

COLLABORATION PROTOCOL

between

SCIENCE and TECHNOLOGY FOUNDATION (FCT)

AND

**PLANNING, STRATEGY, ASSESSMENT AND INTERNATIONAL RELATIONS DEPARTMENT of the
MINISTRY OF SCIENCE, TECHNOLOGY AND HIGHER EDUCATION, MCTES (GPEARI-MCTES)**

On the

“OBSERVATORY OF SCIENCE, TECHNOLOGY AND QUALIFICATIONS”

Scientific and technological capacity has increased considerably in Portugal over the last few years, the number of researchers in the active population having reached 8.2 researchers (FTE) per one thousand active workers in 2009, exceeding the UE or OECD average, and approaching the levels of more developed countries.

This growth is observed both in the public and in the business sectors and, in addition, shows the strengthening of the scientific capacity of higher education and private research institutions. It also reflects the creation of new scientific institutions, both public and private, and the broadening base of companies, hospitals and other institutions with research activities operating in Portugal. The number of companies with R&D activities has grown, reaching in 2009 approximately 2000 companies in all sectors of economic activity, while in 2005 there were around 930. This increase is particularly relevant in the recessive international economic context that has characterized recent years, as the total business expenditure in R&D has almost tripled since 2005 (at current prices).

The growth in company investments in R&D reflects the impact of the accumulation of public investment in science and technology and the effort made by the private sector to valorise scientific development and the installed technological capacity, particularly in terms of their potential for innovation, access to emerging markets and development of exports. After the reintroduction in Portugal of Fiscal Incentives for Business R&D in 2005 (i.e., “SIFIDE”), which was strengthened considerably at the end of 2008, the SIFIDE was extended for another five years as from 2011, having been further enhanced to encourage the hiring of PhDs.

The increased training and qualification of new human resources, and their institutional placement, together with the attraction and retention of researchers from the rest of the

world, confirms the distinctive features of the current Portuguese scientific and technological development. In 2009, there were 45,909 researchers recorded, when measured in full time equivalents (FTE), of a total of 52,313 personnel (including technical personnel, also in FTE). The number of researchers in companies already represents approximately 24% of the total number of researchers in Portugal, having tripled between 2005 and 2009, now reaching 10,841 (FTE). Additionally, recent data on the flow of PhDs in the last forty years shows the capacity of scientific institutions in Portugal to attract and retain researchers.

This increase in new human resource qualifications was followed in recent years by a far-reaching institutional reform of higher education, resulting in a system relatively more diversified and more open to society, enjoying greater credibility in Portuguese society and among international partners. Amongst other aspects:

- The 20-year old segment of the population enrolled in higher education has grown 19% since 2005 and attained 37% in 2010, surpassing the European average of 35%;
- The number of higher education graduates increased 20% between 2005 and 2010, reaching a total of 81 thousand new graduates in all cycles of study (there were 70 thousand in 2005), with approximately 77% of these degrees being obtained in public education;
- The number of graduates in mathematics, science and technology areas increased from 10 to 15 per thousand amongst the age group 20-29 years old, between 2005 and 2009, having also exceeded the European average of 14.

Also well known is the fact that the political priority given to scientific and technological development was also accompanied by the continuous strengthening of experimental teaching in sciences and the encouragement of a scientific and technological culture. The national network of "*Ciência Viva Centres*" now includes 21 centres (there were 10 in 2005).

The progress documented in the previous paragraphs was also accompanied by a strict budgetary framework, with priority for scientific development through the Government's "Commitment to Science", leading to a total annual financing given by the Foundation to Science and Technology which doubled between 2005 and 2010, when it reached nearly 490 million Euros.

It should finally be noted that the statistical results published over the last few years reflect a continued effort in the modernization of the information gathering process through the national R&D survey, in close collaboration with similar entities from other countries and especially OECD and EUROSTAT. In particular, it should be noted that the coordination with the higher education statistical monitoring and recording system for masters and PhD students was improved, and the efforts to improve data gathering by companies were continued.

It is in this context that it is urgent to carry out a more thorough observation of the national scientific and technological capacity, in particular of qualified human resources, their institutional placement and the conditions for their settling in Portugal, in a manner that complements and supplements the existing R&D and innovation surveys. It requires encouraging studies and motivating research teams who would work on the processes of technological change in Portugal, analysing the dynamics of scientific and technological

development and the flows of qualified human resources, including their links to the job markets. It is also intended to facilitate the publication and dissemination of works and analyses relevant to the formulation of policies and strategic and operational planning in the science and technology areas.

In line with the best European practices, the activity of observation in science and technology should involve mobilizing research teams to work in close collaboration with the statistical and administrative services of the Ministry of Science, Technology and Higher Education, namely those responsible for gathering and publishing statistics, completing and extending the classification that is currently done on the national scientific and technological system with new works and the systematic analysis of the principal challenges and opportunities that science and advanced training face in Portugal.

The activity and works to be performed should be oriented by an international Scientific Council, so as to ensure that the methodology is up to date and meets the quality required by the complexities of the subjects to be dealt with, as well as guaranteeing their broadest dissemination. Naturally, it may be applied to all the domains thought useful and relevant, but priority should be given to the observation of the flows of qualified human resources, including employment and mobility conditions for graduates and PhDs. It should also include studies on the impact science and technology activities have on economic and social development.

In this context, FCT and GPEARI/MCTES, under the terms of Art. 2 of Decree-Law no. 152/2007, of 27 April, and Art. 2(2) of Regulatory Decree no. 60/2007, of 27 April, do hereby establish this protocol with the goal of creating and promoting a “Observatory of Science, Technology and Qualifications”, under the following terms:

Article 1

Observatory of Science, Technology and Qualifications

1. The “Observatory of Science, Technology and Qualifications”, hereinafter designated “Observatory” is a joint project of FCT and GPEARI, with the purpose to study the national scientific and technological capacity, particularly in regard to qualified human resources, their institutional placement and the conditions for their settling in Portugal, in a manner that complements and supplements the normal exercises of science and technology surveys, encouraging external research teams to work in close collaboration with the services of the Ministry of Science, Technology and Higher Education responsible for gathering and publishing statistics.
2. The object of the Observatory should complete and extend the data gathered through the national surveys of the scientific and technological system, specifically through the systematic analysis of the processes of technological change in Portugal, identifying and analysing the

dynamics of scientific and technological development and the flows of qualified human resources, including their links to the job market.

3. The Observatory is comprised of research teams who work in close collaboration with the services of the Ministry of Science, Technology and Higher Education responsible for gathering and publishing statistics on topics that include at least those referred to in Annex 1 of the current agreement.

Article 2

Scientific Council

1. The Observatory activity is accompanied by a Scientific Council.
2. The Scientific Council is composed of five to seven members, all experts of international renown in the areas of action of the Observatory, of which at least two members are foreign experts.
3. The members and the chairman of the Scientific Council are appointed by the President of FCT, for a three-year period, which may be renewed, the initial composition of which is given in Annex 2 of the current agreement.
4. The members of the Scientific Council may lead or form part of the Observatory research teams.
5. The scientific council is to meet at least twice a year, with logistics support provided by the services of the Ministry of Science, Technology and Higher Education responsible for gathering and publishing S&T statistics or by FCT;
6. The Scientific Council meetings are convened by the senior director of GPEARl responsible for S&T statistical services, by the President of FCT or by a majority of its members.
7. The Scientific Council meetings have the support and presence of the senior director of GPEARl responsible for S&T statistical services.

Article 3

Responsibilities of the Scientific Council

The Scientific Council of the Observatory has the following responsibilities:

- a) Accompany, advise and stimulate the activities developed by the research teams who form the Observatory, specifically in projects that are complementary and supplementary to the science and technology surveys, facilitating international comparison of the progress in national scientific and technological capacity;

- b) Accompany the surveys performed annually in the areas of Science & Technology, Innovation and Higher Education, encouraging and stimulating their quality, international relevance and ensuring their complete independence;
- c) Provide assessment reports on the activities and publications of the services responsible for gathering and publishing S&T statistics, whenever requested by the GPEARI coordination or FCT, or whenever it is advisable;
- d) Encourage and guide the publication of the results of the studies to be made;

Article 4

The responsibilities of the parties

1- It is the joint responsibility of FCT and GPEARI/MCTES to:

- a) Ensure the functioning and operation of the Scientific Council;
- b) Mobilize research teams and support research projects in partnership with research units, under recommendation from the Scientific Council;
- c) Ensure close collaboration between the research teams and the services responsible for gathering and publishing S&T statistics, including the reception of research fellows and the contracting of PhD researchers for these services;
- d) Develop collaboration platforms with the S&T system that allow the use of science and technology statistical data;
- e) Ensure the availability of the information and the results of the works to be developed, keeping a site on the internet available under the title "Observatory of Science, Technology and Qualifications", with content preferably in Portuguese and English.

2- Additionally, it is the responsibility of FCT to:

- a) Ensure the financial support that allows performing the Observatory activities, including the operation of the Scientific Council;
- b) Ensure the financial support of research fellows, *teams and research projects* and/or contracting researchers by the services responsible for gathering and publishing S&T statistics;
- c) Ensure the financing of R&D projects in partnership between research units and the services responsible for gathering and publishing S&T statistics.

Article 5

Duration

The current Protocol is signed for an indefinite period of time, and may be amended by agreement between the signatories;

Lisbon, 04 April 2011

President of the FOUNDATION FOR SCIENCE AND TECHNOLOGY (FCT)

João Sentieiro

**Director of the PLANNING, STRATEGY, ASSESSMENT AND INTERNATIONAL RELATIONS
DEPARTMENT OF MCTES (GPEARI-MCTES)**

Vitor Magriço

**Deputy Director of the PLANNING, STRATEGY, ASSESSMENT AND INTERNATIONAL
RELATIONS DEPARTMENT OF MCTES (GPEARI-MCTES)**

Joana Mendonça

ANNEX 1. Initial Reference terms for the projects to be developed by the “Observatory of Science, Technology and Qualifications”

The “Observatory of Science, Technology and Qualifications” has as its objective to carry out a more thorough observation of the national scientific and technological capacity, in particular on qualified human resources, their institutional placement and conditions for settling in Portugal, in a manner that complements and supplements science and technology survey activities. In this context, the projects and activities to be performed should be guided by the following questions.

1. Observation of employment and mobility of the graduates

- What are the employment tendencies of undergraduates and masters? What is the time necessary to obtain employment? Type of labour relationship (stable/precarious)?
- Unemployment trends, by age/scientific area (including the unemployed, whether registered or unregistered in employment centres). What is the period of unemployment for the undergraduates, masters and PhDs?
- How has the job market reacted to the undergraduates /masters from Bologna?
- What is the degree of change of the scientific area from the 1st to the 2nd cycle of Bologna?
- Is there a tendency to leave the country, to access the job market or to continue studies? At what point of the life cycle (soon after graduating)? For how long a time?
- Is there interregional mobility, for the same reasons?
- How has the search for Higher Education by foreign students progressed? Do they stay in Portugal or do they return to their own countries?

2. Graduate and PhD employment and mobility

- PhDs residing in Portugal (Portuguese and foreigners): What do they do? Is employment compatible with qualifications? Time necessary for obtaining employment? Type of labour relationship (stable/precarious)?
- Foreign PhDs in Portugal: where did they graduate? What do they do? Why did they come? Do they develop networks with other countries? Plans for the future?
- Portuguese PhDs abroad: Where did they graduate? What do they do? Why did they leave? Do they develop networks with Portugal? Plans for the future?
- How do they (ex-) fellows (doctors and post-doctorate students) fit into the job market? (NOTE: particular attention to those that are finishing the post-doctorate grants)
- Unemployment trend, by age/scientific areas (including the unemployed, whether registered or unregistered in employment centres).

3. Progress of the science, technology and innovation indicators

- How have the indicators progressed in Portugal, and how does this compare with other countries, namely in the European Union, specifically in respect to human resources and their mobility?
- How can these indicators be estimated in the medium/long term?
- What are the perspectives for change in the science and technology indicators?

4. Economic and social Impact of science and technology

- How to measure and optimize the analysis of the complex relations between S&T and economic growth, namely the impact of business expenditure in R&D (BERD)? How to analyse and quantify the relation between BERD and the business capacity to export?
- What are the dynamics of employment in the companies that perform R&D activities, when compared with the companies that do not develop R&D? How do the characteristics of the workers in the companies in both groups differ? What are the dynamics of mobility of the workers in the companies that perform R&D?

MAIN SOURCES OF INFORMATION:

Sources integrated in the national statistical system

- MCTES/GPEARI: various
- INE (i.e., the national statistical institute): Censuses, in particular the 2011 census (allowed assessing current employment and unemployment, as well as the migratory entrance of graduates, according to several variables – sex, age, nationality, scientific area...); Employment survey (analysis of large groupings) (*NOTE: particular attention to the 2011 Census, with data probably available at the beginning of 2012; in the case of unemployed, allowing the assessment of all, whether registered or not in employment centres*)
- INE/SEF (i.e., emigration and foreign services): immigration data (student visas, authorizations for residence by level of education)
- MTSS (i.e., labour ministry): List of personnel (educational attainment data, according to several variables)
- IEPF (i.e., employment and professional training institute): registered unemployment

International statistics sources

- OECD: collaboration with OECD that allows access to detailed statistics from destination countries, in particular the results from the round of 2011 censuses (this data allows assessing the number of graduates with Portuguese nationality, as well as those born in Portugal, residing abroad, according to several variables. Objective: update estimates of the OECD and the World Bank on the migration of highly qualified persons.)
- Miscellaneous sources of statistics from other countries (as an alternative or a supplement to the OECD data), in particular statistics of annual flows of Portuguese, by age and educational attainment (*NOTE: possible link with the Emigration Centre*)

Databases

- Databases for graduates of the 1st and 2nd cycles (to be created)
- Database of PhDs in Portugal and Portuguese abroad: nominal database of PhDs from MCTES
- Database of qualified Portuguese abroad: Star Tracker/Talent Foundation, Portuguese researchers associations, etc.

Others

- Materials gathered in the scope of the Paths of Graduates entering Higher Education Observation System (ODES), in particular research into the paths of PhDs entering Higher Education, 2001 (*NOTE: possible repetition of this survey for a more recent group*)
- Studies and miscellaneous projects (including projects financed by FCT, concluded and in progress; studies done by Higher Education institutions on the employability of their graduates, etc.)
- Miscellaneous documentation

ANNEX 2. Initial composition of the “Observatory of Science, Technology and Qualifications” Scientific Council, April 2011

1. **Giorgio Sirilli**, giorgio.sirilli@cnr.it, Chairman.
Research Director, “National Research Council of Italy” (CNR), “Institute for the Study of Regionalism, Federalism and Self-Government” (ISSIRFA), Italy;
Chairman, NESTI/OECD, “National Experts in Science and Technology Indicators”, 1986–2002

2. **Fred Gault**, gault@merit.unu.edu
Research Director, *UNU Maastricht Economic and Social Research and Training Institute on Innovation and Technology (UNU-MERIT)*
Professor Extraordinaire, *Tshwane University of Technology, South Africa (member of the TUT Institute for Economic Research on Innovation)*
Director, *Statistics Canada, 2000-2008*
Chairman, NESTI/OECD, “National Experts in Science and Technology Indicators”, 2002–2008;
Chairman, WPIIS/OECD, *Working Party on Indicators for the Information Society, 1997–2002.*

3. **João Peixoto**, jpeixoto@iseg.utl.pt
Coordinator of the PhD program in Economic Sociology and Organizations, ISEG/UTL, since 2010.
Associate Professor, ISEG/UTL, since 2003.
Full Professor in Sociology, ISEG/UTL, 2002
Researcher at SOCIUS – Economic Sociology and Organizations Research Centre, ISEG/UTL, since 1991.
Visiting Professor at Brown University, USA, 2008-2009 and 2005-2006.

4. **António Firmino da Costa**, antonio.costa@iscte.pt
Assistant Professor, ISCTE – Lisbon University Institute.
Director, Centre for Research and Sociology Studies, CIES/ ISCTE, 2000-2005

5. **Pedro Portugal**, pportugal@bportugal.pt
Senior Researcher, Bank of Portugal, since 1996
Guest Professor, School of Economics, New Lisbon University, since 1999
Full Professor in Economics, Porto University School of Economics, 1999