equipment and an academic career progression more attractive (less demanding) than a university one to promote the development of the polytechnic sector. The regional character of the polytechnics was stressed by allowing the institutions to reserve a percentage of vacancies for students living in the region.
284. At the beginning of the eighties, budgetary constraints associated with the difficult economic period the country was undergoing weighed heavily. The other main problem was access to higher education, due to the *numerus clausus* system imposed in 1977, to contain the almost



uncontrolled expansion of enrolments that occurred in the aftermath of the revolution. If the political transformations of the previous decade had increased the system's democratisation, notably by improving the equality of educational opportunities, there were difficulties and resistances mainly due to inefficient organisation and lack of coordination between ministries. This produced an increasing gap between aspirations/objectives/statements and realisations/possibilities. The organisational problems were exacerbated by lack of tradition in evaluation and accountability, which made it quite difficult to assess reforms and their effectiveness.

285. In 1982 the OECD produced *Evaluation of the Portuguese National Education Policies*, which concluded that supply of higher education was insufficient, both in terms of quantity and options. It emphasised the need for more alternatives for students that did not get into higher education due to the *numerus clausus* and for dropouts after the first year of enrolment. The report pointed to the significant differences between a minor part of the student population that had access to university education of good quality and the large majority, which either did not finish secondary education or finished it without getting access to a highly selective system. Hence, the report recommended diversifying the higher education supply in order to meet the country's demand, namely, by promoting post-secondary vocational education and training.
286. The restrictive *numerus clausus* policy, the impending adhesion to the EU, the reports of OECD and the World Bank (1989) recognised that for some years now the entry capacity of the higher education system has been inadequate to absorb all secondary school graduates. The political objective was to expand even if quality had to be sacrificed.
287. The main political objective was to increase access to higher education. This goal was clearly defined, and it aimed to substantially change the system. However, there were also other policy objectives, which, while also quite important, were not so clearly spelled out or were not consistently pursued. Objectives such as giving priority to areas relevant to the national economy or the pursuit of quality were often sacrificed to the main objective of increasing enrolment in higher education.
288. Since 1996/97 there was a dramatic change in conditions as a result of the decrease in the number of candidates to higher education. For the first time in forty years the number of vacancies exceeded the number of candidates. Moreover, economic conditions had changed from a relatively comfortable economic situation in the early 1990s to one of economic recession that has influenced governmental priorities from unfettered expansion to a decrease in enrolments and strong emphasis on quality. Many higher education institutions began to be affected by the change in governmental priorities from expansion at any cost to consolidation of the system and quality.
289. To conclude, one may say that the educational policies have produced mixed results, mainly due to difficulties of effective regulation of the system. Although the major objective of increasing the participation rate has been quite successful, other objectives were not completely fulfilled. The result of an unregulated system has been a heterogeneous and stratified situation with some strong high-achieving institutions on the one hand, and with weaker and less responsive institutions that are losing students and unable to respond positively to new external opportunities and state incentives on the other hand.

### **8.3. Governance structures**

290. The Autonomy Acts are rather prescriptive about the governance structures of public higher education institutions, failing to take into account the diversity of institutions in size, missions, complexity, regional dependence, and internationalisation.

291. The Autonomy Acts favour a strong collegial model with participation of the academic staff, non-academic staff and students. While students are well represented at all levels, outside stakeholders have a very limited role and, in many cases, only in an advisory capacity.
292. This collegial mode of governance has remained unchanged since the Autonomy Acts, with all top academic management positions (including the rector) being elected. However the role of academic managers and managing systems has been changing. As in other Western countries there is evidence of overlap between management and academic roles. In the late 1980s and coinciding with the passing of the Autonomy Acts, questions of quality and efficiency have emerged with some regularity in political and academic discourses.
293. However, the governing bodies of universities are strictly defined by law. They are the *University Assembly* (for the approval of the statutes and election of the Rector), the *Rector* (uninominal executive body), the *University Senate* (policy and legislative body) and the Administrative Council (for the current financial administration). The statutes may create other bodies that share functions from the Senate or the Administrative Council and under this provision some Universities have created Scientific or Academic Councils to coordinate the scientific-pedagogic policies of the University. Advisory Committees may also be foreseen in the statutes, both at University and organic unit level.
294. The competences of the collegiate bodies are also defined by law. Their composition is defined in the statutes, under narrow limits referring to compulsory *ex-officio* members and to criteria on elected representatives from the professors, other academic staff, students and non-academic staff, parity between the members of elected academic staff and elected students and balance in the representation of the organic units regardless of their dimension.
295. The rigidity in the law makes differentiation between the governance structures in the universities difficult. It is difficult to adapt the governance model to the specificities of the institution's mission and profile.
296. The situation is aggravated at the level of the institution's units (Faculties, Schools, Institutes or, in some cases, Departments), whose organic structure must include the *Assembly of Representatives*, the *Directive Council*, the *Pedagogic Council* and the *Scientific Council* (or a Pedagogical-Scientific Council). The law does not preclude the existence of a *Dean*, but the most frequent situation is the existence of different Presidents for the several bodies (the organic unit is then represented by the President of the Directive Council), which may lead to conflict in the view of some overlap of competences.
297. The provisions on the composition of the governing bodies raise some problems, such as:
- a) The size and dimension of most of the collegiate bodies; the number of members of the University Assembly in the 14 public universities in 2002 varied between 64 and 331, and in the University Senates it ranged from 36 to 179. So, problems of quorum and inefficiency easily arise.
  - b) The predominance of the collegiate approach in the university management leads to slow and cumbersome decision processes and a lack of personal responsibilities.
  - c) Decision-making tends to be corporative, often lacking clarity and transparency, which does not contribute to the necessary institutional cohesion.
  - d) Leadership is not favoured and strategic planning is not a common tool for institutional development.
298. Another important point relates to the very low and erratic external (lay) participation in the governing bodies. The Autonomy law does not allow for external participation in the University Assembly and the Assembly elects the Rector from within the full professors of the University, *i.e.*, the election of the Rector is a strictly internal academic process. The external participation in the Administrative Council is also inexistent.

299. The Senate, however, may have external participation up to 15% of its composition, but the external members, when foreseen in the statutes, are nominated by the Rector, or by the Senate under a proposal from the Rector, which in some way hinders their independence. Even so, in 2002, only half of the universities had external members in their Senates, from 3% to 12%, which shows a very low participation of external members.
300. Most universities created Advisory Committees with strong percentage of external numbers, but in general such bodies seldom meet and have little influence in the institution's strategy.
301. The organisational structure of each polytechnic institute is defined in its statutes, but the Autonomy Act defines the number and nature of the governing bodies. They are the *President* (uninominal executive body), the *General Council* (a policy making body) and the *Administrative Council* (for the current financial administration).
302. The participation of external representatives is compulsory in the election of the President and in the composition of the General Council, but it does not exist in the Assembly for preparation and approval of the statutes.
303. An electoral assembly elects the President where 20% of its members must be representatives from the community and the economic activities. However, some of the polytechnics fail to meet this rule and on average the percentage of external members in the electoral assemblies was 15.5% in 2002.
304. The President may be elected from among the qualified academic staff in the Polytechnic or in any other higher education institution, or from highly recognised (lay) personalities with a relevant professional experience, although this last possibility was so far never used.
305. The General Council may include external (lay) members, but their number may not exceed the number of Schools in the Polytechnic. The external representation is therefore quite low, averaging 13.2% for the 16 public polytechnics.
306. The participation of the community is higher in the Polytechnic Schools, although only at an advisory level. The Schools' governing bodies are the *Director* or the *Directive Council*, the *Scientific Council* and the *Pedagogic Council* (or the *Pedagogical-Scientific Council*), the *Advisory Council* and the *Administrative Council*. The external participation is very high in the Advisory Council (70.9% on average) and is also present, at a much lower level, in about half the Scientific Councils (7.6% on average).
307. In the private sector, the founder entity has the responsibility for the administrative, economic and financial organisation and management, but the institutions must have pedagogic, scientific and cultural autonomy, dully specified in their statutes. Consequently, the law establishes that each private higher education institution must have at least the following governing bodies: a *Rector* (for university institutions) or a *President* (for polytechnic institutions); a *Director* or a *Directive Council*; a *Scientific Council*; a *Pedagogic Council*.
308. The key issue in the governance of private higher education institutions is the interface between the founder entity and the institution itself. The way in which the founder entities relate with their higher education institutions is very heterogeneous, ranging from cases of ample scientific and pedagogic autonomy that fosters the independence of thought and of teaching, to examples of a strong decisive intervention of elements from the founder entity in the academic bodies of the institution.

309. There is no reference in the Private Higher Education Act to the external participation in the academic governing bodies. Therefore, the presence of external personalities or entities, other than the ones associated in the founder entity, is left to the discretion of the institution.
310. Several factors have contributed to the emergence of managerial pressures, such as difficulties associated with the operation of the traditional bureaucratic-collegial model in a “massified” system; the recent decline in the number of higher education applicants; pressures resulting from the recent economic difficulties of the country; and increasing competition for students.
311. Recent research on the Portuguese higher education system has shown that a number of people criticise the present university model of governance and management, placing emphasis on its ‘corporatist perversion’ rather than on its lack of efficiency. They also consider that collective governance bodies, particularly the Senate, represent only corporative interests and their membership gives excessive weight to the representation of the different internal bodies, such as students and non-academic staff.
312. The discussions on professional management are consistent with the discussions on the functioning of governance bodies and the reallocation of the relative weight of the representation of external stakeholders (economic, social and cultural) in those bodies. In general, it is assumed that governance bodies need restructuring, that their composition needs revision and that eventually they can coexist with or be replaced by a ‘Board of Trustees’. However, for some people the more professional administrative structure should be merely functional and pragmatic, always subordinated to academic power and designed to liberate academics of the more technical activities of day-to-day management, including financial management.
313. Numerous opinions defend the need to increase the representation of external stakeholders (mainly from the business world) and to reduce the representation of some of the internal bodies, in particular students and non-academic staff. There is also an increase of opinion to reduce the power of the rector, either by changing its legitimacy source or by restricting its legal authority to academic problems.
314. One possible solution is to encourage diversity. Traditional institutions could keep the present corporative governance models or move at a slower pace of change. More dynamic institutions could begin to open participation of internal and external members, namely in a strategic governing body with responsibility to approve the strategic vision and the strategic programme for the institution, as well as the development plans proposed by the academic bodies, and to monitor the economic and financial life of the institution. External members could have enhanced responsibilities in fund raising.
315. There are also other incentives for more efficient management. The government has introduced a new formula where the allocation rationale changed to become increasingly more performance-based by progressively introducing “quality related parameters” (see § 253).

#### **8.4. System linkages**

316. There is little coordination between the different sectors of the higher education system (universities and polytechnics, public and private institutions) and between institutions in the same sector.
317. The World Bank report (1989) had already stated that the system should improve its external efficiency and its articulation to the needs of the country. The structure of courses and degrees were heavily concentrated in traditional areas, with an over-emphasis on the university sector in detriment of more technical degrees (polytechnics). Geographic articulation was also proposed with more distribution of teaching and research potential, namely between old and new public

universities. Low levels of research and development should be improved by strengthening the articulation with the economic and industrial system.

318. Despite the early warning from the World Bank, incomplete government regulation over the expansion period resulted in a network of institutions and study programmes that does not answer to what have been the declared government priorities over more than two decades: increasing the percentage of graduates in areas that are relevant for the country's social and economic development, increasing the diversity of higher education provision, ensuring a balanced geographical provision of higher education and opening the system to students from all socio-economic backgrounds.
319. More recently, decreasing birth rates combined with more demanding entry conditions to higher education has sustained the system's expansion while the labour market has become saturated in some areas (e.g. law, management, some areas of agriculture, teacher training).
320. The result of this process has been a fragmented network of universities, polytechnics and non-integrated schools, a number of them being quite specialised and very small. Over the last few years some private institutions have closed or merged with others and many are facing difficult problems due to declining enrolments.
321. A number of private institutions have ceased their activity and /or have merged. Mergers have taken place throughout the country as a number of small schools ceased their activity and merger with private universities or with larger polytechnic institutes.
322. Analysing enrolments in programmes across the whole system it is evident that there are a large number of programmes with only a small number of students. Although some programmes need to be protected even with low enrolments, for instance those related to the Portuguese language and culture, it is not necessary that every institution offer those programmes. However, apparently institutions do not coordinate their offer, which does not allow for economies of scale and more efficient operation of the system.
323. In an effort to rationalise supply, the Ministry of Science, Technology and Higher Education has decided to intercede by declaring that it will not finance new academic programmes with less than 20 students. It is expected that over 400 new study programmes may not be funded in 2006-2007. Relevance criteria, however, may influence this decision on a case-by-case basis.
324. Some observers have identified an "academic drift" in polytechnics but also signs of 'vocational drift' in public universities. Contrary to expectations, the curricula of the polytechnics' initial training programmes have generally followed university models quite closely. The result has been that the polytechnic sector has failed to create a real alternative for intermediate-level employment in the labour market. Instead, most polytechnics, instead of following a strategy of differentiation which might have enabled them to 'corner the market' in the intermediate levels of human resources training, have chosen to identify themselves with the university model.
325. At the same time, some universities are more oriented towards labour market needs and demands, and are preparing to include more vocational components in some of their programmes (both undergraduate and postgraduate). The development of experiments and strategies of partnership with industry and the service sector for knowledge and technology exchange and transfer has given them added leverage in this direction.
326. However, recent legislation regulating the implementation of the Bologna process has provided a clarification of the identity of the two sub-systems by setting different rules for study programmes of universities and polytechnics.

327. However, the changing context surrounding the Portuguese higher education system – overcapacity, inter-institutional competition, the implementation of the Bologna process and the emergence of new publics and new demands for life-long education and internationalisation – should not be seen as a threat but as an opportunity to restructure the system, aiming at increasing its efficiency, quality and relevance and at its enlargement to new publics, lifelong activities and in terms of internationalisation.

### **8.5. Non traditional forms of education and training**

328. Other forms of education, such as adult and continuing education, have traditionally been underdeveloped areas of the Portuguese education system in general and, especially of its higher education system. Despite the low average education level of its population, Portugal is one of the European countries with the lowest offer of lifelong education and retraining opportunities.

329. Access routes to higher education are generally very traditional, many institutions do not care to enrol students from non-traditional access routes, and there is neither tradition nor accumulated knowledge in the area of recognition of informal training activities.

330. Continuing education has not yet been organised on a widespread scale, but change is beginning to occur. Higher education institutions, particularly the public ones, are starting to recognise that they should take responsibility for lifelong learning. It is possible that the difficulties created by the declining number of traditional students will help institutions assume an increasing role in the ‘less traditional’ educational market, including continuing education, in order to survive.

331. Policy measures in the context of lifelong education target adult students older than 25, now lowered to 23, allowing enrolment in higher education courses in any Portuguese university or polytechnic without the full secondary school diploma, provided that they passed an examination – either the regular entrance examination or an ‘ad hoc’ examination (which was first established in 1979). Adult applicants, (23 years and over) are submitted to (i) a curriculum analysis; (ii) an interview; (iii) a written and or practical examination on subjects defined by each institution. The expected impact of this measure has been presented in § 228.

332. Special laws also target students in employment. Working students represent a low percentage in Portugal, where most students in higher education are supported by their parents. They are a diverse, adult public that require further qualification.

333. The Technological Specialisation Courses (CETs), aiming at conferring students a Diploma of Technological Specialisation and a level IV professional qualification are gaining increasing relevance in Portugal, due to the general low qualification level of the population. The CETs will receive substantial funding over the incoming years and it is expected that the polytechnic sector will increase its offer in this area (see § 230).

### **8.6 Unemployment, employment and higher education**

334. The pace of growth of the higher education graduates employment, in an unfavourable labour market context, led to the duplication of the unemployment rate registered, in 2000 (3.9%), in the last quarter of 2005 (8%), hasn’t been, then, enough to respond to the great afflux of young graduates to the labour market in the last years. That has led to a stronger incidence of the unemployment on that segment of the population since its number, according to the INE Employment Survey, increased from 15273, in 2000, to 46217 in 2005 (annual averages) reaching the 42000 individuals in the first quarter of 2006.

335. This situation is also explained by the financial restraint of the Portuguese State, due to the high public deficit, which led to heavy restrictions on new admissions in the public administration. In the past a large percentage of the recent graduates were employed in the public administration, namely in the educational system – that stopped hiring new teachers because of demographic effects of low birth rates – and other social services.

336. However, although we have witnessed an increase in the number of unemployed graduates, the percentage of qualified unemployed in the universe of the working, qualified population (6.3% in 2005) is still lower than the ratio for the lower qualification levels (8.0% secondary education and 7.8% basic education) and lower than the national average (7.6%).

Table 8.1 - Evolution of the unemployment rate by schooling levels

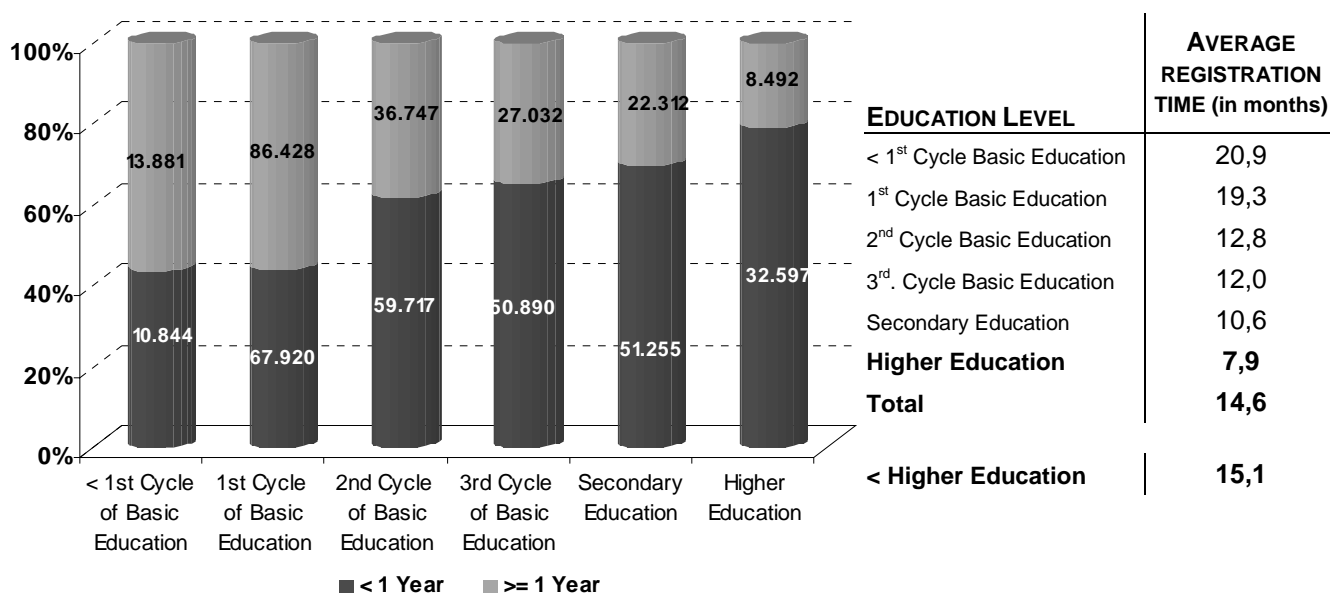
Values in Thousands

Schooling levels	2000	2001	2002	2003	2004	2005
Unemployed Population Higher Education	15.3	17.8	26.1	37.0	37.9	46.2
Working Population Higher Education	487.6	516.3	533.,2	617.6	714.2	733.1
<b>Unemployment Population Higher Ed./Working Pop. Higher Education</b>	3.1%	3.4%	4.9%	6.0%	5.3%	6.3%
Unemployed population Secondary Education	29.2	30.0	37.2	48.9	52.1	64.8
Working population Secondary Education	628.6	659.4	680.5	718.8	750.0	805.7
<b>Unemployed Population Secondary Ed. / Working Pop. Secondary Ed.</b>	4.6%	4.6%	5.5%	6.8%	6.9%	8.0%
Unemployed Population Basic Education	161.1	165.8	207.3	255.5	275.1	311.2
Working population Basic education	4110.1	4149.6	4194.2	4122.9	4023.7	4006.0
<b>Unemployed Population Basic. Ed. / Working Pop. Basic. Ed.</b>	3.9%	4.0%	4.9%	6.2%	6.8%	7.8%
Total of Unemployed Population	205.5	213.5	270.6	341.4	365.1	422.2
Total of Working Population	5226.3	5325.2	5407.9	54459.3	5487.9	5544.8
<b>Total Unemployment Rate</b>	3.9%	4.0%	5.0%	6.3%	6.7%	7.6%

Source: INE, "Inquérito ao Emprego"

337. Unemployment tends to be less severe to those with higher qualifications since the average spell of registered unemployment is much shorter than the national average (8 months for the higher education graduates, 15 months for the general average), which is also confirmed by the lower weight of long-term unemployment of this segment of the population.

Table 8.2 - Time of registration of the unemployed by education level- 2005



338. Within the National Action Plan for Employment (2005-2008) an Intervention Programme for Unemployed with Higher Education is underway. The programme aims to promote the socio-occupational integration of all the unemployed with higher education by resorting, whenever necessary, to an adjustment or retraining of their competences, thereby contributing to greater social cohesion and economic development. In 2005, this programme covered about 26200 people and involved a total investment of 58 million euros.

339. Data provided by the IEFP on the implementation of the employment and vocational training measures shows that on what refers to employment programmes, the relative weight of the people with more than 12 years of education has passed from 18%, in the 3rd quarter of 2004, to 21.7% in the 4th quarter of 2005, and in what concerns vocational training from 17% to 18.2% for the same periods.

340. There are other measures involving advanced training or the insertion training placements addressed to publics with higher education. Such measures, although with some fluctuations, cover more than 30000 people with higher education.

341. The following measures address adjustment between job supply and demand and cover people with higher education, with some of them addressed exclusively to that group: Integrated Intervention Programme for Unemployed with Higher Education (NAP 2005-2008) covering 108,000 unemployed with higher education and involving an investment of 240 million euros. The IEFP's provisional data (2005) point to 26000 unemployed covered and to an investment of 58 million euros. An increase in the number of people covered by the IEFP programme on Training Placements occurred, from 17209 youngsters in 2004, to 20032 in 2005, (19.058 +953 INOV-JOVEM+21 training placements of Portuguese descendants), of which the majority were young graduates (13 926). The inquiry made during 2005 to the addressees of the measure, 3 months after its conclusion, showed that 70.7% of the respondents changed their socio-occupational status and were now employed. The same happened in 2004.

342. The improvement of the socio-economic situation of the former trainees is slightly better in the youth segment than that of the adults (73.2% versus 68.1%). On the other hand, in what refers to persistence of unemployment the segment aged 25-30 shows a higher percentage (27.3% versus



21.4% - rate of influx in unemployment of the younger people). 75.6% of the unemployed have declared that the training placement had been determinant for their (re)-insertion into the labour market and 74.2% refer that they had got their present job through the enterprise/entity of their training placement.

343. Programme INOV-JOVEM, in coordination with the Ministry for Economy and Innovation, already integrated during 2005, and up to April 2006, about 1465 young graduates in key areas for the SMEs.
344. A further measure is the temporary exemption from the payment of Social Security Contributions, during 36 months, for the hiring of youths aged 16-30.
345. FORDESDQ and Training for Qualified Unemployed covered about 9500 unemployed with higher qualification in 2005. A study made by the Public Employment Service in 2005, to the beneficiaries of the measure showed that 3 months after its conclusion ¼ of inquired had got a job after their participation in that measure; about 63% were unemployed; these values are similar to those obtained by the inquiry made in 2004, a trend that reflects the difficult economic situation of the country. The analysis of the age groups shows that there are more youngsters getting a job than adults, and this aspect is more evident in the Southern regions of the country. The analysis shows also that those who have tried their first entry into the labour market show a higher rate of influx in employment (30.6%) compared with those who wish to re-enter (23.4%). After terminating the training, about 62% of the inquired had developed efforts to get a job. As in 2004, among the difficulties faced to get a job, it stands out the shortage of jobs in the areas related to the academic training and the shortage of jobs in the respective region. It should also be pointed out, in third place, the lack of professional experience.
346. Local Employment Initiatives (ILE), Self-employment Creation (CPE) and Aids to Hiring reached about 1000 unemployed with higher qualification in 2005. While the Promotion of the Programme on Training Placements in Public Administration (POAP) addressed exclusively to the integration of graduates in the different services of Administration, with the IEFPP support.
347. Reform of the technological specialisation courses (post-secondary vocational training – level 4 of the EU), in order to expand this training in higher education institutions and to give an opportunity of re-qualification to people with higher studies and from vocational areas with strong employability problems.
348. Promoting the employment of Masters and PhDs with relevance for R&D in companies. The objective is to support the integration of highly qualified human resources in enterprises in order to perform functions requiring autonomy and research and development capacity, thereby promoting innovation and boosting the enterprises competitiveness.
349. Fellowships are also provided for PhD studies in enterprises, promoting a business environment and topics relevant for the enterprises. This action aims to promote the advanced training in a business environment through the cooperation of enterprises and universities.

### **8.7 Relationship with upper secondary education**

350. The linkages and articulation between the higher and secondary levels of education need close monitoring so as to ensure that they pursue comparable objectives and aims.
351. In the late 80s increasing enrolment in higher education was a priority and entrance examinations were used to rank students in the national tender for places in Higher Education without minimum marks, meaning that any student completing upper secondary education could enter higher education without additional barriers provided there were vacant places.

352. A decade later, due to the extremely fast growth of the system, questions about quality persistently emerged. The government decided to change the paradigm of expansion to one of consolidation and quality. Subsequently, the government reintroduced national examinations at the end of upper secondary education. Students can complete their studies provided that a weighted average of the marks of national examinations (30%) and school marks (70%) is over 9.5 out of 20. As, in general, school grades are higher than national examination marks, a student can complete upper secondary education with marks below 9.5 in the national examinations.
353. However, the Ministry has progressively enforced the rule that students entering higher education must have grades above 9.5 in those disciplines that are considered fundamental to enter a particular higher education programme. From 1996 to 2003 the Ministry put pressure on institutions to raise the entrance standards, but then, in 2003 a new law enforced the use of minimum marks. This measure was introduced by a 2003 decree-law.
354. The main reason for introducing the minimum admission national score was to ensure the quality of the students entering higher education as well as increasing concern with falling standards. As higher education institutions sought to attract students irrespective of their acquired competencies, the Ministry sought to impose more rigour through minimum standards (95 out of 200).
355. The national scores setting minimum admission could impact upon the dropout rates at the university level, especially in the first year. By improving the mechanisms of access, through better co-ordination between both levels of education, and a more simplified and flexible system, linkages between secondary and higher education could be improved. The drop-out rate could, however, be related to the fact that the *numerus clausus* system forced many students to enrol in programs far from their preferences.
356. Many factors still affect negatively students' career during this phase of schooling. Over the last few years there were thousands of students completing 16 years of age (the limit age for compulsory education) without completing basic schooling (9 years). There were also a very large number of students less than 24 years old that were enrolled in upper secondary education but have left the education system without graduating.
357. Every year, a number of students with low education level will enter the segments of the labour market employing workers with low qualification. These young people tend not to return to the education system to complete upper secondary education, due to the predominantly academic character of this education level. Indeed most of the upper secondary education provision aims at providing a route to enter higher education, less than 30% having a technological or vocational emphasis.
358. In 2001 the drop-out rate associated with anticipated leaves and early leaves are still a problem and there are persistently high retention rates in upper secondary education, which since 1995 have been consistently around 35%.
359. The highest percentage of retention and drop-out occurs in the first year of every cycle and it is especially significant in the 10<sup>th</sup> grade that marks the transition from basic education to upper secondary education. This may help explain the low completion rate of upper secondary education.
360. The present government has decided to launch a set of programmes aiming at improving the qualification of the Portuguese population and developing life-long learning. These objectives are an integral component of the national effort under the EU Lisbon strategy. Some of the goals defined in the "New Opportunity Programme" are:

- a) Increasing the offer of vocational education in upper secondary education to enrol an additional number of 100,000 students. By 2010 vocational education should represent 50% of the total offer of upper secondary education, the other 50% corresponding to general education leading directly to higher education.
- b) Offering a new opportunity to students that would leave the education system before completing basic education. Until 2010 there will be an adequate number of vacancies in vocational programmes offering an alternative route for the completion of basic education.
- c) Integrating vocational courses in upper secondary schools that traditionally only provided general courses leading to higher education.
- d) To implement a system for the recognition and certification of competencies and to offer new vocational training opportunities to adults with low qualifications.

### 8.8 Student transfers and credit recognition

361. There are limits to the transfer of students between programmes within the one institution and between different higher education institutions, which result from the generalised *numerus clausus* system. Students are placed by means of a national public tender in the available vacancies according to their stated order of preferences and conditioned by their marks. Therefore, mobility has been traditionally conditioned by the desire of not subverting the results of this national tender. In general, every year each institution opens a limited number of vacancies for transfers between programmes and between institutions and students will enter a competition to fill these vacancies.
362. When an institution accepts the transfer of a student from other institution/programme it also recognises its credits for prior learning in other institution/programme but the decision lies with the receiving institution and it is decided on a case-by-case basis.
363. There is an increasing pattern of student mobility between study programme and between institutions determined by the number of vacancies that institutions open for specific purposes. Table 8.3 quantifies the number of students changing programme and institution for the academic year 2004/05 (first year enrolments) and shows that some 12% of students change their choice of programme, 3% move to other institution and only 1% are students aged over 25 years and have access to the university through a special entrance system for students not holding an upper secondary school diploma. The special entrance system was changed by the present government aiming at increasing the number of students entering higher education.

Table 8.3 – Students changing programme and institution, 1<sup>st</sup> year, 2004-05

	% filled vacancies	New students	Change of programme	Change of institution	≥ 25 years old
Public universities	86.8	21 201	2 083	524	238
Public polytechnics	79.6	14 111	1 799	418	145
Private institutions	48.0	13 362	1 880	711	168
Total	69.7	49 674	5 762	1653	551

Source: OCES, 2005

364. Recognition of prior learning for purposes of admission of students and for credit accumulation is still very limited and mainly used to admit adult students without formal qualifications.
365. The government has recently passed a law allowing for the implementation of the Bologna process, which will result in the generalised use of ECTS and increasing mobility, at least at the end of each cycle of studies.

366. New students entering higher education for the first time have information provided by the Ministry on entrance conditions for every programme and institution, which is part of the national placement system. Students can also obtain some information about the quality of each programme by visiting the site of the quality evaluation agencies, which provide the external evaluation reports. The Ministry has just announced that a new measure that will make higher education institutions responsible for collecting information on the employability of their graduates.

## **9. ASSURING AND IMPROVING THE QUALITY OF TERTIARY EDUCATION**

### **9.1 The Portuguese Quality Assurance System**

367. The Government of Portugal has identified as a strategic objective to guarantee and ensure a system of higher education fully integrated at the European level, in terms of quality, levels of participation and employability of graduates.
368. Quality assurance of higher education in Portugal has been based on the Higher Education Evaluation Act, Law 38/94, passed by Parliament in November 1994. This law was closely developed in collaboration with the Council of Rectors of Public Universities, CRUP.
369. The quality assurance system, established by Law 38/94, has been implemented over the last decade based on a national-based system of self-evaluation with characteristics that might be summarised as follows:
- the evaluation process applies to all higher education institutions and develops in two phases: self- and external evaluation;
  - the responsibility for the coordination of external evaluation lays with representative entities which must be recognised as such by the Government.
  - there are no direct links between the results of the evaluation and the financing of teaching activities, although continued negative results may have consequences on financing and on the recognition of degrees. As a result, the formula for the funding of higher education institutions does not contain any component dependent on the results of quality evaluation;
  - the system aims at the improvement of the quality of higher education in the different fields of study, taking specially into account the nature and typology of teaching, the qualification of the academic staff and the conditions of functioning.
370. Soon after the publication of Law 38/94, the Minister of Education signed a protocol with the Presidents of CRUP and FUP, which recognised the Foundation of Portuguese Universities (FUP) as the representative entity for the public universities together with the Catholic University and defined the general guidelines of the evaluation system. The pilot project launched by CRUP in 1993 was integrated into the new framework and considered as the “first round of evaluations” to be concluded until 1999 under the coordination of the evaluation council established by FUP.
371. The other sectors of higher education organised their own evaluation agencies but had to wait for regulation that was finally established by Decree-Law 205/98, of 11 July, which instituted the practical principles for the recognition of the representative entities and created the National Council for the Evaluation of Higher Education (CNAVES), as a global coordinating body of the evaluation system.
372. CNAVES had a statutory function (Decree-law n. 205/98, 11 July) to assist and assure the credibility of the process of higher education, and to review and report on the quality assurance procedures. CNAVES established protocols for the recognition of the new representative entities – the Association of the Portuguese Polytechnic Institutes (ADISPOR) and the Portuguese Association of Private Higher Education (APESP). These were signed in December 1998 and March 1999, respectively.
373. The representative entities created four evaluation councils, corresponding to the different higher education sectors:
- The Evaluation Council for Public Universities (includes also the Catholic University and the military institutions for university education), managed through FUP;
  - The Evaluation Council for Public Polytechnics, managed through ADISPOR;

- The Evaluation Council for Private Universities, managed through APESP;
- The Evaluation Council for Private Polytechnics, managed through APESP.

374. The responsibility of the national quality assurance system rests with the CNAVES, including the observance of the standards for the overall operation of the system. Nevertheless, the complexity of the organisational structure contributed to hindering efficiency and diluting responsibilities.
375. The option taken was to adopt a programme-oriented approach. Two rounds of programme evaluations took place. The first round (1995-2000) included the public universities and the Catholic University. The second round (2000-2005) continued to be programme-oriented and included programmes at all the higher education institutions.
376. As a result of the evaluation approach taken, a systematic approach to monitor and to support higher education institutions was never developed. Follow-up of the assessments was inexistent and, in many cases, the reports failed to provide consistent, clear and sufficient information to the stakeholders. The reports were not easy to read, and it is doubtful that the different stakeholders of higher education, including employers, students and their parents, used them consistently.
377. Review teams often lacked adequate training and briefing of the evaluation guidelines and this led to criticism that the review teams were not independent and reflected in-breeding. In the last round, the review teams involved 637 experts for the university subsystem, of which only 16% were foreign and 18% were from the external community, and 524 experts for the polytechnic subsystem (only with 3% foreign, 10% non-academics, while 44% from the universities and 41% affiliated to polytechnic institutions).
378. Most significant was the general perception that the evaluation results had no consequences. There were no plans of action drawn up to overcome or attenuate weaknesses or reinforce strengths. There were neither procedures nor timings for follow-up actions. Neither governments nor higher education institutions took any follow-up action. Consequently, the impact of the evaluation approach was negligible.
379. To address the questions of quality of the system, the current government has commissioned an overall assessment and quality review of the Portuguese higher education system. The assessment exercise is structured in two main tasks:
- An overall review of the higher education system and policies examining the comparative performance to other OECD countries and providing recommendations for its improvement;
  - A review of the present accreditation and quality assurance processes and practices, including those performed by the National Council for the Evaluation of Higher Education (CNAVES).
380. This exercise is an extensive, independent and objective assessment of the higher education system and conducted following international criteria with the ultimate goal to guide the reorganisation and rationalisation of the system. The exercises have been commissioned to the OECD and to European Network of Quality Assurance (ENQA), respectively, and both reports are expected to be completed during 2006.

## **9.2. Professional accreditation**

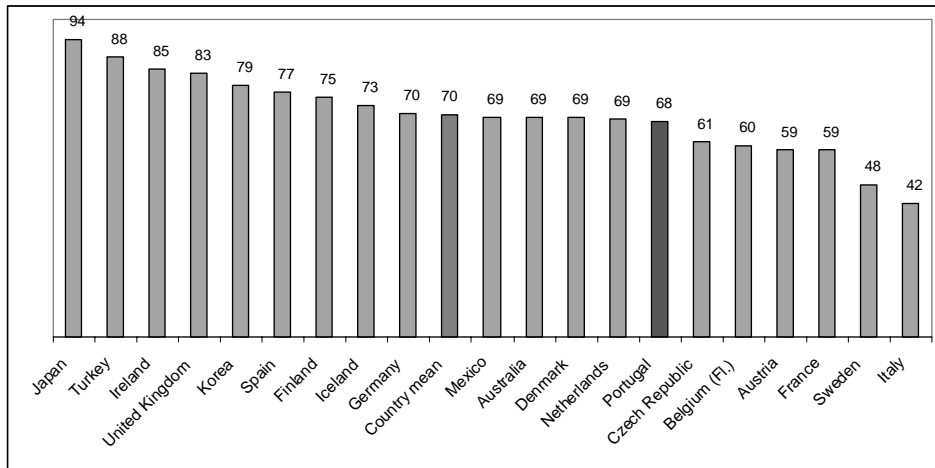
381. The accreditation of higher education institutions has been attributed (through Law 1/2003, 6 January; article 36, n. 3) to the Institutions in charge of the evaluation process, but its practice has not been regulated and, therefore, could not be implemented. As a result, the accreditation

of higher education institutions needs to be designed, regulated and implemented following current trends at European and international levels.

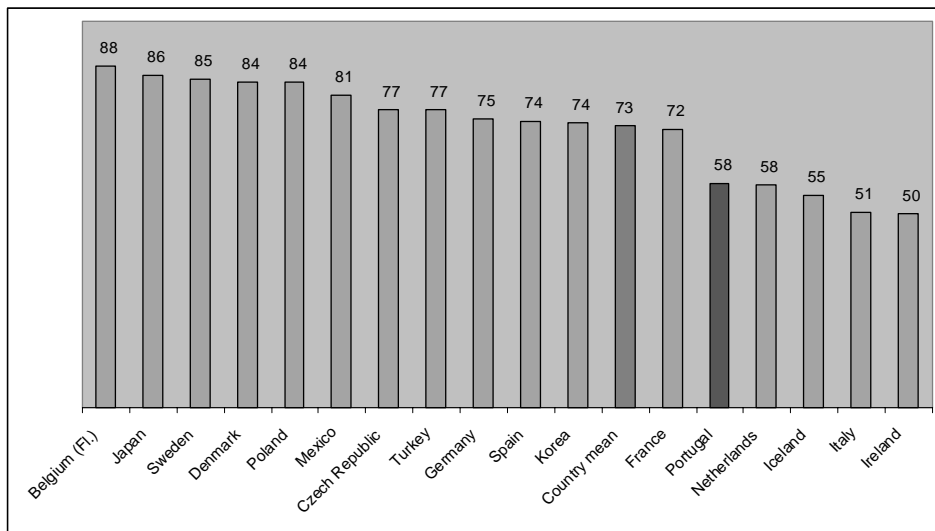
382. Professional accreditation has been pursued through professional associations. These are public corporations for liberal professions (lawyers, doctors, engineers and pharmacists), which are organized in the form of public bodies with an associative basis (i.e., “statutory membership organisations”), working within the public law. The Constitution of the Portuguese Republic grants the freedom of professional exercise, therefore professional associations with power to limit or to condition access need to be established by an Act of Parliament or by a government Decree-Law duly authorised by Parliament.
383. The requirements for becoming an effective member of a professional association vary substantially with the profession. In some cases holding the appropriate degree is a sufficient condition. In other cases admission follows a training period and/or an examination. In 1994 the Engineers’ Association (i.e., “Ordem dos Engenheiros”) established a system of accreditation, and apparently other professional associations are following suite. As a general rule when an accreditation system exists, graduates from accredited higher education institutions have direct access to effective membership. In the case of engineering, the accreditation system uses a methodology that is quite similar to the national quality assurance system.
384. The Architects’ Association established an accreditation system similar to that of the Engineers. The new statutes of the Pharmacists’ Association approved by Decree-Law 288/2001 of 10 of November allow the association to start accreditation procedure. None of the other Professional associations has so far established a system of accreditation, and the statutes of some do not confer this capacity to them.

### 9.3. Graduation rates

385. Graduation rates are a measure of the success of education programmes. There are social, economic, psychological and organisational reasons for not completing higher education. The challenge posed by unsuccessful rates of finishing higher education may be helped with the transition of a system based on the transmission of knowledge to a system based on the development of competencies, as discussed within the Bologna process.
386. Figure 9.1 indicates measures of success (i.e., “survival rate”) in public higher education, for both long (university) and short degrees (polytechnics) using the methodologies referred by OECD (Education at a Glance, 2005). The data suggests that for university education the average values are comparable to those reported at international levels.
387. However the data for higher type-B higher education are of concern as Portugal ranks 15 percent below the average. This might be explained by the lower marks of students entering the polytechnics and by the higher percentage of students employed.
388. The higher education access system, based on a competition for places in a situation of generalised *numeri clausi*, which many times results in placing the students in programmes that are not really their major preferences, may also contribute to decrease the system’s pedagogical efficiency.



a) - Survival rates in tertiary-type A education (mainly Portuguese 'licenciatura')



b) Survival rates in tertiary-type B education (Portuguese 'Bacharelato')

Figure 9.1 Survival rates in tertiary-type education in OECD countries (2000)

Note: according to the OECD's "survival rate index", which quantifies the number of graduates divided by the number of new entrants in the typical year of entrance)

389. Figure 9.2 indicates measures of dropout rates in public higher education, by scientific area. One observes comparatively lower dropout rates in health sciences (with values slightly increasing in recent years). Two convergent factors may explain this result, one being the higher marks of students entering the health sector (a very competitive area) and the other that most students in the health sector are placed in programmes that correspond to their preferences.



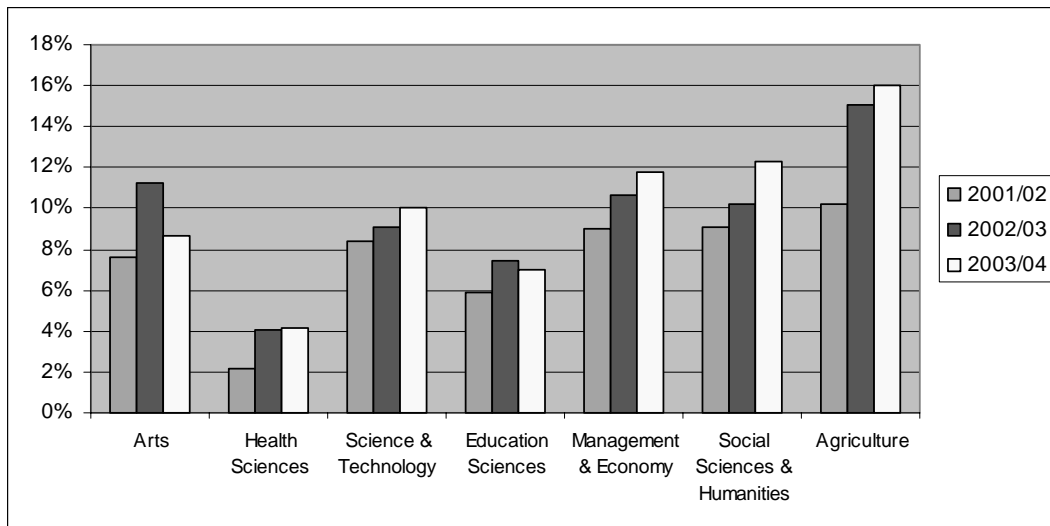


Figure 9.2 – Academic dropout rates in public higher education for 2002 – 2004  
 Note: the “drop-out rate” represents the fraction of students enrolled that have left the programme without a diploma, as calculated in percentage of that year’s total enrolments.  
 Source: OCES

390. In conclusion, assuring and improving the quality and internationalisation of higher education is a major policy concern. The Ministry of Science, Technology and Higher Education has taken the initiative of commissioning a series of review exercises to international agencies. The exercises are designed to ensure that the higher education system and its stakeholders gain maximum benefit from comprehensive evaluations by teams of experienced international experts and that the procedures and processes in place on the Portuguese higher education system can be benchmarked against the best practices internationally.

## 10. INTERNATIONALISATION

391. Globalisation and internationalisation are integral components of Portuguese science, technology and higher education policies.
392. The policy rationale for internationalisation is based on the perception that the quality of the education system cannot be isolated from the international and European context. One can identify in the Portuguese higher education system a relationship between internationalisation and quality of education, as the internationalisation process started as a means to promote the quality of the activities and to develop new areas of knowledge and scientific research.
393. The Portuguese higher education, measured in terms of student and staff mobility is becoming more international, as the flux of incoming and outgoing students, teachers and researchers presents a positive trend. The European Union programmes provide a rationale to develop and implement new higher education and research internationalisation policies.
394. With integration in the European Union the incentives and the framework of the internationalisation of higher education policies increased. There are also many European students coming to Portuguese higher education institutions for a short period of time and often not registered in the system.
395. There are special regimes for access to higher education for students from Portuguese speaking countries. Earmarked vacancies in the higher education system, both in public and private higher education institutions (universities and polytechnics), are provided for students (descendants of Portuguese emigrants and students from the Portuguese Speaking Countries, namely from Cape Verde, Angola, Mozambique, Guinea, São Tome & Príncipe, Brazil and East Timor). The number of candidates that actually obtained a place in Portuguese higher education institutions (universities and polytechnics) has been growing since 1998, which confirms the efforts to help in the qualification of these countries' human resources, demonstrating also the important role that co-operation with and mobility from developing countries plays in the internationalisation process.
396. Efforts have been made to improve language requirements and Portuguese language is taught to students from Europe, namely in the scope of the European mobility programmes, such as in SOCRATES and LEONARDO. In the 2000 report "*The Portuguese participation in ERASMUS – 1987/1999*", edited by the ERASMUS unit of the SOCRATES National Agency, this linguistic issue is pointed as a barrier to European students' mobility of to Portugal. To overcome this barrier, the Portuguese higher education institutions have been promoting language courses for outgoing and incoming students, and Portugal has been an active participant in the Intensive Language Preparation of ERASMUS students by organising Intensive Portuguese Language and Culture courses in Portugal for incoming students.
397. Table 10.1 presents the data on outgoing Portuguese ERASMUS students and one can observe that there is a sustained increasing trend of the number of students, both outgoing and incoming.

Table 10.1 – Erasmus student mobility

	2000/01	2001/02	2002/03	2003/04
Outgoing	2 569	2 825	3 172	3 646
Incoming	1 830	2 179	2 404	2 772

Sources: Socrates and Leonardo da Vinci National Agency, 2005

398. Spain (23.2%), Italy (18.4%), France (10.8%), Germany (9.2%), the United Kingdom (6.0%) and the Netherlands (5.9%), represent 73.5% of all outgoing students and are the preferred destination countries chosen by the Portuguese students and this pattern has been constant over the last three to four years. This is probably due to both linguistic and cultural aspects as well as economic ones. Spain is the closest neighbour country, and this means lower travel costs associated with reduced language barriers. The United Kingdom, France and Germany are Portuguese references in the higher education area and Italy is a preferred country for many Portuguese.

399. Incoming students come preferably from Spain (28%), Italy (18%), France (11%), Germany (9%) and Belgium (7%), which almost reproduces the pattern of choice of the outgoing Portuguese students.

400. There are also foreign students that decided to enrol as normal students in a Portuguese higher education institution. Figure 10.1 presents the number of these students by Continent of origin. It can be seen that about half of the students come from Africa (PALOPs). Among the European students the main percentage has come from Luxembourg in 1998, which is quite understandable if one thinks of the large Portuguese community that lives and works in this country. More recently this scenario has radically changed, as citizens from Switzerland, France, Belgium and United Kingdom have become the main national groups enrolled in Portuguese higher education (OECD).

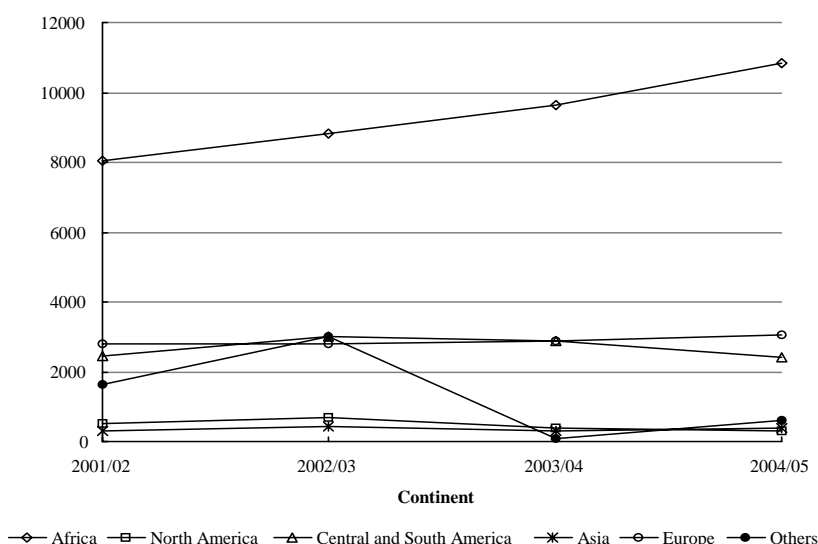


Figure 10.1 – Foreign students enrolled in Portuguese institutions as regular students  
Sources: OCES, 2005

401. The SOCRATES programme is the main origin of the mobility of Portuguese higher education professors, and the total number of teachers enrolled in it has been rising over the last four years, as it is shown in Table 10.2.

Table 10.2 – Portuguese professors' mobility under SOCRATES (I and II) programme

	2000/01	2001/02	2002/03	2003/04
Outgoing	397	460	484	532
Incoming	149	231	271	338

Sources: Socrates and Leonardo da Vinci National Agency, 2005

402. The Foundation for Science and Technology (FCT) funds Portuguese advanced training in Portugal and abroad. Numerous grants are attributed yearly to post-graduate students (researchers) for doctoral and post-doctoral studies in Portugal or abroad. Moreover, Portugal also funds foreign graduate students from different countries who want to complete their studies in Portugal.
403. Table 10.3 presents the number of yearly grants awarded by the FCT to both outgoing Portuguese researchers and to incoming foreign researchers.

Table 10.3 – Grants awarded by the FCT to Portuguese researchers

	1998	1999	2000	2001	2002	2003	2004*
Master	288	262	208	115	82	73	98
Ph.D.	800	733	828	831	872	563	1221
Post-doc	164	210	282	358	371	226	290

\* Until May 2004

404. The number of scholarships for advanced training awarded by the Foundation for Science and Technology (Figure 10.2) has given an important contribution for progress registered in research activities. As can be seen in the pie chart the number of advanced training that is both completed abroad or in a mixed mode between Portugal and abroad is almost half of all the advanced training grants attributed by the FCT.

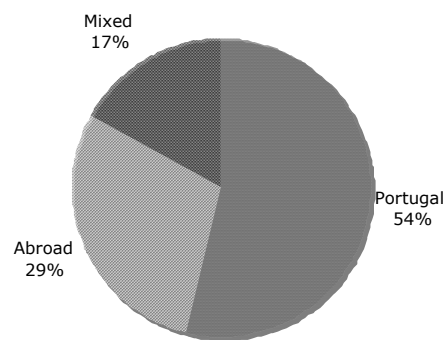


Figure 10.2 – Scholarships for advanced training (Masters, PhD and post-doctoral)

405. Internationalisation of Portuguese research and technology also occurs through bilateral and multilateral co-operation with other countries and organisations. Portugal participates in numerous European programmes (see § 162 for Framework Programme participation results) and this is becoming a priority in terms of ensuring diversified funding sources. Portugal is also an active participant in the majority of the important European and international laboratories and organisations.

406. Brain drain has so far not been a problem for Portugal, but current international trends on the competition for skilled people do represent new challenges for Portuguese policies. There is an increasing capability of Portuguese universities to offer PhD programmes, which is creating new challenges and opportunities that can guarantee quality and strengthen internationalisation while establishing international research networks, where PhD students can be fundamental links.
407. In 2006, the Ministry of Science, Technology and Higher Education initiated a series of innovative international partnerships between Portuguese and North American universities. The objective is to improve competitiveness, productivity and entrepreneurship through a range of education, research and technology transfer measures. International alliances between different universities are to work at the interface between academia and industry and promote knowledge transfers. These international agreements and alliances have focused their activities in four areas: (i) undergraduate education, (ii) professional practice education including Executive Education and Masters Programmes, (iii) integrated research, and (iv) the National Competitiveness Network for disseminating findings to other universities. The proposed objective is to develop integrated research and education programmes focussed on new technologies while promoting entrepreneurial and business skills.
408. The international focus developed within the research and the higher education sector stresses both cooperation and competition. To develop the system, within an increasingly competitive and global economy, the focus is on the adoption of internationalised criteria to improve the quality of the system.
409. International assessments and evaluations in research have been regularly practiced since the mid 1990; and currently international assessments and quality assurance evaluation exercises in higher education are underway. In sum, strategies for developing and reinforcing internationalisation of Portuguese research and higher education are a priority: through international partnerships with universities, through bilateral and multilateral arrangements, attracting international students to study and work in Portugal, supporting student and staff mobility, promoting international panels, committees, conferences and generally creating an open and international environment that supports excellence and ensures quality.

## 11. CONCLUSION

410. The purpose of this chapter is to provide an overall assessment of higher education policy and to provide some insights on trends and changes in policy development. The current discussion on higher education is understood within the context of social and economic change in Portugal, in particular, within the European Union context to evolve to a knowledge-based society.
411. The current policy challenges corresponded to a period of relative stagnation in the growth of higher education students after a period of more than 30 years of consecutive growth. Over the last decades Portugal was able to increase its higher education system at a growth rate that has no parallel in other European countries and today participation (20-24 years) corresponds to a gross enrolment rate over 50%, with the number of enrolled students increasing almost 800% relative to the student population in 1974. Research activities also increased substantially over the last decade: the number of PhDs in Portuguese Research Units increased over 130% from 1996 to 2003, the yearly number of new PhDs more than trebled from 1990 to 2004, while the number of Portuguese scientific publications increased fourfold between 1991 and 2001.
412. In the period between 2002 and 2005 the number of students registered in public higher education institutions fell by 10%, representing a loss of 29 000 students. This decrease in enrolment can be seen as a result of changing demographics trends, the unsuccessful rates in completing secondary school and the increasing exigencies in admission to higher education. In the last year government measures have begun to successfully address this decline and turn enrolment rates around to a growth of 1.5% for 2006-2007.
413. Nevertheless, Portugal remains one of the European countries with the lowest number of graduates, and increasing the academic and professional qualifications of the Portuguese society continues to be an essential factor for economic, social and technological modernization. Contrary to what is sometimes affirmed, Portugal does not have too many graduates, but actually has too few. Portugal remains one of the European countries with the lowest number of graduates, and increasing the academic and professional qualifications of the Portuguese society continues to be an essential factor for economic, social and technological modernisation.
414. Holding a qualification from higher education is a social resource, which is critical for future learning, life plans and employability. Making higher education training more socially and culturally relevant and improving its quality will simultaneously attract more people to attend courses and assure better conditions for their successful completion.
415. The growth of students' attending higher education was associated with the development of a complex network of institutions, integrating 14 public universities and one university institute and 15 public polytechnics, with a network of about 117 private institutions. This growth has led to questions about the need to rationalisation offer, to questions of access and *numerus clausus* policy considerations, to whether the institutions are able to ensure adequate links with the employment and labour market and in general with the overall quality of the system, the institutions and the courses provided. Quality factors have risen to the forefront of education policy concerns.
416. A number of challenges and issues have been raised and need to be addressed:
- How to improve the regulatory framework and to ensure the adequate supply of higher education graduates to the labour market, in a way that fosters quality, with the necessary specialization?
  - How to strengthen lifelong learning, vocational training, and certification of formal or informal training, as well as flexible study schemes?

- Which level of public funding is necessary to guarantee the adequate growth of the knowledge base?
- What are the implications for the organization of the supply of higher education and, in particular, for post-graduation education?
- Which governance system and institutional autonomy is suitable for higher education institutions?
- How to increase the number of students, decrease drop-out and retention rates and help qualify the Portuguese population?
- Which social support and loan systems?
- What strategies to promote access for new publics, including students who have left the education system before enrolling in higher education, including those from working class and lower class backgrounds?
- Which effective need to promote the internationalization of higher education and research units? Reflection on a possible brain drain trend in Portugal, including examining career prospects for research and academic staff?

417. Clear policy options are essential to guarantee the higher qualification of Portuguese people in the European space, implementing the Bologna process and reinforcing the system of higher education, promoting the quality of the system and extending access to new publics.

418. Taking the conceptualisation of knowledge-based economies into account, it can be said that the performance in competitive knowledge environments depends basically on the quality of human resources (namely, their specialisation, competences, educational level, and learning capacity) and on the activities and incentives, which are oriented towards knowledge creation and diffusion.

419. Several studies over the last decades have continuously shown that the complexity of the innovation process favours societies organised around a demanding culture with evaluation routines and open to criticism. This requires structures that are prearranged formally and institutionally (i.e., schools, firms, universities, laboratories, governmental and non-governmental organisations, namely for the promotion of scientific culture). For that reason, it is vital for States to make the autonomy of universities and scientific institutions feasible, as well as enable a sustainable development possible regardless of external alterations to science development. This is a major objective of the current government programme, but it represents a major challenge for the institutions themselves, as well as for the overall governance of the higher education system.

420. The analysis of higher education is framed conceptually in a systemic view of the role of science and technology, in which the main issues affect knowledge sharing and diffusion. Therefore, analysis on the understanding of a complex national context, considers the following factors:

- People: it refers to the country's human capital, in particular, to the levels of formal education held by its workforce. The country at large is still characterized by a workforce with rather low educational and training levels, contrasting with a younger population with similar qualifications levels as other OECD's countries. This fact has resulted in new challenges for the workforce qualification's development, and for the attraction of new talents to S&T in order to foster scientific employment and expand national and international knowledge networks.
- Knowledge: it is linked to the creation of new knowledge in Portugal, because the country has serious deficits in R&D scale and intensity in comparison with the other OECD's countries.

- Ideas: regarding, in particular, knowledge diffusion and therefore the innovative capacity, to which the relationship of firms with academic research brings about new challenges and also an increasing accountability of its activities.

421. Moreover, other noteworthy aspects within the conceptual framework include:

- Infrastructures: consists on the necessary conditions for the development of higher education, namely for the functioning of scientific institutions and their relationship with higher education, society, and firms in particular.
- Institutions: consists on the sufficient conditions for a knowledge driven society, including the necessary reinforcement of the scientific institutions, as well as the legal framework under which higher education develops.
- Incentives: consists on the necessary conditions for a higher education system, especially in terms of public and private efforts that are vital to develop new and disseminate existing knowledge. In this context, market conditions, competitive structure and naturally public policies are considered, especially associated with higher education funding and evaluation.

422. In order to allow scientific organisations and higher education institutions to develop and promote themselves autonomously, the diversity of funding sources should be facilitated and the governance of the system renewed. The institutions themselves must defend their own budgets, namely in face of independent peers. It is obvious that this process involves institutional reform, deriving from the higher education institutions' need to evolve towards responsibility and accountability to society.

423. Within the higher education system, the strengthening of science and technology institutions necessarily involves the sustainability of incentive programmes and the continuous implementation of independent scientific evaluation models, which have been put in practice and disseminated in OECD's most industrialised countries. Portuguese institutions have experienced these processes in a systematic way only since 1996 and such practices should be continued and fully appropriated in Portugal.

424. Table 11.1 presents the main Governmental goals, as expressed through the revised country strategy to achieve the Lisbon Goals, as well as the Government's Technological Plan. The main objective for higher education during the present legislature is to contribute towards overcoming the country's scientific and technological delay and to fulfil the urgent need to ensure that new generations are qualified for the requirements of the European space, guaranteeing the full integration and qualification of national institutions of higher education in Europe.

425. Internationalisation and globalisation are central tenets in the government's policy towards promoting the objectives of science, technology and higher education. This has been shown in the funding programmes of the FCT, in particular, in the significant number of PhDs grants attributed both in the country and abroad. Participation in EU mobility programmes is another avenue that can be further supported.

426. The international qualification of Portuguese higher education is essential today for the development of the country and the employability of our graduates. This challenge involves assuring the transition from an education system based on the transmission of knowledge to a system based on competence building. This is a central and critical issue all over Europe, and particularly in Portugal, given the system's drop-out rates and the conservative influence of rhetorical and passive methods of teaching.

427. But the challenges for Portugal also include improving access to higher education and creating the conditions for enabling every citizen to gain access to life-long learning, and developing the



role of the institutions of higher education in this process. In this context, the main objectives of the Government for the 2005-2009 period include:

- Implementing the Bologna European process for the reform of higher education, which is an opportunity to stimulate entry into higher education, improve the quality and relevance of the training provided, and to encourage mobility and internationalisation.
- Reinforcing a system of higher education with autonomous institutions, facilitating the reform of the way these institutions are governed in order to develop a culture of accountability and to make forms of organisation and management more flexible, promoting the de-governmentalisation of the system and valuing partnerships between national and foreign institutions.
- Promoting the quality of the system, valuing the need to work with various types of public, which would require the structuring of an internationally recognised quality assurance system, developing the present model of assessment and financing and developing a national system of accreditation.
- Promoting equal opportunities for access to higher education, improving attendance and completion of courses in higher education, attracting new types of public, in a logic of life-long learning and the improvement of social action in schools.

428. For these objectives to be achieved, it will be necessary to:

- Give priority to the consolidation and re-organisation of the system of higher education, avoiding further expansion of infrastructures without a serious critical review of the capacity installed;
- Promote the independent, transparent and rigorous assessment of the public and private, university and polytechnic systems, working with international standards (namely as set by OECD), to permit the necessary stream-lining and re-organization of the present system in the light of the challenges in the future;
- Stimulate the diversity and flexibility of the system of higher education, particularly in terms of specialisation and institutional performance and guaranteeing closer relationship between the university and polytechnic sub-systems, valuing excellence in both;
- Create and develop a system of accreditation for all of higher education according to international standards which, together with the progressive internationalisation of the present system of assessment, may contribute to internationalising the Portuguese education system and improving its regulation to benefit public interest, clarifying the role of the State in relation to the institutions;
- Clarify the public funding system of the institutions of higher education, guaranteeing the necessary stability in the institutions and elements of trust between the institutions and the State;
- Review both the laws regulating the autonomy of the universities and polytechnics and those regulating academic careers, in order to adapt the objectives of higher education to the European space.

Table 11.1 Main Government Goals for 2010, as expressed in the “Technological Plan”

Context	Indicator	Source	EU 15	EU Leader 2003	Spain	Portugal	
						2003	Goal 2010
<b>Characterization of Human Resources</b>	1. Tertiary graduates in science and technology per 1 000 of population aged 20-29 years	Eurostat	12,2 (2001)	24,2 (IE)	12,6	8,2	12
	2. S&E graduates (ISCED 5 e 6) as % of new degrees	Eurostat, Key Figures 2005	24,2%	30,5% (SE)	28,1%	19%	25%
	3. Total R&D personnel (FTE) per thousand labour force	OCDE, MSTI	10,5%	21,8 (FI)	7,8%	4,7%	7,5
	4. Number of researchers (FTE) per 1000 labour force	Eurostat, Key Figures 2005	5,4 (EU25)	16,2 (FI)	4,9	3,6	6
<b>S&amp;T Resources (input)</b>	5. Highly qualified scientific and technical workers as % of total labour force	Eurostat, Key Figures 2005	13,8% (EU25)	21,2% (DK)	15,3%	7,8%	11%
	6. Business Enterprise Expenditure on R&D (BERD) as % of GDP	Eurostat, Key Figures 2005	1,23% (EU25)	2,95% (SE)	0,57%	0,26%	0,75%
	7. Percentage of Gross domestic expenditure on R&D (GERD) financed by government	Eurostat	0,70%	1,0% (SE)	0,42%	0,47%	1%
	8. New PhDs per thousand population aged 25-34	OCES, INE	-	-	-	0,60 (2003)	0,9
<b>S&amp;T Performance (output)</b>	9. New PhDs in S&E fields of study per thousand population aged 25-34	Eurostat, Key Figures 2003-4	0,55 (2001)	1,37 (SE) (2001)	0,35 (2001)	0,30 (2001)	0,45
	10. Number of scientific publications per million population	Thompson Scientific, Key Figures 2005	439	1642 (SE)	588	406	650
	11. Number of patent applications to the European Patent Office (EPO) per million inhabitants	Eurostat	158,72 (2000)	361,50 (SE) (2000)	28,75 (2001)	4,01 (2000)	12
	12. Number of patents granted by the United States Patent and Trademark Office (USPTO) per million inhabitants	Eurostat	66,66 (2000)	494,16 (LI) (2002)	8 (2002)	1,29 (2002)	4
	13. High-tech manufacturing industries - exports as % of total manufacturing exports	Eurostat (context), UN (comtrade), Key Figures 2005	19,7% (EU25)	51,6% (IE)	9,3%	11,6%	15%
	14. Technology balance of payments (receipts-payments) as % of GDP	OCDE	- 0,06% (2001)	0,51% (BE+LU) (2001)	- 0,14% (2001)	- 0,28% (2001)	- 0,15%

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