NATIONAL SCIENCE & TECHNONOLOGY INDICATORS 2002

President of Brazil

Luís Inácio Lula da Silva

Minister of Science and Technology

Eduardo Campos

Executive Secretariat

Luís Manuel Rebelo Fernandes

Assessorsip of Monitoring and Evaluation

Maria do Carmo Pompeu Sidrim

General Coordination Indicators

Fábio Paceli Anselmo

Technical Team

Carlos Roberto Colares Gonsalves
Fernando Varejão Freire
Frederico Melo e Silva
Luiz Mário Marques Couto
Mayra Juruá Gomes de Oliveira
Renato Baumgratz Viotti

General Coordination of Program

Maria do Socoro Fernandes

Technical Team

Aridney Loyelo Barcellos
Fábio da Silva Araújo
Gilson de Morais Batista
Luís Felipe Fontes do Amaral
Norma Suely Batista Gomes
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Address:

MCT - Ministério da Ciência e Tecnologia
SEXEC - Secretaria Executiva
ASCAV - Assessoria de Acompanhamento e Avaliação
Coordenação de Estatísticas e Indicadores
Esplanada dos Ministérios, Bloco E - sala 526
CEP: 70067-900 - Brasília - DF

Telephone: (61) 317-8117/317-8118
Fax: (61) 317-8048
E-mail: webind@mct.gov.br
website: http://www.mct.gov.br/estat/ascavpp

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Presentation

The Science and Technology Ministry – MCT brings to light the nacional indicators on science and technology (S&T) by issue and Internet version. The information review process took place from second semester of 2003 up to 2004, includingavailable data until april of that year. There was the concern to keep the methodological standard used in the previous version, to preserve international comparisons and the evolution accompaniment of the expended resources and the results gotten by the country in this area.

The home page offers ease room for new indicators presentation and update availability since new information is gotten. The printed stuff does not possess this flexibility. It is intended to produce at least one printed edition per year, enclosing a selection of main tables and available graphics on Internet.

The technical standard of these publications will be sponsored by Permanent Commission of Indicators, created by the MCT, in 2003, to assist this Ministry on data drilling, information analisys and indicators out put.

The search for sound information will be the MCT permanent objective despite real difficulties related to scope magnitude of the science and technology, multiple sources of information and the permanent data evaluation. This task will be carried out by the Ministry's technicians, with the valuable aid of the primary sources of information producers mentioned in tables and presented graphics.

The debate on the meaning of indicators will go on looking for better and complete information to give support to government and society.

Prof. Luís Manuel Rebelo Fernandes
Executive secretary

Summary

Human Resources

Education and Research Scholarships

Scientific Production

Patents

Tecnological Balance

International Comparisons

History

For more than two decades, the development of a large base of quantitative information on Science and Technology (S&T) has consistently been on the agenda of many countries. Increasing competition among companies, regions and countries, the fast pace of technological change, the high standards for research and the general perception that knowledge has become essential for the generation of wealth and the promotion of social well-being are some of the main reasons why governments and institutions have invested considerable efforts in identifying and producing Science and Technology indicators.

A comprehensive information system about S&T could be an essential tool for evaluating the scientific and technological potential of a country, monitoring opportunities in diverse areas and identifying the most promising activities and projects for the future, thereby assisting the strategic decisions of science and technology policy administrators.

Nevertheless, the selection and development of accurate indicators is an extremely complex task. First, the Science and Technology area encompasses a wide and diverse spectrum of activities with very distinct results and requirements, involving multiple agents and both public and private institutions. The second characteristic to be emphasized is the long-term sphere of S&T actions, requiring evaluation and interpretation of results over time. The third and important factor in the area is that produced results are not so easy to compute, as in the case of intangible assets.

Still it is worthwhile to mention the outstanding national standards for this technical and scientific base, thereby demonstrating the need to associate the production of quantitative information with the development of deeper study in order to validate or redefine basis supporting the indicators.

Since the first steps taken by the United Nations Educational, Scientific and Cultural Organization (Unesco) at the beginning of the 1960s towards mapping the "national scientific and technological potential," there has been outstanding progress made in developing concepts, methodologies and techniques for establishing indicators. One stand out is the effort made by the Organization for Economic Cooperation and Development (OECD) to stimulate and conduct comparative studies among their member countries on research and development (R&D) activities.

As well as setting out recommendations and rules to measure R&D activities, the OECD publishes a standardized series of inputs, indicators and results for their group of countries, which have become the basic reference point for other national initiatives. Although these indicators are not exempt from criticism, there is no doubt they constitute a common foundation for many countries in the generation of information.

For lesser developed countries, the challenge is not only to amplify the coverage and scope of the S&T indicators and thus preserve international comparison standards, but also to improve the quality and representativeness of primary information by investing in data collection and evaluation. As well, national studies need to be developed that allow more knowledge about unique S&T structure characteristics so the methodologies used in indicators production can be refined.

The adoption of international standards does not conflict with the objective of national institutions dedicated to the goal of achieving an information system able to generate flexible answers appropriate to the planning, follow up and evaluation needs of respective scientific and technological bases. In the same way, regional initiatives, such as those developed for the Iberian-American Science and Technology Indicators Network (Ricyt) can lead to laying out a standardized set of indicators better adapted to specific regional needs without suggesting a rupture with international recommendations.

In Brazil, the Ministry of Science and Technology's (MCT) National Council for Scientific and Technological Development (CNPq) is the institution that made the first efforts to generate S&T indicators for the country. From the 1980s on, CNPq began gathering and publishing information on Federal Government money invested in S&T, following the first R&D expense recommendations of OECD's Manual Frascati and Unesco's suggestions for correlating science and technology activities. After a decade, most Brazilian states started using the same procedures, allowing a comprehensive picture of public funds invested in S&T to be drawn.

It is worthwhile mentioning other initiatives for developing S&T indicators not related to financial inputs applied in the areas, such as the initiatives from MCT's Brazilian Institute of Information on Science and Technology (Ibict) in the field of the scientific production, and the Ministry of Education Foundation for the Coordination of Improvement of Higher Education Personnel (Capes), in the field of higher education.

From 1999 on, MCT began assuming responsibility for the centralized organization and dissemination of S&T information in the country. This depends on the collaboration of a number of federal and state institutions, private organizations involved in producing information for developing S&T indicators and studies developed on this theme.

At the beginning of the development of S&T indicators, they focused on, the measurement of financial and human funds invested in science and technology. The measurements were limited to identifying the funds invested in research, leading to the development of the so-called "Internal Expenditure in S&D," and to qualifying the human resources dedicated to such activities. Not surprisingly, input indicators have the longest and most detailed history both in Brazil and other countries.

Traditionally, these indicators are disaggregated according to three areas: the nature of the research (basic, applied and correlated scientific and technical activities); sectors developing or financing these activities, such as governments, high education institutions and companies; and the classification of the each sector funds according to specific criteria for government (according to social-economical objectives), high education institutions (according to knowledge areas) and the companies (according to economical activities sectors).

Recently, so-called results indicators have been developed, initially limited to scientific production and later incorporating patent production and the transfer of technology between countries (Technological Balance). Still in the early stages are the attempts development for impact indicators, i.e., forms for measuring how a specific scientific or technological result affects the diverse spheres of individual living conditions, either in the scientific and technological field, the economic sphere, or even the social sphere. In fact, impact indicators in the scientific and technological sphere are currently more developed, especially those constructed in the field of bibliometry. In the other spheres they are still emerging and are often concentrated in case studies or, more commonly, in discussion topics between experts, many of which are very skeptical about the possibility of developing them.

The simple observation of available S&T indicators verifies that the more we move from input indicators to results and then to impact, the scarcer they become, constituting in themselves a summary of their own history.

The indicators now available in Brazil follow roughly this path. Although the country has a long tradition in the production of these indicators, especially input indicators, there are still important gaps to be filled. Nonetheless, here are shown the S&T indicators available today in Brazil. These will be continuously enhanced as methodological and data access difficulties are overcome and new indicators produced.

Introduction

The publishing of the most recent Brazilian science, technology and innovation (S,T&I) indicators has a double objective: to make them public and to provide a comparison of Brazil's results in this field to a group of selected countries from which comparable information is available.

In order to meet these goals, the decision was made to highlight some indicators traditionally referred to as "inputs" – particularly those showing the national expenses in research and development (R&D) and the human resources dedicated to such activities – as well some indicators of "results" such as information on bibliographical production, patenting activity and the technological balance of payment. Certainly, these indicators will be unable to provide a picture of the current situation of the Brazilian S,T&I in its total real complexity, but they appear to be sufficient to highlight some of the most general characteristics, especially when they are compared to indicators from other countries.

An evident gap in this publication is the absence of regional indicators, which does not imply that the MCT underestimates their importance. Concern about these indicators was the subject of the Committee for the Regionalization of S&T Indicators (Comissão para a Regionalização dos Indicadores de C&T) meetings held during the second half of 2002. This Committee - chaired by the Brazilian Institute of Geography and Statistics (IBGE – Instituto Brasileiro de Geografia e Estatística) – and comprised of representatives from the MCT, the Centre of Management and Strategic Studies, the State Secretaries of Science and Technologies Forum, the Forum of State Foundations for Research Support – listened to diverse researchers and institutions from the field and submitted a set of recommendations that are currently being implemented. One accomplishment rising out of the recommendations was the creation and implementation of the Permanent Committee of Indicators.

Another important gap is related to expenses in the correlated scientific and technical activities (atividades científicas e técnicas correlatas – ACTC). In this situation, there were methodological difficulties in elaborate a correct estimate – a situation aggravated by a change in the budgetary classification in 2000. Therefore, the option was to concentrate efforts on R&D expenses, whose statistics were well documented in the Frascati Manual. However, discussions on the methodological procedures needed to arrive at proper expense estimates in ACTC have begun and the results will be published soon.

In this publication, there was an effort to follow the international recommendations relative to different groups of indicators. The expenses indicators meet the recommendations of the Frascati Manual, and the human resources in S&T indicators meet the recommendations from Canberra's Manual, both elaborated by the Organization for Economic Cooperation and Development (Organização para Cooperação e Desenvolvimento Econômico – OCDE). In cases where the international recommendations are less clearly defined, indicators were elaborated that allow Brazil to be compared to other countries in technological and scientific activity results, even if only in rough estimates.

The sources used for the elaboration of this set of indicators were multiple and are mentioned in the publication. Information originating from Industrial Research into Technological Innovation (the Pesquisa Industrial - Inovação Tecnológica – PINTEC) conducted by the IBGE was used in the elaboration of indicators for R&D expenses and the number of researchers was gathered in 2000. Data related to 2003 were collected in the first semester of 2004 and will be released at the beginning of 2005. The inclusion of this new source o information has meant an important advance in the quality of the indicators produced on the theme, but they are comparable to those available before then. The information released in MCT publications, like the the National

Conference on Science, Technology and Innovation Green Book and the Science, Technology and Innovation White Book were developed when Pintec information was not available, so that they are not strictly comparable to those shown now. The indicators also incorporated important methodological modifications for calculating federal R&D expenses. Such estimates were elaborated from information from the execution of the Federal Government budget, whose classification system underwent important changes beginning in 2000. This makes it necessary to review the methods used before 2000 for arriving at estimates, which led to a substantial increase in the coverage of this assessment. For these reasons, we opted to avoid comparisons between estimates of R&D expenses and the number of researchers from years 1999 and 2000, which have been shown in separate tables.

It is also worth noting other restrictions on the estimates of numbers of researchers and personnel in R&D, especially in international comparisons. The indicators elaborated by OCDE standardize the number of researchers based on the time they dedicate to R&D activities, especially in the case of university teachers, postgraduation students and researchers in companies. The information sources used for the elaboration of such estimates in Brazil – other than the Pintec – do not provide data on the time such people dedicate to R&D activities. In most OCDE countries, this dedication is obtained from direct assessments from the researchers, so this problem does not occur in those countries. In Brazil, only Pintec has a similar requirement, and this imposes a certain inaccuracy on computing the R&D time dedication of postgraduation teachers and students. In the case of researchers from the research institutes, the time they spent to be integrally dedicated to R&D activities was considered. Thus, in order to compare the number of researchers and personnel related to R&D, it becomes necessary to assume some hypotheses that are subject to review. It was decided to consider that university teachers and postgraduation students participating in research groups, i.e., registered with the CNPq's (National Council for Scientific and Technological Development) Directory of Research Groups, dedicate 50% of their time to R&D activities. This proportion is the same used by the United States for the calculation of the portion of postgraduation students considered as researchers, according to OCDE's methodological notes: Main Science and Technology Indicators 2001-2002 (p.21-22). With the publication of national indicators and their comparison to the indicators obtained in other countries, we hope to contribute to the definition of S&T policies and to widen the capacity of MCT to participate in the process of overcoming national challenges.

Important comment

The science and technology (S&T), according to manuals accepted internationally, comprises the activities of the "experimental research and development – R&D" and " scientific and technical correlated activities".
The expenses presented in this publication (federal and enterprise) as well as the values presented in the "consolidated indicators and international comparisons", are related exclusively to R&D.
A debate is in progress about the methodologicals procedures to adjust an estimative for investments in C&T, relative to the "scientific and technical correlated activities ", whose results will be published soon.

GENERAL INDICATORS

Table 01

Resident population, Economically Active Population (EAP), Gross Domestic Product (GDP) and conversion factor for Purchase Power Parity (PPP), 1990-2002

Year	Resident population (1)	Economically Active Population (EAP) (2)	Gross Domestic Product (GDP) in millions			Conversion factor for Purchase Power Parity (PPP) (3)
			Current R$	2002 R$	Current PPP$ (purchase power parity)	
1990	147,994	64,588	11.5	1,380,690	781,893	0.0000147078
1991	149,905	-	60.9	1,814,051	808,583	0.0000754558
1992	151,227	72,859	641.9	1,888,575	831,366	0.0007708571
1993	154,513	73,886	14,097.1	1,858,197	860,464	0.0152765726
1994	156,775	-	349,204.7	1,128,182	894,718	0.3957784478
1995	159,045	77,384	646,191.5	1,147,379	1,835,988	0.5629821677
1996	161,247	76,408	778,886.7	1,158,422	1,864,485	0.7310758849
1997	163,471	78,758	870,743.9	1,237,611	1,981,151	0.7560757188
1998	165,688	81,148	914,187.9	1,239,208	1,887,684	0.8033848773
1999	167,910	80,843	973,846.9	1,249,889	1,145,267	0.8491618568
2000	170,143	77,867	1,101,255.1	1,283,466	1,211,611	0.8888894427
2001	172,386	84,726	1,198,736.0	1,309,542	1,268,613	0.9139988533
2002	174,633	87,542	1,346,028.9	1,346,028	1,311,903 (D)	0.9743584459

Source: resident population: ftp://ftp.ibge.gov.br/Estimativas_Projecoes_Populacao/Estimativas_1980_2010/Estimativas_e_taxas_1980_2010.zip, extracted in 04/13/2004. Economically Active Population: National Household Sample Survey (PNAD), of the Brazilian Institute of Geography and Statistics (IBGE); the gross domestic product in R$: http://www.ibge.gov.br/home/estatistica/economia/contasnacionais/2002/tab05.pdf, extracted in 03/23/2004; and for others: World development indicators, 2003 and World Bank atlas, on CD-ROM, World Bank.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) the values were updated by IBGE's population projection for July 1st;
2) not including the rural population of the Rondônia, Acre, Amazonas, Roraima, Pará and Amapá;
3) In 1994 and 2000 was not conducted the National Household Sample Survey (Pesquisa Nacional por Amostra de Domicílos - PNAD); for the PNAD's expansion results of 1992 to the 1996 the new weights generated from the IBGE's population counting of 1996, had been used; the 2002 conversion factor PPP was computed dividing the gross domestic product in current R$ for the gross domestic product in current dollars PPP.

EXPENDITURES INDICATORS

Table 02

Federal government expenditures on research and development (R&D) and percentage relation with gross domestic product (GDP) and with liquid current revenue, 1996-2002

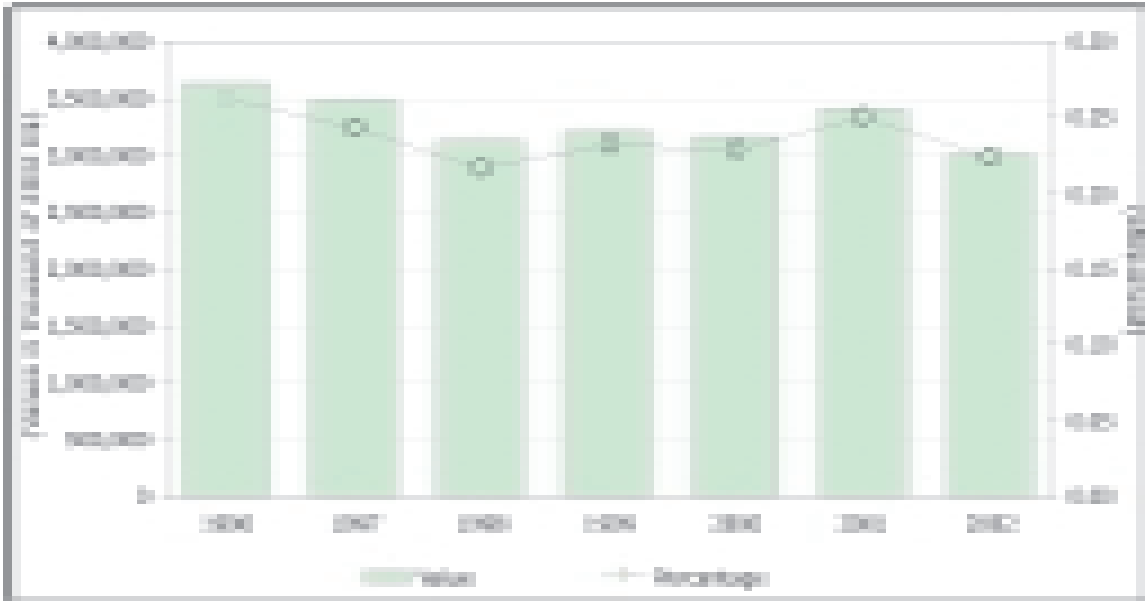
Year	1996	1997	1998	1999	2000	2001	2002
Value	3,638,425	3,486,187	3,134,926	3,216,864	3,154,634	3,408,664	3,017,141
Percentage relation with the gross domestic product	0.26	0.24	0.22	0.23	0.23	0.25	0.22
Percentage relation with the liquid current revenue	2.40	2.20	1.76	1.75	1.74	1.79	1.48

Sources: Federal Government Financial Integrated Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro). Brazilian Institute of Geography and Statistics (IBGE); National Treasury Secretariat (STN).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Monetary values expressed in thousand of 2002 reais, updated by the General Price Index - Internal Availability (IGP-DI) (annual average) of Getúlio Vargas Foundation (FGV). debt not included, inactives and pensioners.

Graph 01

Federal government expenditures on research and development (R&D) and percentage relation with gross domestic product (GDP), 1996-2002



Sources: Federal Government Financial Integrated Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro). Brazilian Institute of Geography and Statistics (IBGE); National Treasury Secretariat (STN).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Monetary values expressed in thousand of 2002 reais, updated by the General Price Index - Internal Availability (IGP-DI) (annual average) of Getúlio Vargas Foundation (FGV). debt not included, inactives and pensioners.

Table 03

Federal government expenditures on research & development (R&D), by Ministry, 1996-2002

(Values in thousand of 2002 R$)

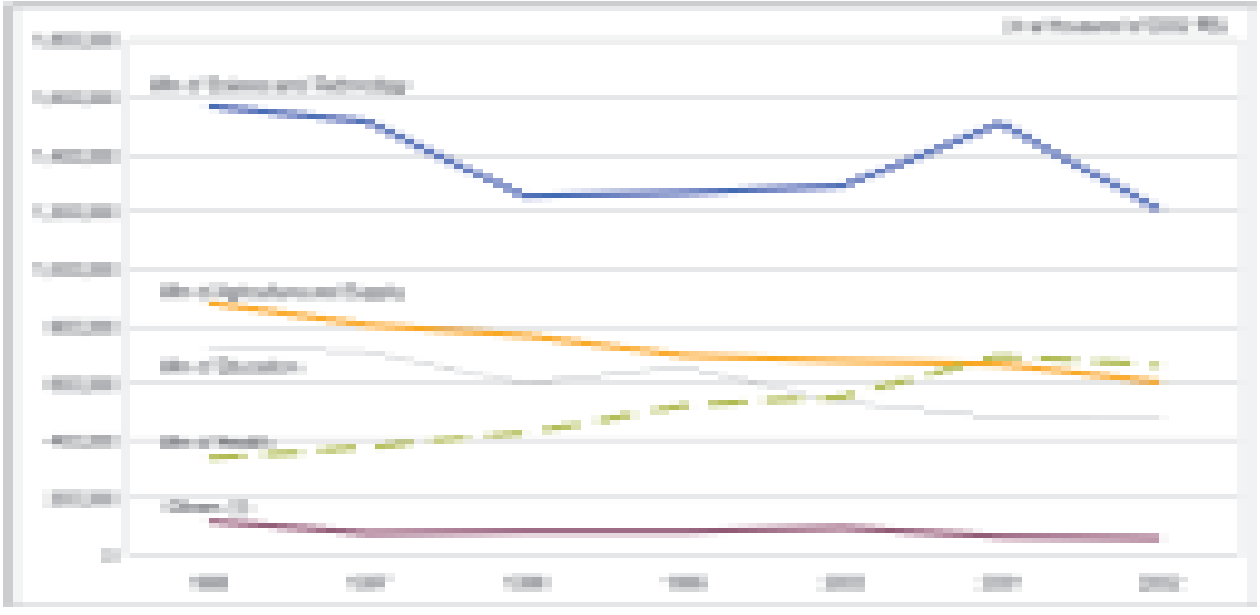
Body	1996	1997	1998	1999	2000	2001	2002
Total	3,630,425	3,486,187	3,134,926	3,216,864	3,154,634	3,489,664	3,317,141
Ministry of Science and Technology	1,567,087	1,517,293	1,254,359	1,364,437	1,298,785	1,588,144	1,288,461
Ministry of Health	306,621	373,341	428,252	519,638	553,442	698,150	662,208
Ministry of Agriculture and Supply	884,357	806,793	778,195	696,654	683,760	666,554	686,663
Ministry of Education	724,906	709,285	588,366	655,872	534,562	479,477	481,277
Others (1)	117,455	79,473	83,754	81,864	92,085	64,338	98,532

Source: Federal Government Financial Integrated Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Monetary values expressed in thousand of 2002 reais, updated by the General Price Index - Internal Availability (IGP-DI) (annual average) of Getúlio Vargas Foundation (FGV).
1) includes the Ministry of the Defense, the Ministry of the Environment, the Presidency of the Republic, the Ministry of National Integration, the Ministry of Sports and Tourism, the Ministry of Mining and Energy, Electoral Justice, the Ministry of Development, Industry and Foreign Trade, the Ministry of Culture, Ministry of the Agrarian Development, the Ministry of Planning, Budgets and Management and the Ministry of Labor and Employment;
Synthesis made from the administrative structure of the 2002 Budget Technical Manual (Manual Técnico de Orçamento - MTO-02) of the Ministry of Planning, Budgets and Management.
expenditures do not include, payment to inactive workers.

Graph 02

Federal government expenditures on research & development (R&D), by Mistery, 996-2002

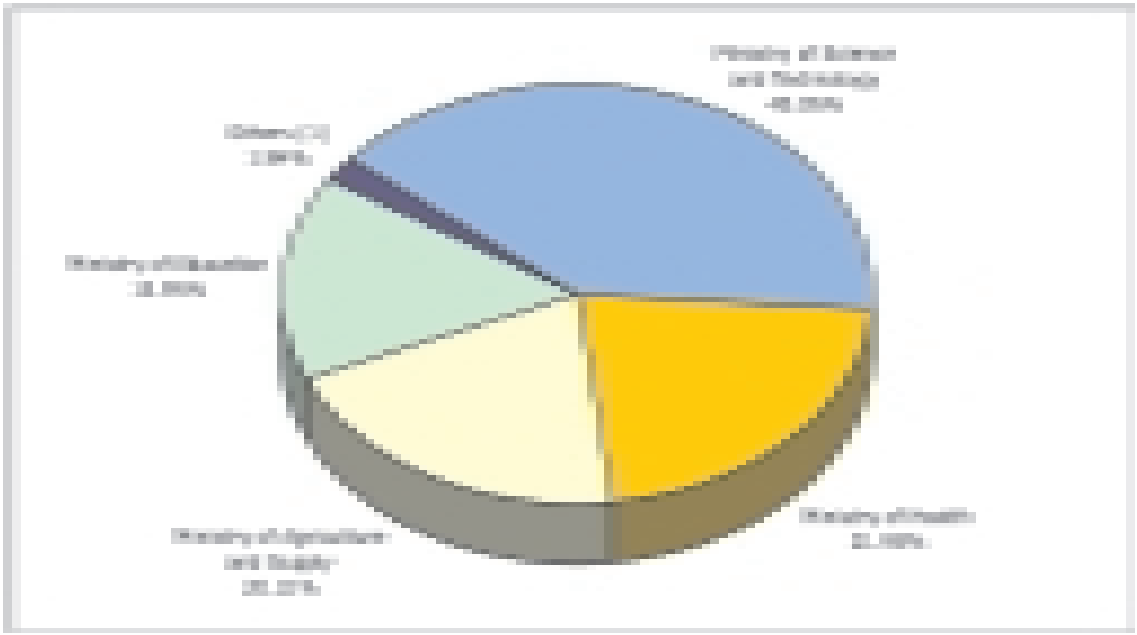


Source: Federal Government Financial Integrated Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) includes the Ministry of the Defense, the Ministry of the Environment, the Presidency of the Republic, the Ministry of National Integration, the Ministry of Sports and Tourism, the Ministry of Mining and Energy, Electoral Justice, the Ministry of Development, Industry and Foreign Trade, the Ministry of Culture, Ministry of the Agrarian Development, the Ministry of Planning, Budgets and Management and the Ministry of Labor and Employment;
monetary values expressed in thousand of 2002 reais, updated by the General Price Index - Internal Availability (IGP-DI) (annual average) of Getúlio Vargas Foundation (FGV).

Graph 03

Percentage distribution of federal government expenditures on research & development (R&D), by ministry - 2002



Source: Federal Government Financial Integrated Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro.

Notes: 1) includes the Ministry of the Defense, the Ministry of the Environment, the Presidency of the Republic, the Ministry of National Integration, the Ministry of Sports and Tourism, the Ministry of Mining and Energy, Electoral Justice, the Ministry of Development, Industry and Foreign Trade, the Ministry of Culture, Ministry of the Agrarian Development, the Ministry of Planning, Budgets and Management and the Ministry of Labor and Employment;
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 04

The Ministry of Science and Technology expenditures on research & development (R&D), by budgetary units, 1996-2002

(Values in Thousands of 2002 R$)

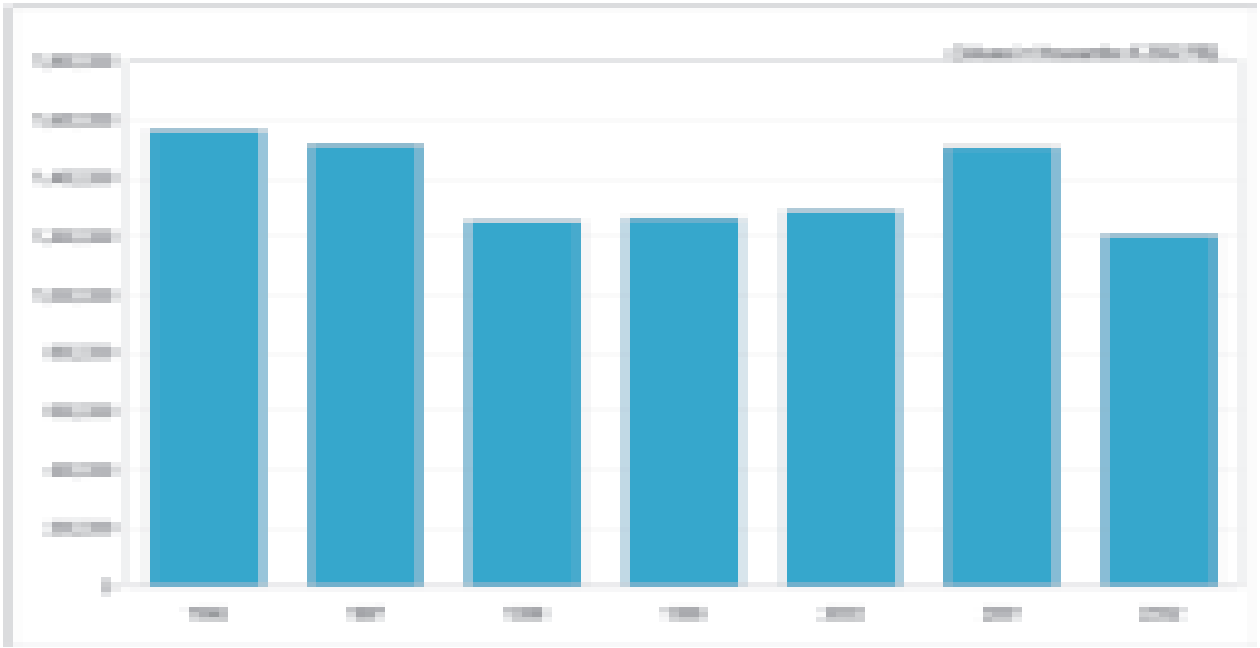
Budgetary unit	1996	1997	1998	1999	2000	2001	2002
Ministry of Science and Technology	1,567,887	1,517,293	1,254,339	1,364,417	1,396,785	1,588,144	1,388,461
Ministry of Science and Technology - Direct Administration [1]	388,566	314,693	339,613	302,778	288,343	405,412	331,843
Brazilian Space Agency - AEB	31,386	34,297	30,388	5,215	12,496	15,575	11,041
National Nuclear Energy Commission - CNEN	33,457	34,767	34,851	20,174	22,896	18,962	13,353
National Council for Scientific and Technological Development - CNPq	981,196	999,775	749,631	765,593	735,845	581,436	525,538
Computer Technology Center - PCTE	11,565	11,385	13,636	13,153	9,896	-	-
National Fund for Scientific and Technological Development - FNDCT	106,718	106,375	86,038	129,895	229,305	421,368	305,784

Source: Federal Government Financial Integrated Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) "Direct administration" includes, in 1999, expenditures of the Extraordinary Minister Cabinet of Special Projects (R$ 629 millions); institutes are included in CNPq up to 1999. From 2000, up to now, they are included in MCT budget.
monetary values expressed in a thousand 2002 reais, updated by the General Price Index – Internal Supply (IGP-DI) (annual average) of the Getúlio Vargas Foundation (FGV).
consolidation made from the administrative structure of the Budget Technical Manual (Manual Técnico de Orçamento - MTO-02) of 2002, of the Ministry of Planning, Budgets and Management;
expenditures do not include, payment to inactive workers.

Graph 04

The Ministry of Science and Technology expenditures on research & development (R&D), 1996-2002



Source: Federal Government Financial Integrated Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: Monetary values expressed in a thousand 2002 reais, updated by the General Price Index – Internal Supply (IGP-DI) (annual average) of the Getúlio Vargas Foundation (FGV).

Table 05

State government expenditures on research & development (R&D) by region, 1996-2002

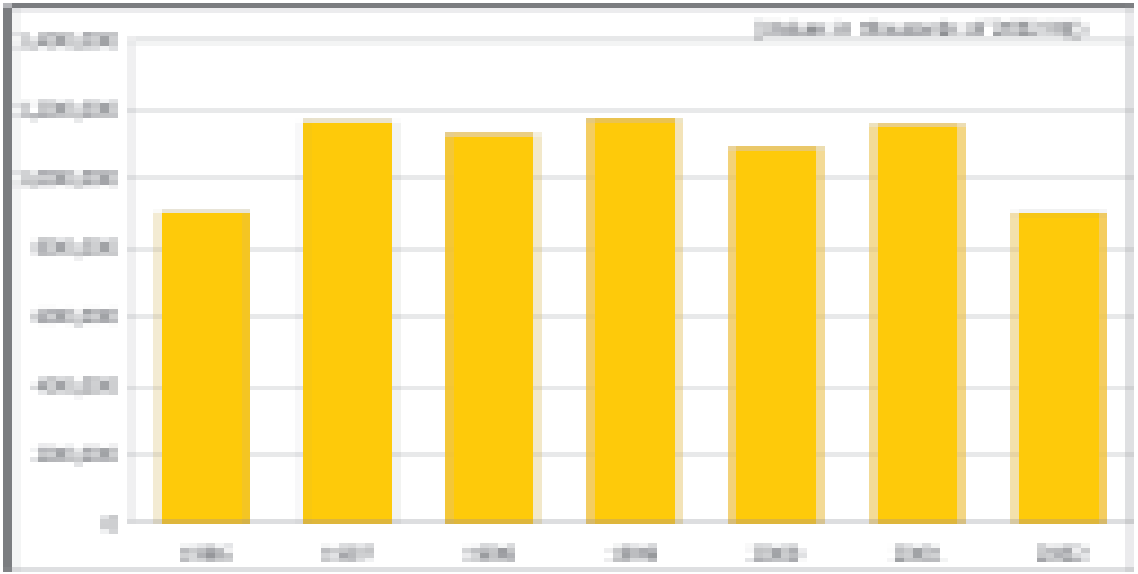
Year	Total	North	Northeast	Southeast	South	Center-West
1996	901,785	1,303	28,316	570,283	389,787	27
1997	1,166,317	3,108	42,499	757,742	316,914	46,856
1998	1,130,885	4,355	24,133	743,861	319,711	39,622
1999	1,174,463	4,118	36,245	871,948	223,569	38,593
2000	1,090,463	8,873	45,396	932,597	102,874	1,722
2001	1,158,522	8,502	76,901	960,114	111,060	1,836
2002	900,406	5,199	62,789	775,856	50,589	2,854

Source: General Balance of States and surveys achieved by the State Secretariats of Science and Technology or similar institutions.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Monetary values expressed in thousands of 2002 reais, updated by the General Price Index - Internal Availability - IGP-DI - (annual average) of the Getúlio Vargas Foundation (FGV).
expenditures do not include, payment to inactive workers.

Graph 05

State government expenditures on research & development (R&D), 1996-2002

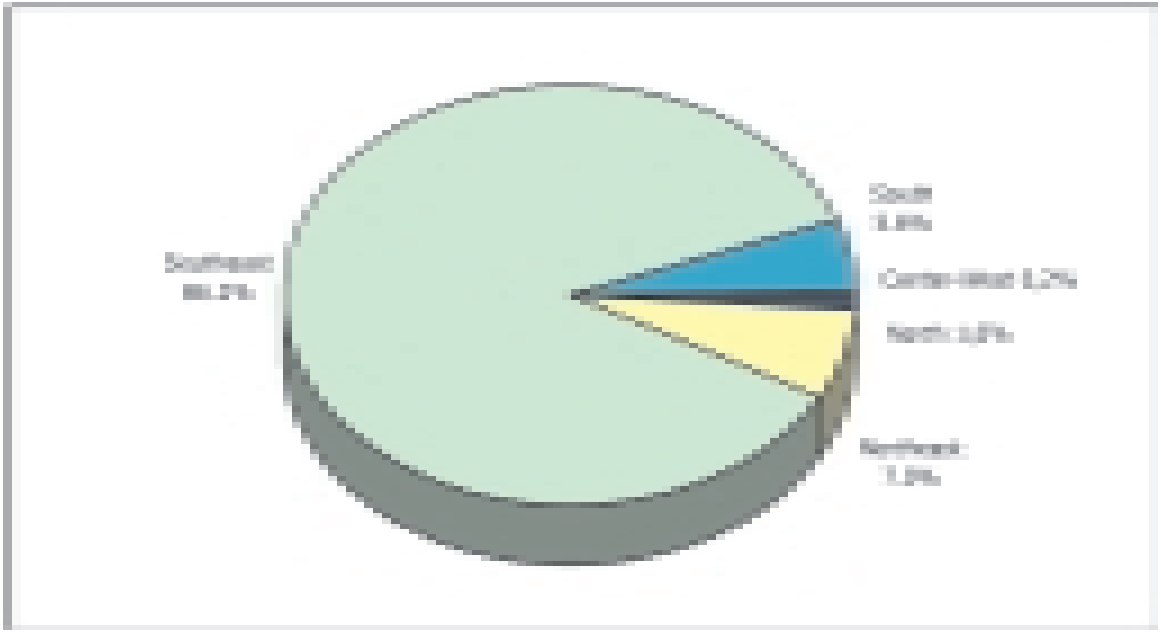


Source: General Balance of States and surveys achieved by the State Secretariats of Science and Technology or similar institutions.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Monetary values expressed in thousands of 2002 reais, updated by the General Price Index - Internal Availability - IGP-DI - (annual average) of the Getúlio Vargas Foundation (FGV).

Graph 06

Distribution of state government expenditures on research & development (R&D), according to regions, 2002



Source: General Balance of States and surveys achieved by the State Secretariats of Science and Technology or similar institutions.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 06

Industrial companies expenditures on research and development (R&D), by activities, 2000

Extractive and transforming industries activities	Internal R&D activities	Acquisition of external R&D	Total	(%)
Total	3,741,573	630,739	4,372,311	100.0
Extractive industries	29,094	6,739	35,833	0.8
Transformation industries	3,712,478	624,000	4,336,479	99.2
Assembly of automotive vehicles, trailers and trucks manufacturing	472,337	75,500	548,837	12.6
Manufacturing of communication devices and equipments manufacturing	384,768	113,680	498,448	11.4
Oil refining	444,637	52,071	496,708	11.4
Chemicals - i manufacturing	414,094	36,394	450,488	10.3
Machines and equipment manufacturing	341,968	20,394	362,354	8.3
Machines, devices and electrical materials manufacturing	260,631	38,606	299,237	6.8
Other transport equipment manufacturing	260,178	2,645	262,815	6.0
Food products manufacturing	218,363	31,373	249,736	5.7
Pharmaceutical products manufacturing	111,978	80,417	192,395	4.4
Office machines and computer equipment manufacturing	109,068	18,091	127,451	2.9
Rubber and plastic articles manufacturing	91,337	27,059	118,396	2.7
Iron and steel products manufacturing	100,821	3,638	104,459	2.5
Metal products manufacturing	60,585	13,179	73,764	1.7
Instrumentation and precision and optical instruments manufacturing	75,293	3,151	78,444	1.7
Non-metallic mineral products manufacturing	51,411	11,337	62,748	1.4
Paper and packages and other paper artifacts manufacturing	54,821	3,116	58,937	1.3
Fabrics manufacturing	45,333	3,109	48,438	1.1
Metallurgy of non-ferrous metals and casting	38,831	6,579	44,688	1.0

(continue)

Table 06

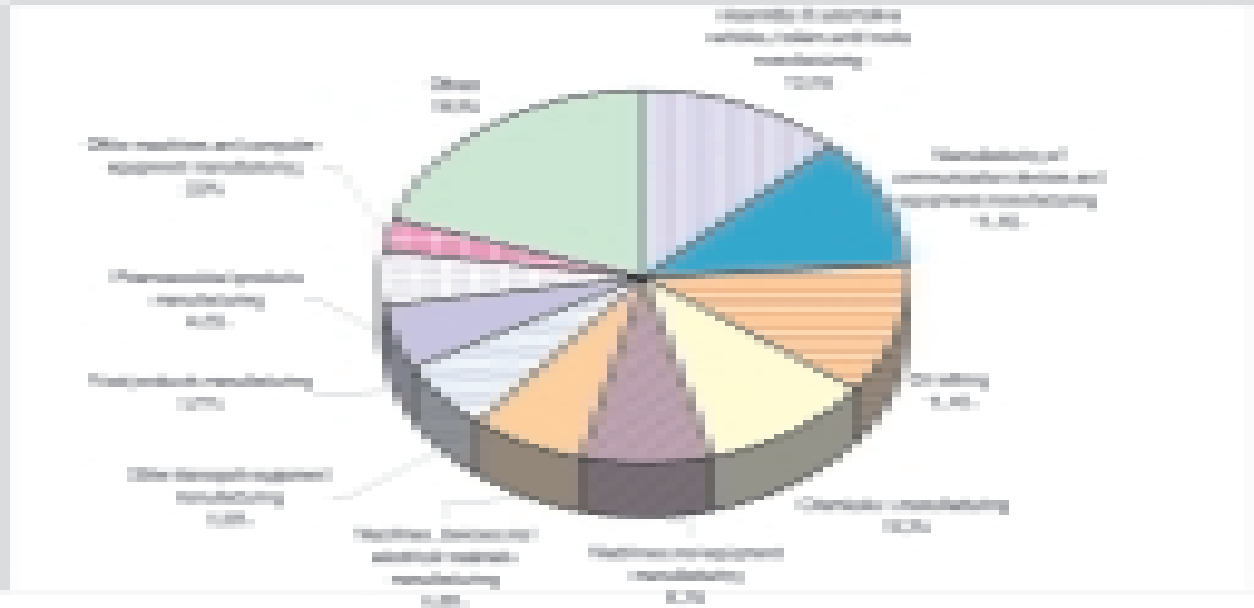
Industrial companies expenditures on research and development (R&D), by activities, 2000 (conclusion)

Extractive and transforming industries activities	Internal R&D activities	Acquisition of external R&D	Total	(%)
Basic electronic material manufacturing	33,387	10,098	43,485	0.9
Preparation of leathers and manufacturing of leather goods, travel articles and shoes	33,978	3,965	37,943	0.8
Furniture manufacturing	31,341	3,731	35,072	0.8
Pulp and other pastes for paper manufacturing manufacturing	18,678	4,823	23,501	0.5
Tobacco products manufacturing	23,474	–	23,474	0.5
Clothing and accessories manufacturing	21,663	1,338	23,001	0.5
Diverse products manufacturing	19,588	2,331	21,919	0.5
Publishing, printing and copying recordings	16,362	5,499	21,861	0.5
Wood products manufacturing	21,974	1,308	23,282	0.5
Beverages manufacturing	9,117	791	9,909	0.2
Ethyl, fuel alcohol and elaboration of nuclear fuels manufacturing	3,417	333	3,749	0.1

Source: Industrial Research on Technological Innovation of 2000 (Pintec) of the Brazilian Institute of Geography and Statistics - IBGE
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 07

Distribution of industrial companies expenditures on research and development (R&D), according to activities, 2000



Fuente: Industrial Research on Technological Innovation (Pintec) of 2000 of the Brazilian Institute of Geography and Statistics (IBGE).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 07

Expenditures on Research and Development (R&D) - 2000-2002

Sectors	In millions of current R$			In millions of current (1) PPP dollars (purchase power parity)			% of annual total			% in relation to GDP (1)		
	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002
Total	12,969.67	...	...	11,452.98	...	...	100.00	...	...	1.00	...	...
Public expenditures	5,408.67	...	...	5,175.41	...	...	58.43	...	...	0.58	...	...
Federal expenditures	4,380.67	...	...	4,887.74	...	...	48.85	...	...	0.48	...	...
Budget	3,198.57	3,803.59	3,617.14	3,658.86	3,136.58	3,696.57	24.66	...	...	0.23	0.25	0.21
Postgraduation	1,875.28	...	...	1,228.86	...	...	17.28	...	...	0.17	...	...
State expenditures	2,245.28	...	...	2,287.67	...	...	28.27	...	...	0.28	...	...
Budget	871.28	1,029.84	988.48	988.11	1,052.58	924.11	7.94	...	...	0.09	0.09	0.09
Postgraduation	1,343.58	...	...	1,298.57	...	...	10.43	...	...	0.18	...	...
Business Enterprise Expenditures	6,569.88	...	...	5,177.46	...	...	40.58	...	...	0.42	...	...
Companies	4,372.28	...	...	4,863.48	...	...	36.86	...	...	0.48	...	...
Postgraduation	188.58	...	...	313.96	...	...	1.72	...	...	0.02	...	...

Source: Federal Government Integrated Financial Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro and Industrial Research on Technological Innovation - Pintec of the Brazilian Institute of Geography and Statistics - IBGE.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: 1) PPP rate - 2000 = 0,880894427 ; 2001 = 0,933908533 ; 2002 = 0,974350459277222
... information not available.

Table 08

National expenses on research and development (R&D), by financing sector and execution sector, 2000

(in current millions of R$)

Sectors		Financing				Total by execution sector
		Government	High Education	Business Enterprise	Non profit Private	
Execution	Government	3.308,7	—	—	—	3.308,7
	High education	3.014,2	188,5	94,6	—	3.302,3
	Business Enterprise	8,1	0,0	4.277,7	—	4.285,8
	Non profit private	71,9	—	—	—	71,9
Total by financing sector		6.488,9	188,5	4.372,3	0,0	10.968,7

Source: Federal Government Integrated Financial Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro) and Industrial Research on Technological Innovation - Pintec of the Brazilian Institute of Geography and Statistics - IBGE.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: The expenses portion financed and executed by the companies refers to "domestic" expenses on research and development (R&D), as shown by the Industrial Research on Technological Innovation - Pintec of the Brazilian Institute of Geography and Statistics - IBGE.
Higher Education includes the public and private sectors
... Unavailable information.

Table 09

Percentage distribution of national expenses on research and development (R&D), by financing sector and according to execution sector, 2000

(percentage)

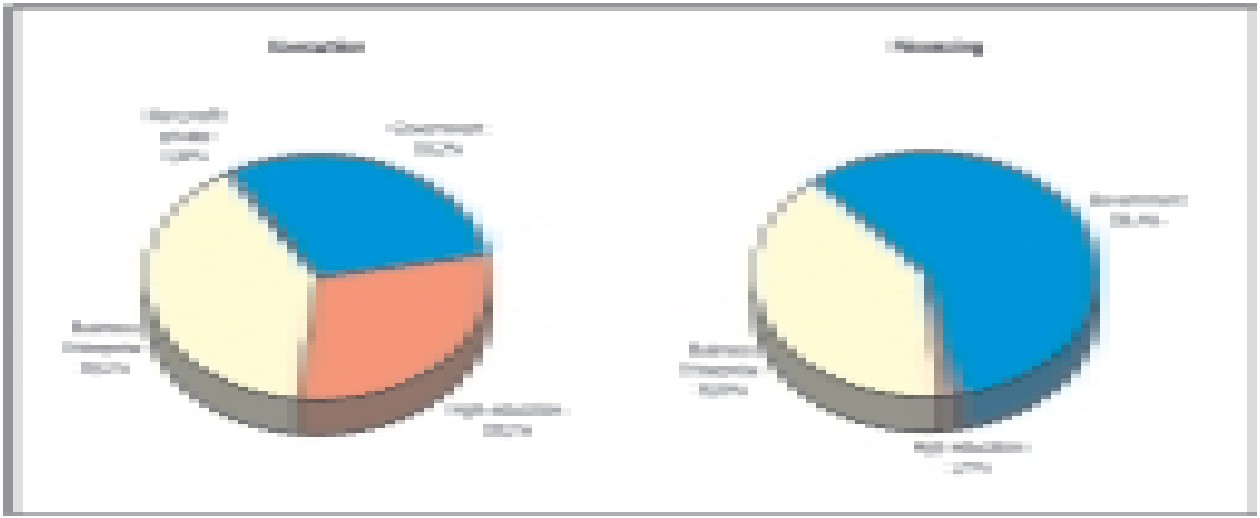
Sectors		Financing				Total by execution sector
		Government	High Education	Business Enterprise	Non profit Private	
Execution	Government	30,2	...	...	...	30,2
	High education	27,5	1,7	0,9	...	30,1
	Business Enterprise	0,1	...	39,8	...	39,1
	Non profit private	0,6	...	...	...	0,6
Total by financing sector		58,4	1,7	39,9	...	100,0

Source: Federal Government Integrated Financial Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro) and Industrial Research on Technological Innovation - Pintec of the Brazilian Institute of Geography and Statistics - IBGE.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: The expenses portion financed and executed by the companies refers to "domestic" expenses on research and development (R&D), as shown by the Industrial Research on Technological Innovation - Pintec of the Brazilian Institute of Geography and Statistics - IBGE.
Higher Education includes the public and private sectors
... Unavailable information.

Graph 08

Percentage distribution of national expenses on research and development (R&D), by financing sector and execution sector, 2000



Source: Federal Government Integrated Financial Administration System - Siafi. Special extraction produced by the Federal Data Processing Service - Serpro) and Industrial Research on Technological Innovation - Pintec of the Brazilian Institute of Geography and Statistics - IBGE.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: The expenses portion financed and executed by the companies refers to "domestic" expenses on research and development (R&D), as shown by the Industrial Research on Technological Innovation - Pintec of the Brazilian Institute of Geography and Statistics - IBGE.
Higher Education includes the public and private sectors

Table 10

Public expenses on research and development (R&D), by socio-economic objectives, 2000[1]

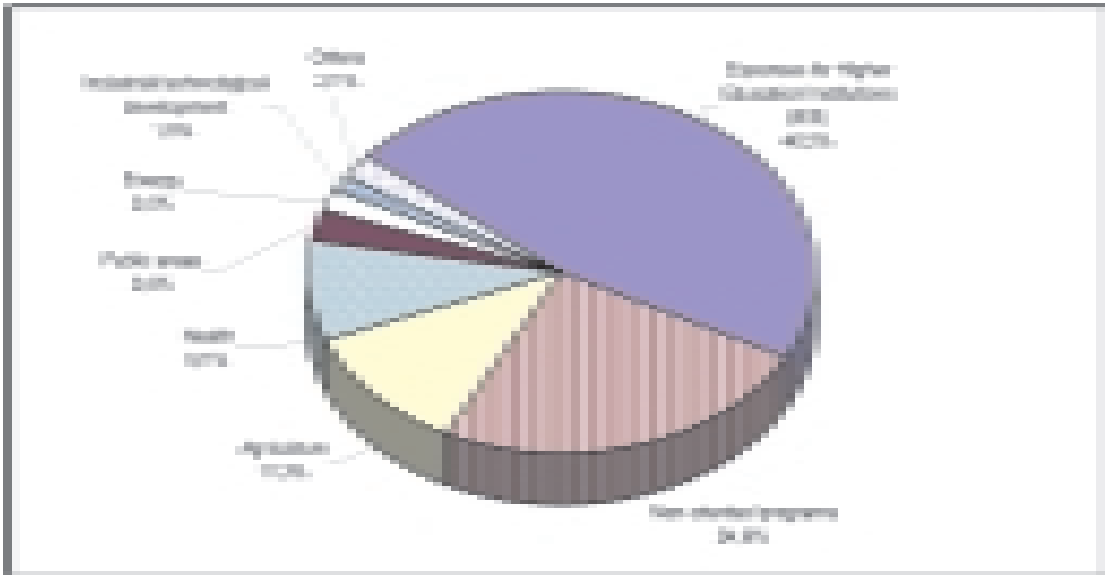
Socioeconomic Objectives	In millions of current R$	Percentage
Total	**6.408,87**	**100,00**
Knowledge Advance	4.576,22	71,40
Expenses for Higher Education Institutions (IES)	2.981,76	46,53
Non oriented programs	1.594,46	24,88
Agriculture	722,11	11,27
Health	581,60	9,07
Public areas	166,15	2,59
Energy	131,29	2,05
Industrial technological development	96,28	1,50
Earth and atmosphere exploration	64,78	1,01
Infra-structure	27,04	0,42
Defense	26,46	0,41
Environmental control and protection	13,06	0,20
Social development and services	3,66	0,06
Non specified	0,23	0,004

Source: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: 1) Includes public resources applied to postgraduation.

Graph 09

Distribution of public expenses on research and development (R&D), by socio-economic objectives, 2000



Source: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: estimated data

HUMAN RESOURCES

Table 11

Average years of study of the Working Age Population (10 years old or above), total and by region, 1981-2001

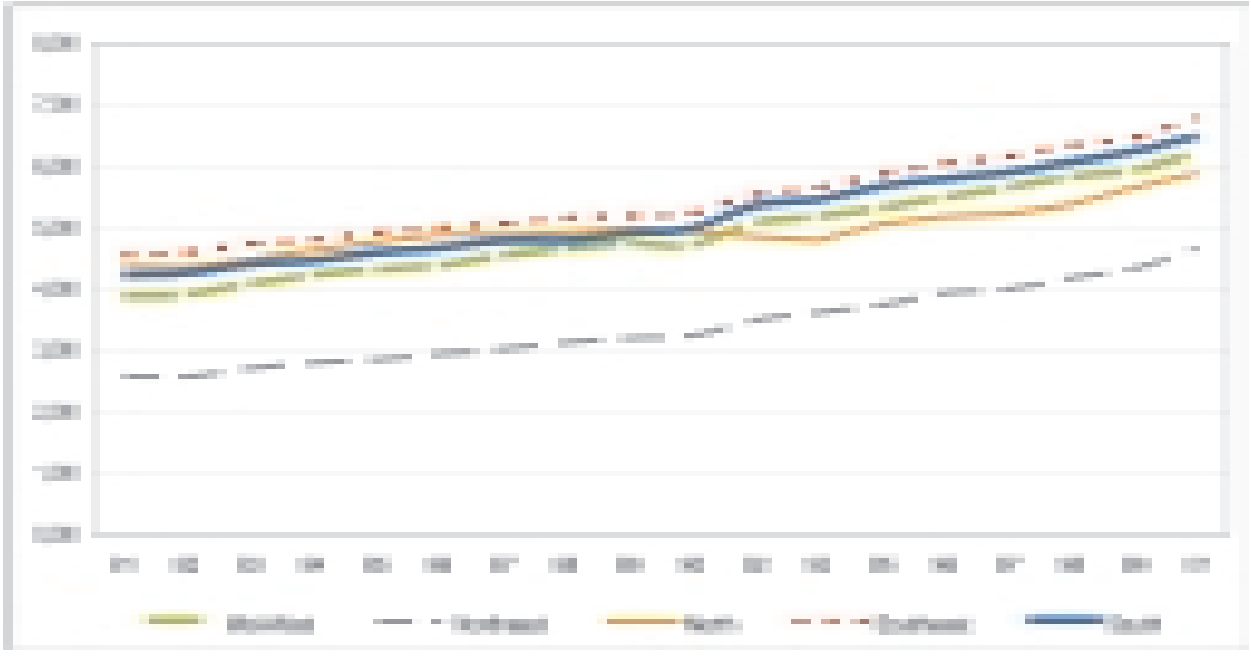
Year	Brazil	Mid-West Region	Northeast Region	North Region	Southeast Region	South Region
1981	3,89	3,89	2,58	4,37	4,55	4,23
1982	3,92	3,91	2,57	4,35	4,59	4,26
1983	4,06	4,08	2,79	4,48	4,73	4,40
1984	4,14	4,23	2,83	4,62	4,79	4,47
1985	4,24	4,32	2,85	4,76	4,91	4,59
1986	4,33	4,38	2,94	4,88	5,06	4,67
1987	4,40	4,55	3,81	4,87	5,06	4,78
1988	4,49	4,65	3,12	4,91	5,16	4,79
1989	4,55	4,74	3,19	5,00	5,19	4,90
1990	4,59	4,71	3,23	4,94	5,24	4,99
1992	4,87	5,08	3,49	4,85	5,53	5,36
1993	4,98	5,18	3,62	4,79	5,65	5,45
1995	5,17	5,32	3,74	5,06	5,87	5,67
1996	5,34	5,49	3,93	5,18	6,06	5,80
1997	5,43	5,65	3,99	5,23	6,15	5,90
1998	5,61	5,83	4,18	5,37	6,34	6,07
1999	5,75	5,94	4,33	5,65	6,46	6,24
2001	6,06	6,21	4,66	5,89	6,79	6,49

Source: National Household Sample Survey (Pesquisa Nacional por Amostra de Domicílios – PNAD) (microdata) of the () Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística – IBGE).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: not including the rural population of the States of Rondônia, Acre, Amazonas, Roraima, Pará and Amapá. In 1991, 1994 and 2000 the () National Household Sample Survey (PNAD) was not conducted.
From 1981 to 1990, the 9 to 11 years of study value was converted into 10 years of study, and 12 or more years was considered as 12 years of study.
From 1992 to 2001, 15 or more years of study were considered as 15 years of study. For PNAD's results from 1992 to 1996, the new weights generated from IBGE's 1996 Population Census were used. For PNAD's results from 1999, the new weights generated from IBGE's 2000 Demographic Census were used.

Graph 10

Average years of study of the Working Age Population (10 or more years old), by region, 1981/2001



Source: National Household Sample Survey (PNAD) (microdata) of Brazilian Institute of Geography and Statistics (IBGE).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 12

Number of vacancies available for the college entrance exam, registrations in the college entrance exam, students admitted and enrollments in higher education through the college entrance exam, and higher education graduates, according to administrative responsibility, 1996-2002

(In thousands)

	1996	1997	1998	1999	2000	2001	2002
Total							
Vacancies	**838**	**888**	**778**	**894**	**1.216**	**1.488**	**1.773**
Registrations	**2.948**	**3.713**	**3.898**	**3.944**	**4.940**	**4.380**	**4.984**
Admitted students	**514**	**534**	**651**	**744**	**898**	**1.037**	**1.385**
Enrollments	**1.869**	**1.946**	**2.126**	**2.370**	**2.694**	**3.031**	**3.483**
Graduates	**260**	**274**	**301**	**325**	**352**	**396**	**466**
Public							
Vacancies	184	194	206	219	246	266	265
Registrations	1.385	1.426	1.591	1.806	2.179	2.224	2.627
Admitted students	166	182	196	218	231	249	269
Enrollments	716	758	805	832	887	939	1.092
Graduates	100	106	109	112	117	133	151
Federal							
Vacancies	84	88	91	100	120	124	124
Registrations	741	792	857	958	1.156	1.196	1.234
Admitted students	78	88	89	99	118	121	122
Enrollments	389	398	409	443	483	503	512
Graduates	50	51	53	59	69	66	71

(continue)

Table 12

Number of vacancies available for the college entrance exam, registrations in the college entrance exam, students admitted and enrollments in higher education through the college entrance exam, and higher education graduates, according to administrative responsibility, 1996-2002 (conclusion)

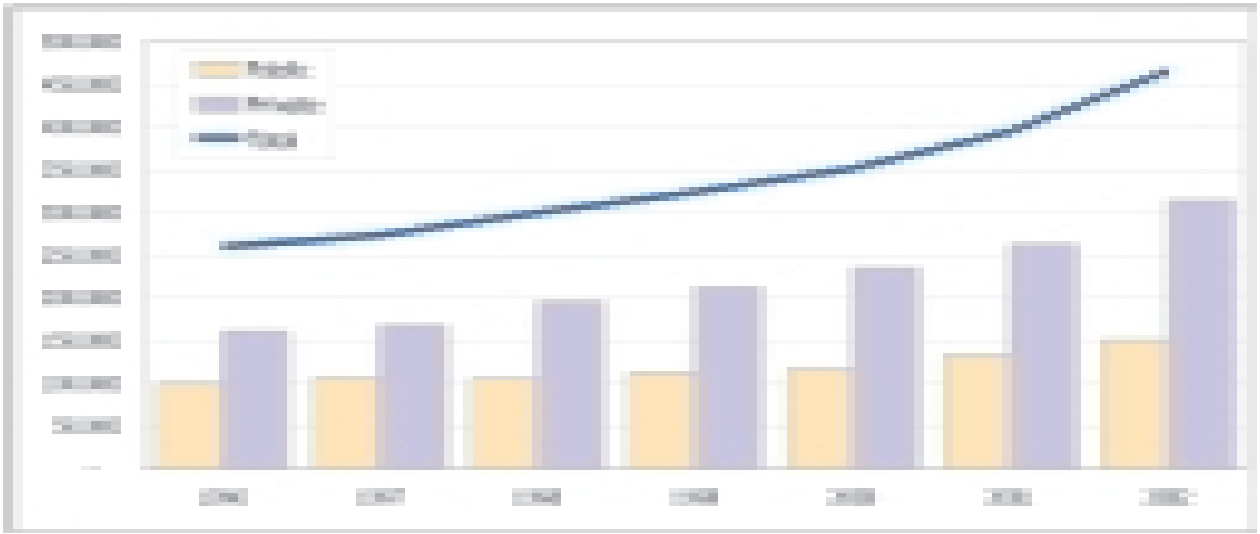
(In thousands)

	1996	1997	1998	1999	2000	2001	2002
State							
Vacancies	64	64	71	85	96	102	132
Registrations	549	578	630	773	963	963	1.316
Admitted students	59	61	68	83	82	97	128
Enrollments	243	254	275	303	333	387	416
Graduates	35	38	41	44	47	55	64
Municipal							
Vacancies	36	42	44	33	29	31	39
Registrations	85	96	104	77	60	63	78
Admitted students	30	35	39	29	24	26	33
Enrollments	103	118	121	97	73	79	104
Graduates	15	18	12	10	11	12	16
Private							
Vacancies	401	505	570	676	971	1.152	1.470
Registrations	1.163	1.268	1.357	1.538	1.861	2.036	2.357
Admitted students	347	392	455	534	664	782	924
Enrollments	1.133	1.168	1.321	1.538	1.807	2.082	2.428
Graduates	181	208	199	212	236	263	315

Source: National Institute for Educational Studies and Research. (Inep) (The Evolution of Higher Education - Graduation), 1980-1998. MEC-Inep, Brasília: 2000.
National Institute for Educational Studies and Research (Inep) (Statistical Synopsis of Higher Education). MEC-Inep, Brasília: various years.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 11

Graduates in higher education by administrative responsibility, 1980-2002



Source: National Institute for Educational Studies and Research. (Inep) (The Evolution of Higher Education - Graduation), 1980-1998. MEC-Inep, Brasília: 2000.
National Institute for Educational Studies and Research (Inep) (Statistical Synopsis of Higher Education). MEC-Inep, Brasília: various years.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 13

Higher education programs, graduates and registrations, by knowledge area, 1997-2002

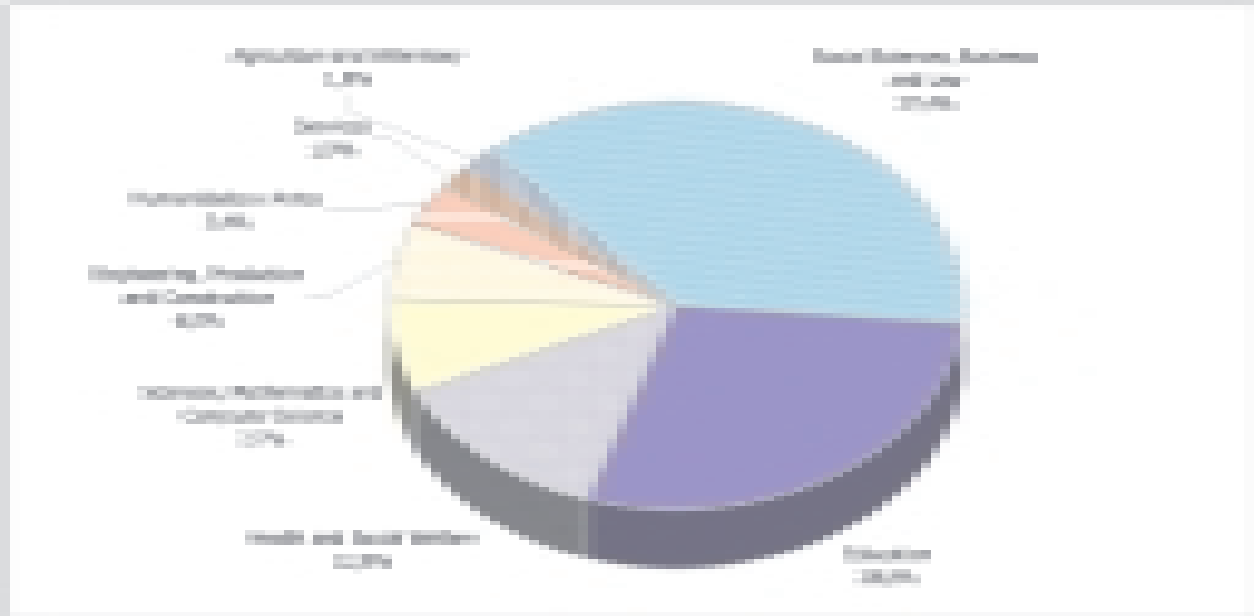
		Total	Education	Humanities and Arts	Social Sciences, Business and Law	Sciences, Mathematics and Computer Science	Engineering, Production and Construction	Agriculture and Veterinary	Health and Social Welfare	Services	[Basic] General Programs]
[illegible]	Number of Courses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Enrollment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Graduates	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
[illegible]	Number of Courses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Enrollment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Graduates	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
[illegible]	Number of Courses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
	Enrollment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
	Graduates	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
[illegible]	Number of Courses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
	Enrollment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
	Graduates	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
[illegible]	Number of Courses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
	Enrollment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Graduates	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
[illegible]	Number of Courses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Enrollment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Graduates	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-

Source: National Institute for Educational Studies and Research (Inep). The Evolution of Higher Education - Graduation: 1989-1998. MEC/INEP, Brasília: 2000. p National Institute for Educational Studies and Research (Inep). Sinopse Statistical Synopsis of Higher Education - Graduation. 1999. MEC/INEP, Brasília: 2000.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: In the 2000 Higher Education Census, the Ministry of Education used a classification adapted for Brazil derived from the proposal developed by Eurostat/OCDE/UNESCO, which details qualification and training areas within the International Standard Classification of Education - ISCED structure. This option was utilized to make Brazilian higher education statistics internationally comparable and to give INEP greater flexibility in this classification when addressing qualification and training areas. Thus there is a greater adaptability of INEP categories to the characteristics and range of national higher education programs. The adoption of this new classification resulted in a break in the education statistics shown by knowledge areas, especially in teacher qualification areas. According to this criterion, degree programs began to be an integral part of the "Education" area by distributing courses, enrollments and graduate statistics in the areas of the new classification.

Graph 12

Percentage distribution of higher education graduates by primary knowledge areas, 2002



Source: National Institute for Educational Studies and Research (Inep). The Evolution of Higher Education - Graduation: 1989-1998. MEC-Inep, Brasília: 2000.National Institute for Educational Studies and Research (Inep). Statistical Synopsis of Higher Education - Graduation. 1999. MEC-Inep, Brasília: 2000.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 14

Higher education graduates by regions, 1992-2002

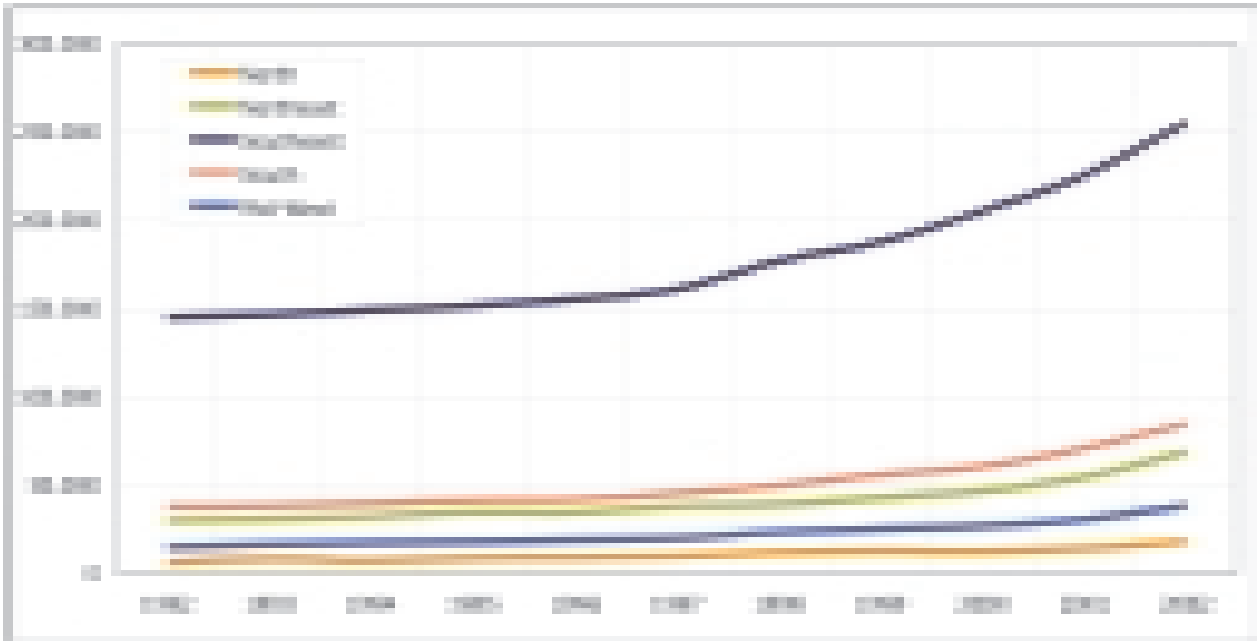
Year	Brazil	North	Northeast	Southeast	South	Mid-West
1992	234.288	6.251	38.185	145.224	37.813	14.775
1993	240.269	8.181	38.930	146.862	38.173	16.203
1994	245.887	7.267	32.442	149.583	39.655	16.940
1995	254.401	8.437	34.940	151.952	41.352	17.720
1996	260.224	8.856	34.845	155.614	42.147	18.762
1997	274.384	9.542	38.196	161.348	45.453	19.845
1998	300.761	11.480	39.392	177.104	49.723	23.062
1999	324.734	12.477	42.916	188.114	55.877	25.350
2000	352.385	12.145	46.860	205.661	60.762	26.877
2001	395.988	13.895	54.771	225.851	70.828	30.643
2002	466.268	17.765	68.824	255.960	84.960	38.731

Source: National Institute for Educational Studies and Research (Inep). The Evolution of Higher Education - Graduation: 1989-1998. MEC-Inep, Brasília: 2000. National Institute for Educational Studies and Research (Inep) Statistical Synopsis of Higher Education - Graduation. 1999. MEC-Inep, Brasília: 2000.

Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 13

Graduates in Higher Education by Region, 1992-2002



Source: National Institute for Educational Studies and Research (Inep). The Evolution of Higher Education - Graduation: 1989-1998. MEC-Inep, Brasília: 2000. National Institute for Educational Studies and Research (Inep) Statistical Synopsis of Higher Education - Graduation. 1999. MEC-Inep, Brasília: 2000.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 15

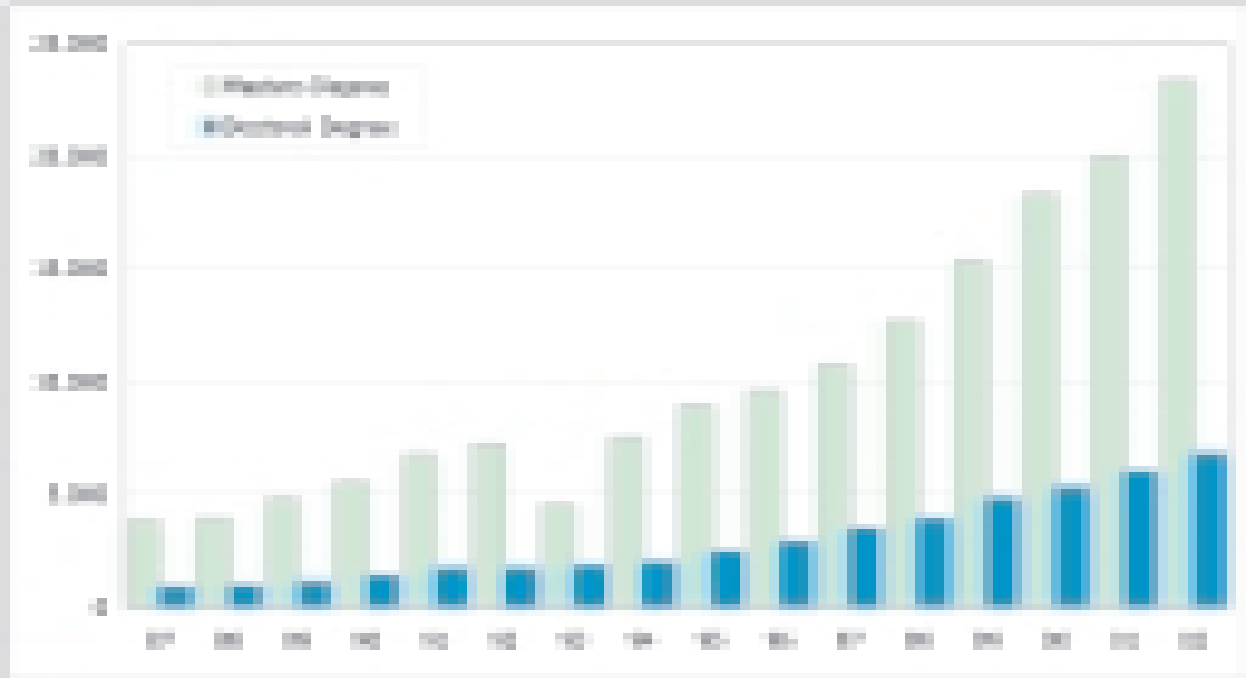
Number of new students, enrolled students, and graduates in master's and Ph.D. degree programs, 1987-2002

Year	New students		Enrolled Students (in December)		Degreed Students	
	Masters Degree	Doctoral Degree	Masters Degree	Doctoral Degree	Masters Degree	Doctoral Degree
1987	9.681	1.886	38.102	8.582	3.818	932
1988	11.373	2.165	31.575	8.515	3.965	990
1989	11.391	2.473	33.273	9.398	4.797	1.139
1990	12.162	3.088	36.502	10.923	5.579	1.400
1991	12.172	3.865	37.205	12.015	6.772	1.750
1992	12.061	3.518	37.412	13.682	7.272	1.759
1993	12.816	4.191	38.205	15.569	4.557	1.875
1994	15.093	4.957	48.027	17.361	7.550	2.831
1995	15.995	5.118	43.121	19.492	8.582	2.497
1996	15.130	4.735	41.928	20.924	9.602	2.949
1997	16.047	5.742	44.015	22.935	10.783	3.497
1998	19.815	6.744	58.816	26.828	12.681	3.949
1999	23.837	7.983	57.044	29.938	15.380	4.853
2000	28.586	8.444	63.614	33.004	18.173	5.335
2001	27.845	9.013	64.906	35.102	19.986	6.842
2002	29.505	9.833	65.044	37.400	23.421	6.843

Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology

Graph 14

Individuals with PhD and Masters Degrees, 1987-2002



Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology

Table 16

Programs and permanent teachers in postgraduation programs, 1987-2002

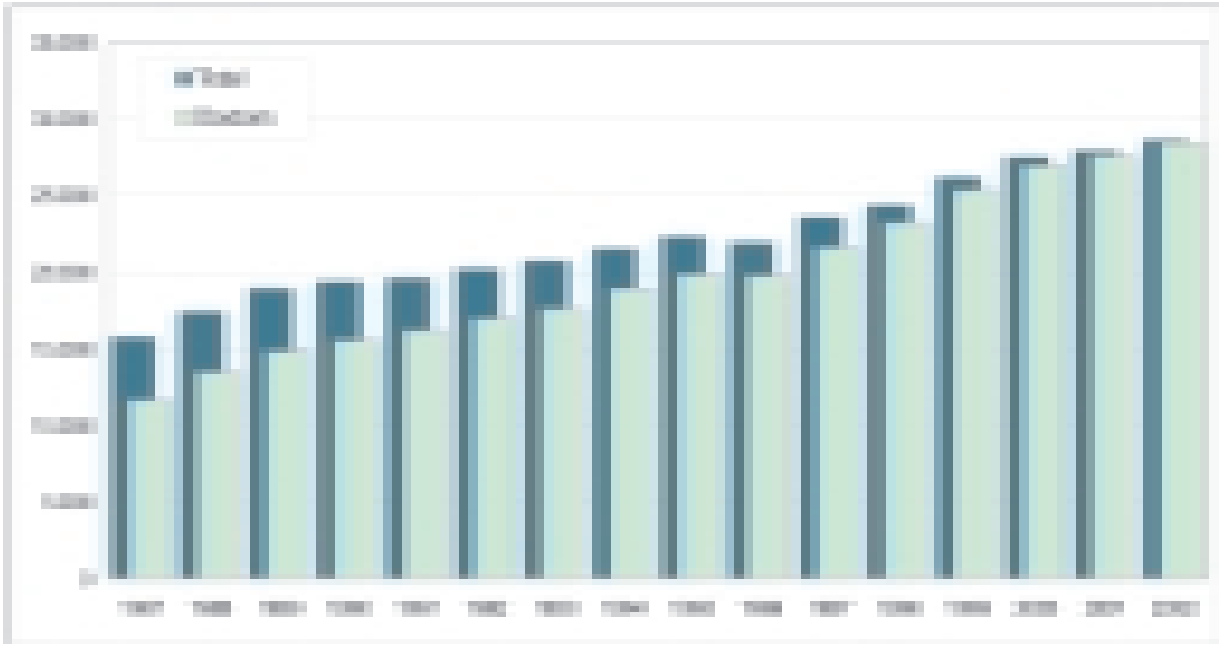
Year	Number of Courses		Permanent teachers(1)	
	Masters Degree	Doctoral Degree	Total	Doctors
1987	861	385	15.752	11.673
1988	899	402	17.499	13.488
1989	936	430	18.967	14.885
1990	964	450	19.444	15.567
1991	982	468	19.645	16.206
1992	1.018	502	20.279	16.962
1993	1.039	524	20.836	17.640
1994	1.119	594	21.589	18.911
1995	1.159	616	22.384	19.890
1996	1.186	629	21.994	19.801
1997	1.249	658	23.657	21.628
1998	1.291	695	24.423	23.236
1999	1.406	752	26.254	25.367
2000	1.490	821	27.555	26.945
2001	1.548	857	28.013	27.637
2002	1.683	917	28.703	28.424

Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) From 1997 on, permanent teachers began to be considered as those dedicating at least 30% of their workload to postgraduation programs.

Graph 15

Total number of permanent teachers with Ph.D.s in postgraduation programs, 1987-2002



Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) From 1997 on, permanent teachers began to be considered as those dedicating at least 30% of their workload to postgraduation programs.

Table 17

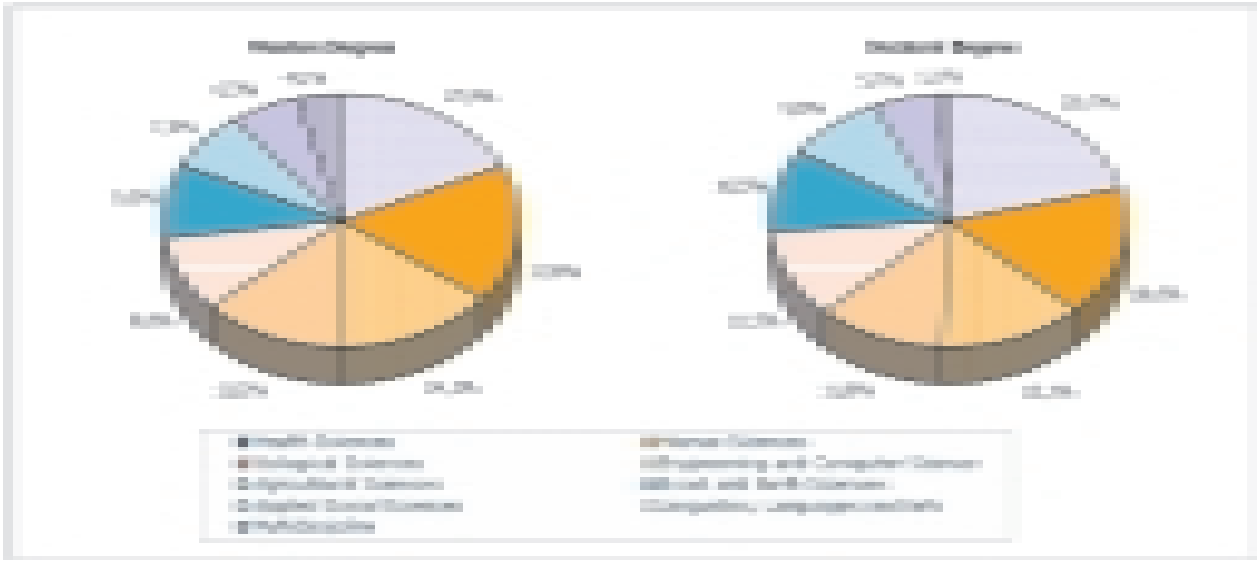
Graduated from postgraduation programs, by knowledge areas, 1992-2002

Subject areas		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	Masters Degree	7.170	7.857	7.546	8.984	9.563	10.780	11.491	13.394	15.573	18.988	21.431
	Doctoral Degree	1.759	1.875	1.827	2.487	2.968	3.897	3.949	4.851	5.308	6.243	8.843
Exact and Earth Sciences	Masters Degree	968	986	979	1.103	1.180	1.345	1.501	1.588	1.780	1.909	2.175
	Doctoral Degree	186	321	328	438	482	518	543	648	737	788	791
Biological Sciences	Masters Degree	632	679	845	808	772	886	1.119	1.286	1.389	1.504	1.748
	Doctoral Degree	322	251	211	365	356	450	517	608	667	709	894
Engineering and Computer Science	Masters Degree	1.348	1.286	1.237	1.583	1.479	1.745	2.089	2.443	2.666	2.788	3.080
	Doctoral Degree	171	244	254	364	418	479	515	611	785	765	886
Health Sciences	Masters Degree	980	988	1.067	1.103	1.368	1.638	1.948	2.438	2.610	3.044	3.358
	Doctoral Degree	324	351	386	489	604	686	791	1.080	1.038	1.185	1.461
Agricultural Sciences	Masters Degree	882	994	913	1.134	1.322	1.254	1.486	1.725	1.979	2.139	2.256
	Doctoral Degree	245	189	167	244	342	369	456	498	610	709	788
Applied Social Sciences	Masters Degree	775	858	757	934	1.029	1.288	1.467	2.088	2.791	3.346	4.184
	Doctoral Degree	129	145	188	182	186	186	281	386	445	479	614
Human Sciences	Masters Degree	1.484	1.375	1.483	1.782	1.874	1.975	2.138	2.485	3.055	3.429	4.171
	Doctoral Degree	298	279	282	341	405	618	653	736	852	1.025	1.139
Linguistics, Language and Arts	Masters Degree	486	458	396	539	675	884	796	886	1.084	1.280	1.467
	Doctoral Degree	99	111	145	137	147	159	187	248	257	329	388
Multidiscipline	Masters Degree	15	25	36	37	82	128	296	463	576	758	858
	Doctoral Degree	–	1	2	5	3	8	17	33	38	80	79

Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 16

Distribution of the number of students who have graduated from postgraduation programs by subject areas, 2002



Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 18

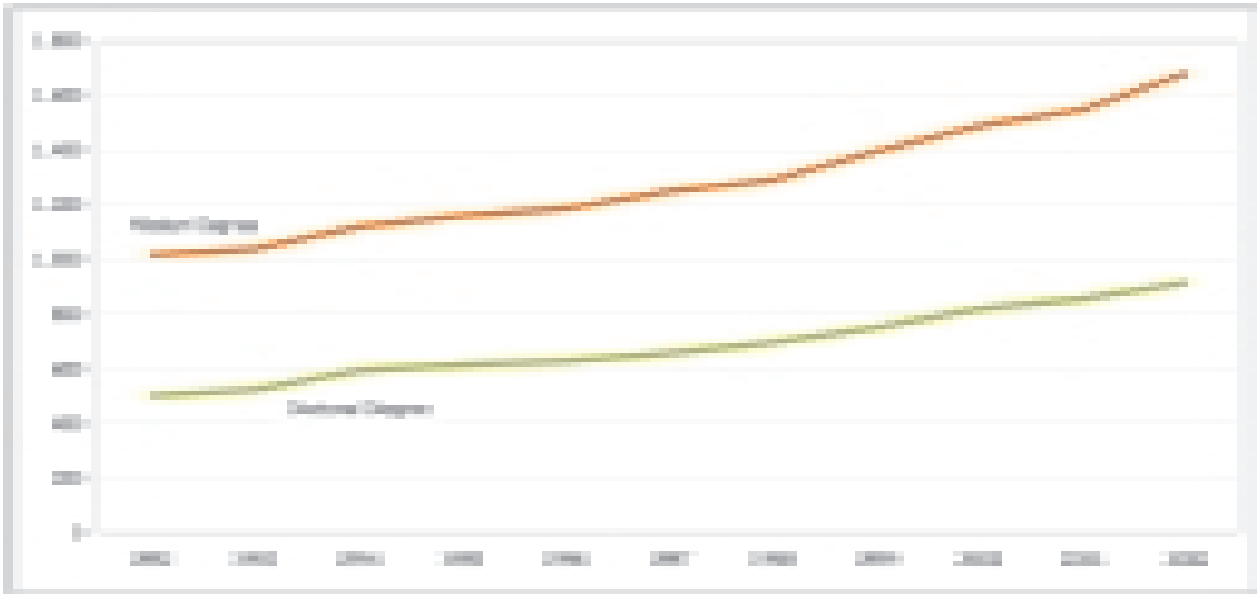
Master and doctoral programs, by main areas of knowledge, 1992-2002

Subject areas		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	Masters Degree	1.383	1.809	1.119	1.159	1.186	1.248	1.291	1.395	1.498	1.548	1.683
	Doctoral Degree	501	529	584	616	629	658	695	752	821	857	917
Exact and Earth Sciences	Masters Degree	151	158	141	147	153	169	169	173	181	187	194
	Doctoral Degree	81	82	86	90	91	94	95	104	109	117	125
Biological Sciences	Masters Degree	109	111	129	123	123	126	135	139	140	153	166
	Doctoral Degree	54	57	79	81	81	84	89	94	100	105	113
Engineering and Computer Science	Masters Degree	105	109	119	125	126	138	147	158	166	183	201
	Doctoral Degree	53	55	58	61	61	63	65	74	85	91	97
Health Sciences	Masters Degree	243	247	270	273	275	284	298	306	328	343	371
	Doctoral Degree	147	149	171	174	179	183	195	197	212	228	234
Agricultural Sciences	Masters Degree	130	134	137	140	145	155	159	167	174	176	183
	Doctoral Degree	48	49	53	55	58	64	66	77	88	97	106
Applied Social Sciences	Masters Degree	85	85	91	100	109	105	111	118	125	170	196
	Doctoral Degree	25	28	31	39	30	36	42	50	56	62	66
Human Sciences	Masters Degree	150	152	163	167	166	174	177	186	186	197	244
	Doctoral Degree	57	59	73	78	82	83	89	96	104	112	125
Linguistics, Languages and Arts	Masters Degree	59	62	65	65	66	68	78	76	88	86	94
	Doctoral Degree	30	34	35	36	36	39	44	47	51	53	54
Multidisciplinar	Masters Degree	4	5	13	19	32	38	34	58	57	73	91
	Doctoral Degree	-	1	7	9	11	12	18	13	16	19	24

Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 17

Master and doctoral programs, 1992-2002



Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 19

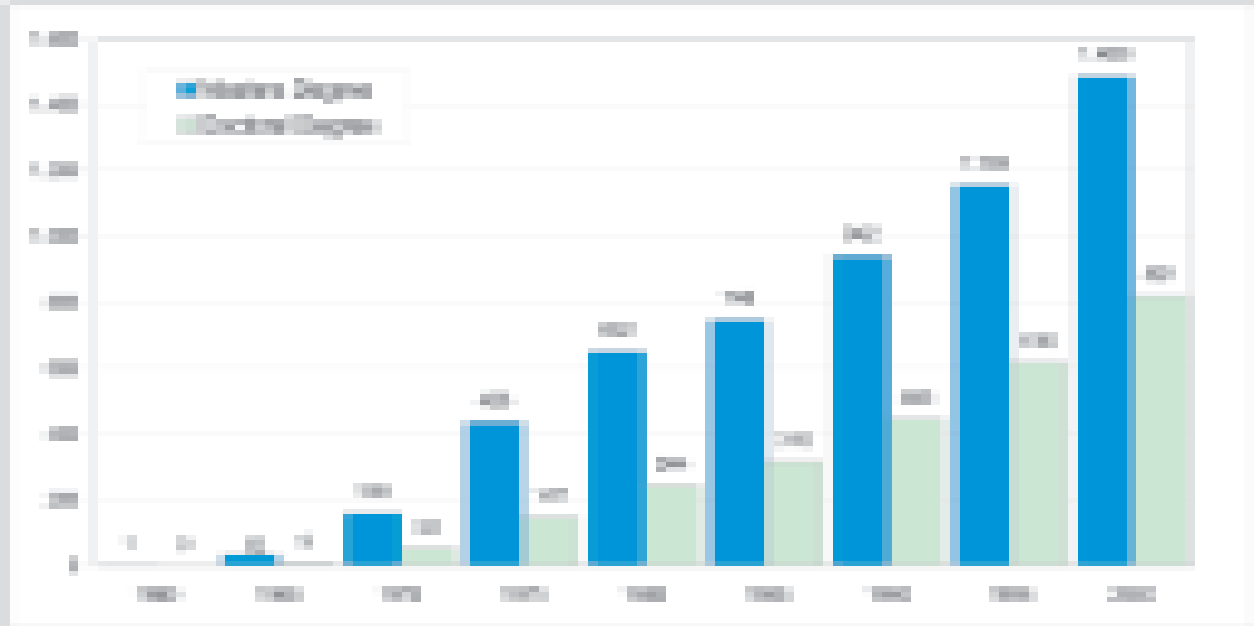
Growth of Master and Doctoral programs, 5 year increments, 1960/2000

	1960	1965	1970	1975	1980	1985	1990	1995	2000
Masters Degree	1	32	159	436	652	748	942	1.159	1.490
Doctoral Degree	0	9	53	147	244	315	445	616	821

Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 18

Growth of Master's and Ph.D. degree programs, every 5 years, 1965/2000



Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 20

Institutions, groups, researchers and researchers with Ph.D 1993/2002

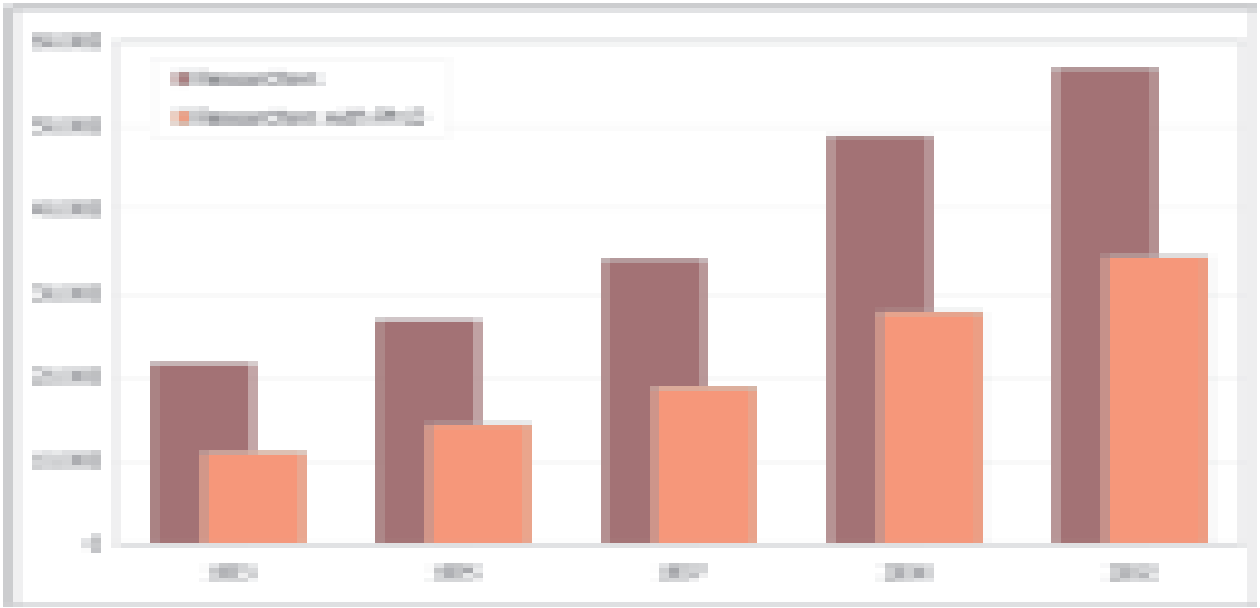
	1993	1995	1997	2000	2002
Institutions	99	158	181	224	268
Groups	4.402	7.271	8.632	11.760	15.158
Researchers (R)	21.541	26.799	34.840	48.781	56.881
Ph.D (D)	10.994	14.388	18.724	27.662	34.348
(D) / (R) in %	51,04	53,39	55,01	56,71	60,38

Source: National Council for Scientific and Technological Development (CNPq) - Directory of Research Groups - 2002 Census.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: A significant degree of the observed growth tendency is due to the increase in the number of institutions included in the survey and the survey coverage rate in the institutions.

Graph 19

Researchers and researchers with Ph.D 1993/2002



Source: National Council for Scientific and Technological Development (CNPq) - Directory of Research Groups - 2002 Census.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 21

Economically Active Population (PEA) and the employed population, by education level, 1992-2001

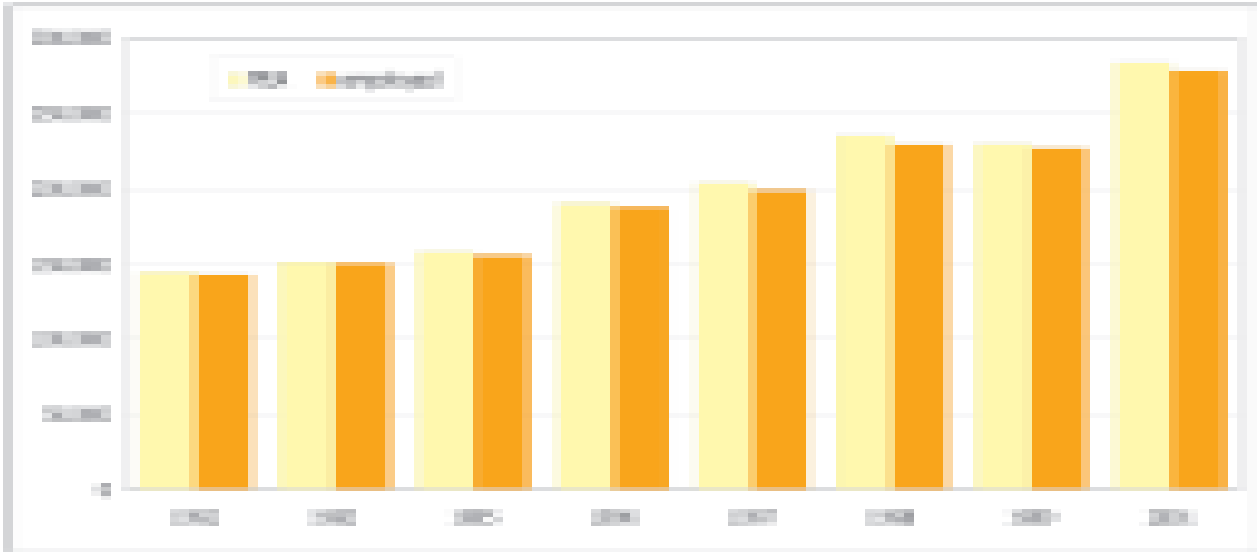
	1992	1993	1995	1996	1997	1998	1999	2001
PEA	**71.999.653**	**73.985.573**	**77.261.571**	**79.419.764**	**80.758.476**	**83.508.277**	**85.843.419**	**94.705.791**
Non educated	7.196.488	7.196.692	6.955.339	6.804.864	6.688.371	6.143.546	6.071.413	5.294.888
Up to Elementary education concluded	48.674.703	48.306.458	49.691.481	47.982.178	48.477.675	48.863.847	49.371.895	47.809.394
Up to non concluded higher education	11.675.078	14.429.036	16.049.468	17.355.369	18.653.857	20.575.613	22.291.792	26.378.215
Higher education concluded	3.672.903	3.879.960	4.339.179	4.388.318	4.751.549	4.900.387	5.088.375	5.526.907
Masters or doctoral degree concluded	149.888	151.356	159.034	159.563	284.325	285.184	229.947	284.291
Employed	**68.186.463**	**69.483.805**	**71.686.963**	**71.105.954**	**73.592.387**	**73.259.492**	**75.833.846**	**76.891.960**
Non educated	7.174.075	7.316.673	6.747.989	6.592.187	6.429.338	5.961.680	5.817.133	5.008.747
Up to Elementary education concluded	44.834.869	45.251.686	46.789.472	44.332.252	44.656.226	44.581.671	44.886.334	43.587.206
Up to non concluded higher education	11.458.532	13.296.579	14.756.393	15.843.857	16.751.565	16.978.578	19.250.356	20.861.581
Higher education concluded	3.578.843	3.771.013	4.236.481	4.369.151	4.581.098	4.736.640	4.873.190	5.206.158
Masters or doctoral degree concluded	140.113	152.857	155.948	168.507	196.980	229.725	251.132	278.306

Source: National Household Sample Survey (PNAD) (microdata) of the Brazilian Institute of Geography and Statistics (IBGE).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: not including the rural population of the States of Rondônia, Acre, Amazonas, Roraima, Pará and Amapá. In 1994 and 2000 the National Household Sample Survey (PNAD) was not conducted.
For PNAD's results from 1992 to 1996, the new values generated from IBGE's 1996 Population Census were used.
For the expansion of PNAD's 1999 results the new values generated from the IBGE's 2000 Demographic Census were used.
The values were corrected by IBGE's population projections for July 1.

Graph 20

Individuals achieving Master's or Ph.D. degrees by employment condition, 1992-2001



Source: National Household Sample Survey (PNAD) (microdata) of the Brazilian Institute of Geography and Statistics (IBGE).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: not including the rural population of the States of Rondônia, Acre, Amazonas, Roraima, Pará and Amapá
In 1994 and 2000 the National Household Sample Survey (PNAD) was not conducted.

Table 22

Percentage distribution of formally employed who attended masters or PhD degree programs, by activity sector, 1992/1999

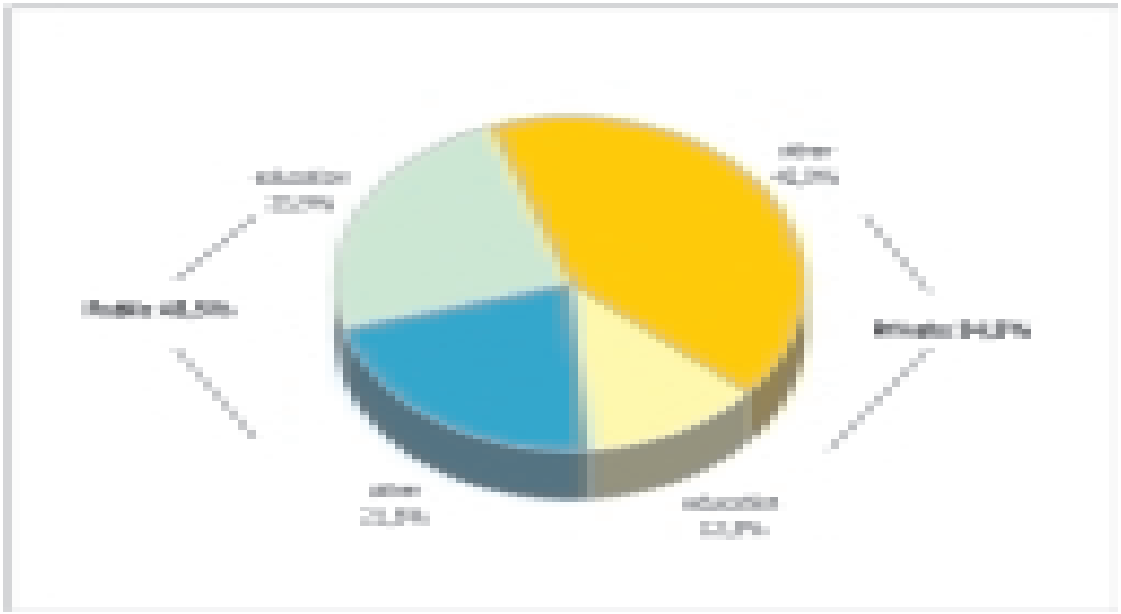
	1992	1993	1995	1996	1997	1998	1999
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Private	49,3	47,1	52,9	52,0	52,5	58,3	54,5
other	37,8	38,4	42,4	39,4	40,0	44,3	42,0
education	11,4	8,6	10,5	12,6	12,6	14,0	12,5
Public	50,7	52,9	47,1	48,0	47,5	41,7	45,5
other	22,7	24,5	18,6	22,7	24,3	21,3	21,6
education	28,1	28,4	28,5	25,4	23,2	20,5	23,9

Source: National Household Sample Survey (PNAD) (microdata) of the Brazilian Institute of Geography and Statistics (IBGE).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes not including the rural population of the States of Rondônia, Acre, Amazonas, Roraima, Pará and Amapá. In 1994, the National Household Sample Survey (PNAD) was not conducted. For PNAD's results from 1992 to 1996, the new values generated from IBGE's 1996 Population Census were used.

Graph 21

Distribution of formally employed who attended Master's or Ph.D. degree programs, by activity sector, 1999



Source: National Household Sample Survey (PNAD) (microdata) of the Brazilian Institute of Geography and Statistics (IBGE).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 23

Number of people involved in research and development (R&D) by institutional sector and education level, 2000

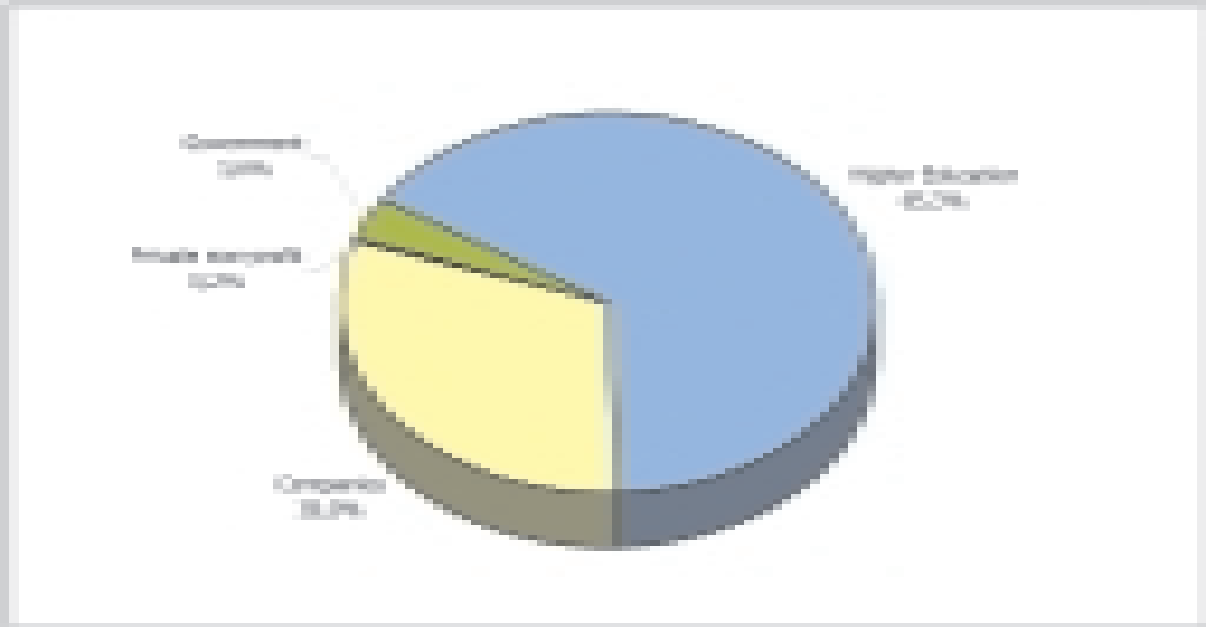
Category	Sectors				Total
	Government	Higher Education	Companies	Private non-profit	
Total	7.438	136.309	64.391	481	208.619
Personnel with higher education and	4.736	100.096	29.086	412	134.330
Postgraduate degrees	4.894	42.022	4.086	287	58.409
Undergrad degrees	642	2.306	25.080	125	28.233
Postgraduation students	...	55.688	...	...	55.898
Ph.D. degrees	...	33.084 (1)	...	...	33.804
Master's degrees	...	20.681	...	...	28.991
Improvement/specialization	...	2.083	...	...	2.803
High School Level	...	23.682 (2)	23.586	...	47.158
Others	2.702 (3)	12.581 (3)	11.739	69 (3)	27.894

Sources: for companies: Industrial Research on Technological Innovation (Pintec) of 2000 from the Brazilian Institute of Geography and Statistics (IBGE), for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes); and, for the remaining: directory of Research Groups in Brazil (DGP), 2000 Census of the Statistics and Information Consultancy (AEI) of the National Council for Scientific and Technological Development (CNPq).
Produced by: Indicators Coordination- Ministry of Science and Technology.

Notes: Double counting may occur because it is possible that one person is involved in research and development (R&D) in more than one sector;
excluding researchers and students not indicating their maximum degrees and training levels, respectively;
1) existing Ph.D. students enrolled at the end of the year;
2) including students with degrees registered with the Directory of Research Groups (DGP);
3) including personnel of different levels of education conducting activities of a technical nature registered with the Directory of Research Groups (DGP).

Graph 22

Percentage of people involved in research and development (R&D), by institutional sector, 2000



Sources: for companies: Industrial Research on Technological Innovation (Pintec) of 2000 from the Brazilian Institute of Geography and Statistics (IBGE), for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes); and, for the remaining: directory of Research Groups in Brazil (DGP), 2000 Census of the Statistics and Information Consultancy (AEI) of the National Council for Scientific and Technological Development (CNPq).
Produced by: Indicators Coordination- Ministry of Science and Technology.

Notes: Double counting may occur because it is possible that one person is involved in research and development (R&D) in more than one sector; researchers not indicating their maximum degree and students not indicating their training levels with the Directory of Research Groups in Brazil (DGP) have been excluded.

Table 24

Number of researchers and support personnel involved in research and development (R&D) by institutional sector and category, 2000

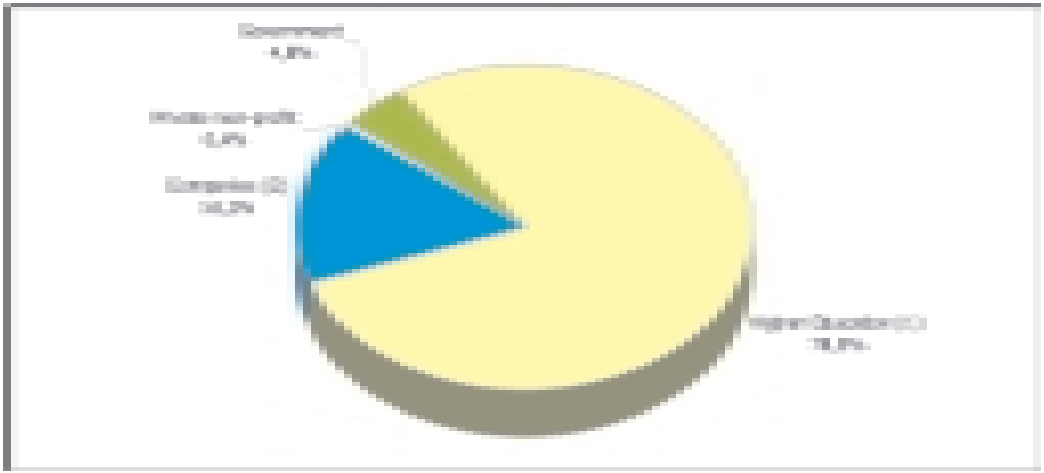
Category	Sectors				Total
	Government	Higher Education	Companies	Private non-profit	
Total	**7.438**	**136.309**	**64.391**	**481**	**208.619**
Researchers	4.736	77.482 [1]	15.988 [2]	412	**98.539**
Support personnel and others	2.702	58.987	48.402 [3]	69	**110.080**
Percentage of researchers	4,81	78,55	16,23	0,42	100,00

Sources: for companies: Industrial Research on Technological Innovation (Pintec) of 2000 from the Brazilian Institute of Geography and Statistics (IBGE); for Ph.D. students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) and, for the remaining: directory of Research Groups in Brazil (DGP) 2000 Census of the Statistics and Information Consultancy (AEI) of the National Council for Scientific and Technological Development (CNPq).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Double counting may occur because it is possible that one person is involved in research and development (R&D) in more than one sector;
Excludes researchers and students not indicating their maximum degrees and training levels, respectively;
1) including researchers registered with the Directory of Research Groups (Diretório dos Grupos de Pesquisa – DGP) and existing Ph.D. students enrolled at the end of the year according to the Manual Frascati recommendation;
2) people with higher education employed exclusively in internal research and development (R&D) activities;
3) people with higher education and high school degrees employed in internal research and development (R&D) activities for a partial period, plus the people with other education levels;

Graph 23

Researchers involved in research and development (R&D) by institutional sector and category, 2000



Sources: for companies: Industrial Research on Technological Innovation (Pintec) of 2000 from the Brazilian Institute of Geography and Statistics (IBGE); for Ph.D. students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) and, for the remaining: directory of Research Groups in Brazil (DGP) 2000 Census of the Statistics and Information Consultancy (AEI) of the National Council for Scientific and Technological Development (CNPq).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Double counting may occur because it is possible that one person is involved in research and development (R&D) in more than one sector;
Excludes researchers and students not indicating their maximum degrees and training levels, respectively;
1) includes researchers registered with the Directory of Research Groups (Diretório dos Grupos de Pesquisa – DGP) and existing Ph.D. students enrolled at the end of the year, according to the Manual Frascati recommendation;
2) people with higher education employed exclusively in internal research and development (R&D) activities;

Table 25

People involved in equivalent to full time research and development (R&D), by institutional sector and education level, 2000

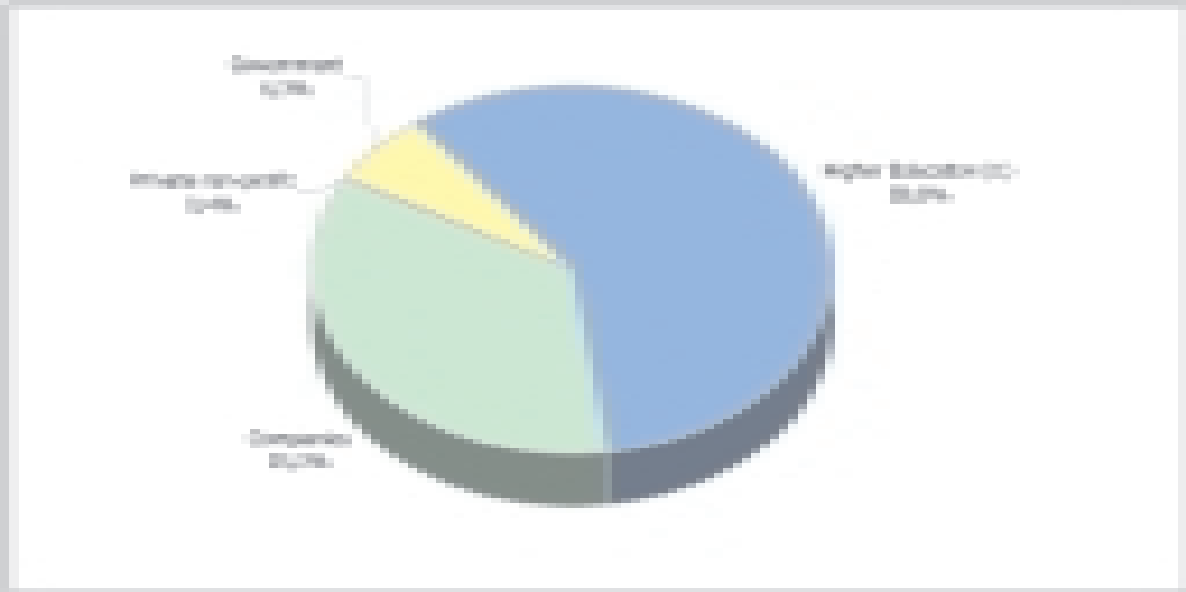
Category	Sectors				Total
	Government	Higher Education	Companies	Private non-profit	
Total	7.438	68.155	41.467	481	117.541
Personnel with higher education and	4.736	58.848	20.114	412	75.310
Postgraduate degrees	4.894	31.061	2.953	287	39.196
Undergrad degrees	642	1.188	17.161	125	19.116
Postgraduation students	...	27.849	...	...	27.849
Ph.D. degrees	...	16.503 (1)	...	...	16.503
Master's degrees	...	10.346	...	...	10.346
Improvement/specialization	...	1.000	...	...	1.000
High School Level	...	11.816 (2)	14.893	...	26.709
Others	2.702 (3)	6.291 (2)	6.460	69 (3)	15.522

Sources: for companies: Industrial Research on Technological Innovation (Pintec) of 2000 from the Brazilian Institute of Geography and Statistics (IBGE), for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes); and, for the remaining: directory of Research Groups in Brazil (DGP), 2000 Census of the Statistics and Information Consultancy (AEI) of the National Council for Scientific and Technological Development (CNPq).
Produced by: Indicators Coordination- Ministry of Science and Technology.

Notes: Double counting may occur because it is possible that one person is involved in research and development (R&D) in more than one sector;
Excludes researchers and students not indicating their maximum degrees and training levels, respectively;
1) existing enrolled Ph.D. students at the end of the year;
2) including undergrad students registered with the Directory of Research Groups (Diretório dos Grupos de Pesquisa – DGP);
3) including people of different education levels conducting activity of technical nature and registered with the Directory of Research Groups (DGP).
In calculating full time equivalence, the following criteria were adopted:
i) people from government and private sector non profit institutions: exclusive dedication to research and development (R&D) activities;
ii) people from the higher education teaching sector: 50% of their time dedicated to research and development (R&D);
iii)) people from companies: the results of the Industrial Research on Technological Innovation (Pesquisa Industrial de Inovação Tecnológica – Pintec) were used, using the value of number of people with exclusive dedication and people with partial dedication and weighed by the average percentage of dedication.

Graph 24

People involved in full time research and development (R&D) by institutional sector, 2000



Sources: for companies: Industrial Research on Technological Innovation (Pintec) of 2000 from the Brazilian Institute of Geography and Statistics (IBGE), for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes); and, for the remaining: directory of Research Groups in Brazil (DGP), 2000 Census of the Statistics and Information Consultancy (AEI) of the National Council for Scientific and Technological Development (CNPq).
Produced by: Indicators Coordination - Ministry of Science and Technology

Notes: Double counting may occur because it is possible that one person is involved in research and development (R&D) in more than one sector;
excluding researchers and students not informing their maximum degree and training level with the Directory of Research Groups in Brazil (Diretório dos Grupos de Pesquisa no Brasil – DGP);
1) students registered with the (Directory of Research Groups in Brazil (Diretório dos Grupos de Pesquisa no Brasil – DGP) were put in the Higher Education Teaching sector.

Table 26

Researchers and support personnel involved full time in research and development (R&D), by institutional sector and category, 2000

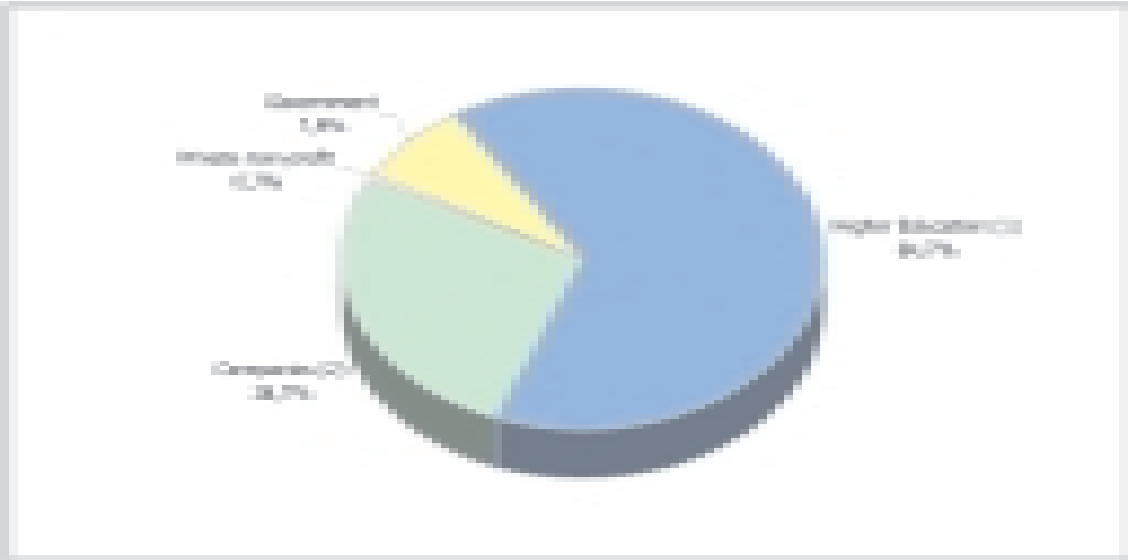
Category	Sectors				Total
	Government	Higher Education	Companies	Private non-profit	
Total	7.438	68.155 [1]	41.467	481	117.541
Researchers	4.736	38.701	15.988 [2]	412	59.838
Support personnel and others	2.702	29.454	25.478 [3]	69	57.703
Percentage of researchers	7,91	64,68	26,72	0,69	100,00

Sources: for companies: Industrial Research on Technological Innovation (Pintec) of 2000 from the Brazilian Institute of Geography and Statistics (IBGE); for Ph.D. students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) and, for the remaining: directory of Research Groups in Brazil (DGP) 2000 Census of the Statistics and Information Consultancy (AEI) of the National Council for Scientific and Technological Development (CNPq).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Double counting may occur because it is possible that one person is involved in research and development (R&D) in more than one sector;
excludes researchers and students not indicating their maximum degrees and training levels, respectively;
1) existing enrolled Ph.D. students at the end of the year;
2) including undergrad students registered with the Directory of Research Groups; (DGP).
3) including people of different education levels conducting activity of a technical nature and registered with the Directory of Research Groups (DGP).
In calculating full time equivalence, the following criteria were adopted:
i) people from government and private sector non profit institutions: exclusive dedication to research and development (R&D) activities;
ii) people from the higher education teaching sector: 50% of their time dedicated to research and development (R&D);
iii)) people from companies: the results of the Industrial Research on Technological Innovation (Pesquisa Industrial de Inovação Tecnológica – Pintec) were used, using the value of number of people with exclusive dedication and people with partial dedication and weighed by the average percentage of dedication.

Graph 25

Percentage of researchers involved full time in research and development (R&D), by institutional sector, 2000



Sources: for companies: Industrial Research on Technological Innovation (Pintec) of 2000 from the Brazilian Institute of Geography and Statistics (IBGE); for Ph.D. students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) and, for the remaining: directory of Research Groups in Brazil (DGP) 2000 Census of the Statistics and Information Consultancy (AEI) of the National Council for Scientific and Technological Development (CNPq)
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Double counting may occur because it is possible that one person is involved in research and development (R&D) in more than one sector;
Excludes researchers and students not indicating their maximum degrees and training levels, with the Directory of Research Groups in Brazil (DGP);
1) students registered with the Directory Group of Research (Diretório dos Grupos de Pesquisa no Brasil – DGP) were included in the Higher Education Teaching sector.
2) people employed exclusively in internal research and development (R&D) activities with higher education level.

Table 27

People with higher education, by different categories, 1992/1999

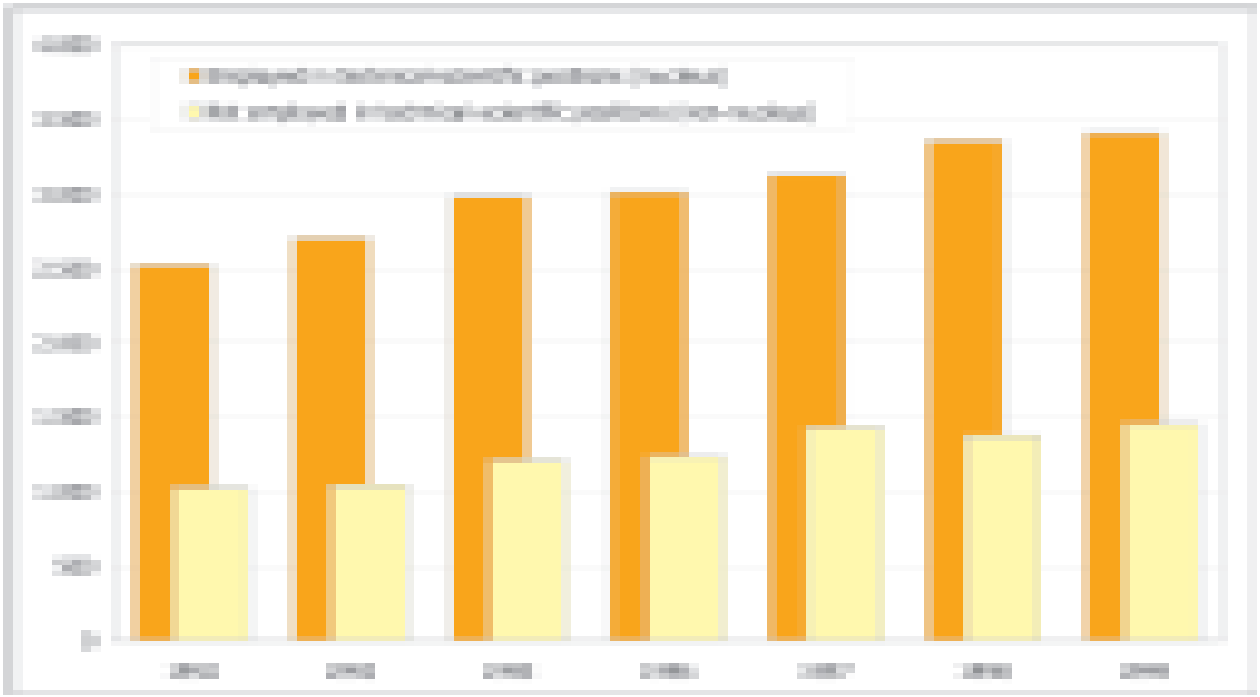
Categories	1992	1993	1995	1996	1997	1998	1999
Total	**4.215**	**4.458**	**4.965**	**5.108**	**5.466**	**5.720**	**5.970**
Employed	**3.556**	**3.749**	**4.196**	**4.249**	**4.565**	**4.733**	**4.865**
Nucleus (1)	2.529	2.784	2.984	3.014	3.131	3.360	3.411
No-nucleus (2)	1.028	1.044	1.212	1.235	1.434	1.373	1.454
Unemployed	**92**	**99**	**180**	**125**	**149**	**171**	**283**
Inactive	**568**	**610**	**669**	**734**	**752**	**816**	**982**
Participation rate - percentage (3)	86,5	86,3	86,5	85,6	86,2	85,7	84,9
Unemployment rate - percentage (4)	2,5	2,6	2,3	2,8	3,2	3,5	4,0

Source: National Household Sample Survey (PNAD) microdata of the Brazilian Institute of Geography and Statistics (IBGE) various years.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: In 1994 and 2000 the National Household Sample Survey (PNAD) was not conducted.
1) nucleus: people with higher education employed in technical-scientific positions (RHCTn);
2) no-nucleus: people with higher education not employed in technical-scientific positions;
3) participation rate: total of people with higher education level in relation to the economically active population (PEA), with higher education level; and
4) unemployment rate: total of people with higher education who looked for a job in the reference week compared to the economically active population with higher education.

Graph 26

People employed with higher education, whether in technical-scientific positions or not, 1992/1999



Source: National Household Sample Survey (PNAD) microdata of the Brazilian Institute of Geography and Statistics (IBGE) various years.
Produced by: Indicators Coordination - Ministry of Science and Technology.

EDUCATION AND RESEARCH SCHOLARSHIPS

Table 28

Master's and Ph.D. degree scholarships in the country financed by federal agencies, 1997-2002

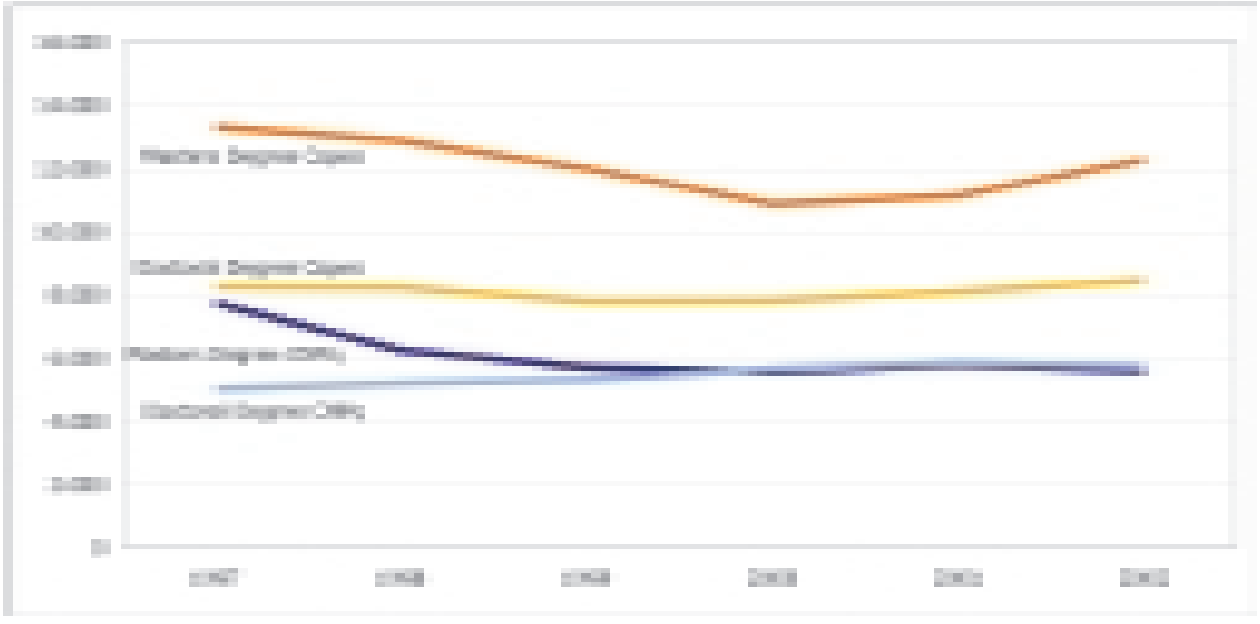
Years	Total		Capes		CNPq (1)	
	Masters Degree	Doctoral Degree	Masters Degree	Doctoral Degree	Masters Degree	Doctoral Degree
1997	21.113	13.291	13.349	8.258	7.764	5.033
1998	19.153	13.445	12.897	8.244	6.256	5.205
1999	17.703	13.137	12.000	7.810	5.693	5.327
2000	16.478	13.497	10.906	7.839	5.572	5.658
2001	16.974	13.945	11.176	8.187	5.798	5.842
2002	17.896	14.209	12.294	8.469	5.602	5.740

Fonte: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) of the Ministry of Education (MEC) and the National Council for Scientific and Technological Development (CNPq) of the Ministry of Science and Technology (MCT).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: 1) Each scholarship is equivalent to 12 monthly rates paid during the year, for one or more scholarship holder; in CAPES from 1997 to 1999, this includes PIDCT scholarship grants granted and not paid.

Graph 27

Master's and Ph.D. degree scholarships in the country financed by federal agencies, 1997-2002



Fonte: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) of the Ministry of Education (MEC) and the National Council for Scientific and Technological Development (CNPq) of the Ministry of Science and Technology (MCT).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 29

Scholarships abroad financed by federal agencies, by modality, 1996-2000

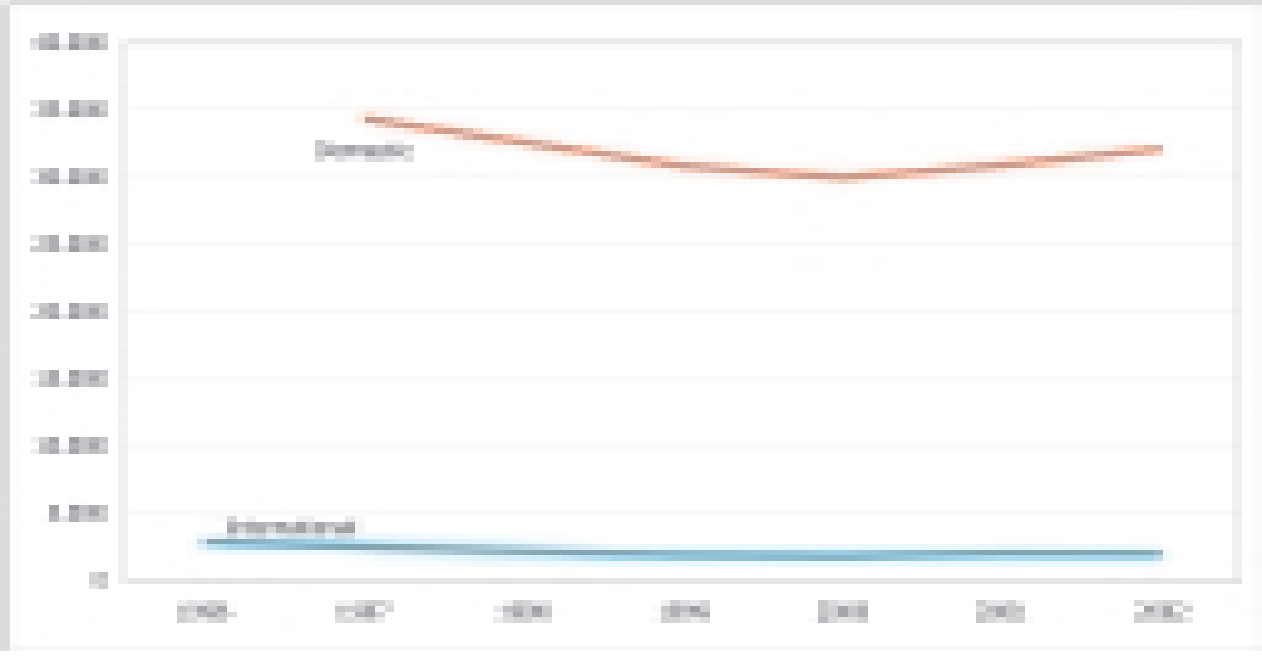
Years	Capes				Cnpq			
	Masters Degree	Doctoral degree	Doctoral degree (Sanduiche mode)	Post-doctoral	Masters Degree	Doctoral degree	Doctoral degree (Sandwiche mode)	Post-doctoral
1996	48	943	354	115	1	1119	227	254
1997	37	955	235	177	–	803	187	166
1998	18	945	252	134	1	572	88	139
1999	8	848	275	138	–	461	47	87
2000	11	761	309	129	–	381	57	104
2001	17	708	357	157	–	438	99	157
2002	11	688	366	188	–	414	98	195

Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) of the Ministry of Education (MEC) and the National Council for Scientific and Technological Development (CNPq) of the Ministry of Science and Technology (MCT).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) Each scholarship is equivalent to 12 monthly rates paid during the year, for one or more scholarship holder.

Graph 28

Domestic and international scholarships financed by federal agencies, 1996-2002



Source: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC and National Council for Scientific and Technological Development (CNPq) from Ministry of Science and Technology.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Note: in domestic include only Master's and Ph.D. degree scholarships.

Table 30

Scholarships granted to undergrad students by federal agencies, by modality: 1980-2002

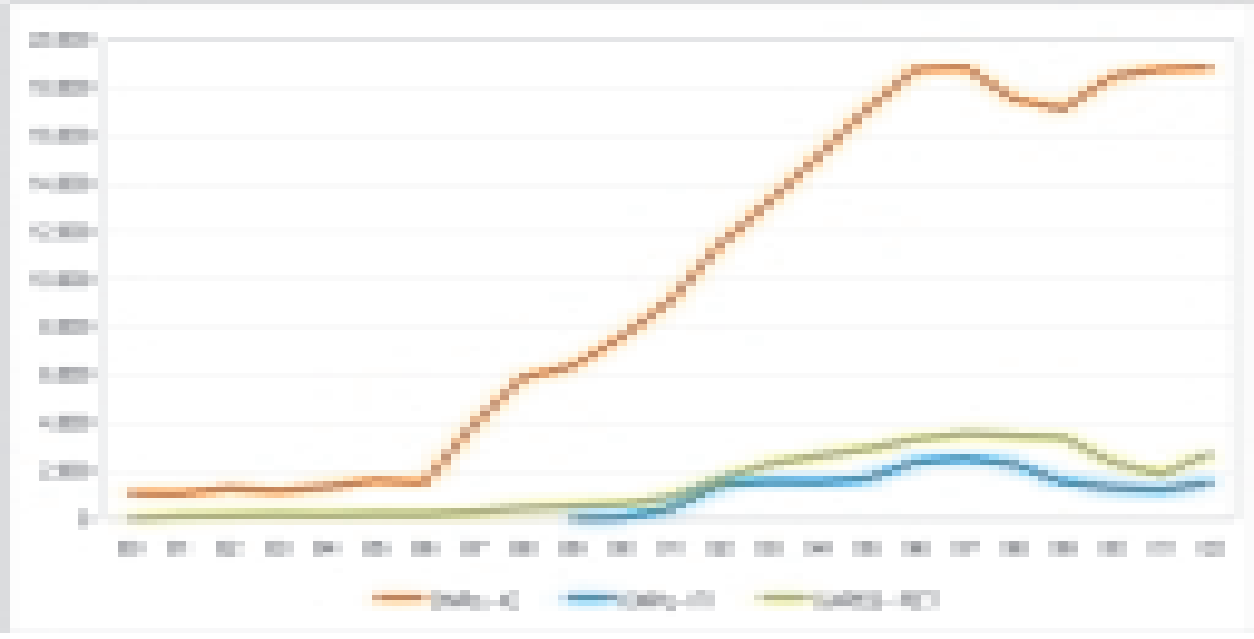
Year	CNPq[1]		SESU[2]
	Science Practicum (IC)	Technology and Industry Practicum (ITI)	Special Training Program (PET)
1980	1.079	...	22
1981	1.052	...	106
1982	1.274	...	115
1983	1.175	...	177
1984	1.321	...	151
1985	1.600	...	201
1986	1.510	...	202
1987	3.921	...	308
1988	5.893	...	461
1989	6.349	29	519
1990	7.548	55	594
1991	9.117	414	893
1992	11.440	1.420	1.642
1993	13.212	1.544	2.284
1994	15.131	1.523	2.630
1995	17.101	1.684	2.904
1996	18.761	2.366	3.324
1997	18.856	2.522	3.556
1998	17.533	2.268	3.479
1999	17.120	1.524	3.405
2000	18.483	1.308	2.361
2001	18.763	1.230	1.849
2002	18.861	1.514	2.759

Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) of the Ministry of Education (MEC) and the National Council for Scientific and Technological Development (CNPq) of the Ministry of Science and Technology (MCT).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) Each scholarship is equivalent to 12 monthly rates paid during the year, for one or more scholarship holder.
2) Number of scholarships granted.

Graph 29

Scholarships granted to undergrads by federal agencies according to modality, 1980-2002



Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) of the Ministry of Education (MEC) and the National Council for Scientific and Technological Development (CNPq) of the Ministry of Science and Technology (MCT).
Produced by: Indicators Coordination - Ministry of Science and Technology.

SCIENTIFIC PRODUCTION

Table 31

Scientific production in the directory of research groups of the National Council for Scientific and Technological Development (CNPq), 1998-2001

Year	Total of authors	Specialized Articles			Books and book chapters	
		National circulation (1)	International circulation (2)	In annals	Books	Book chapters
Researchers						
1998	37.518	16.894	20.550	36.871	2.833	9.546
1999	39.547	16.747	23.715	40.580	2.824	18.863
2000	38.849	18.262	25.143	45.295	3.142	12.397
2001	36.147	17.489	26.102	47.781	3.849	12.721
Students						
1998	11.262	2.515	1.143	5.359	188	494
1999	14.746	3.448	1.817	7.228	253	753
2000	17.867	4.385	2.511	9.816	298	980
2001	21.760	5.075	3.377	12.761	301	1.252

Source: National Council for Scientific and Technological Development (CNPq) Directory of Research Groups in Brazil, 2002 Census.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: (1) Articles published in Portuguese in technical-scientific magazines and specialized periodicals (including articles with no information on the idiom); (2) Articles published in languages different from Portuguese in technical-scientific magazines and specialized periodicals; there is double counting in publications with co-authorship.

Table 32

Technical production in the directory of research groups of the National Council for Scientific and Technological Development (CNPq), 1998-2001

Year	Total authors	Softwares		Technological Products		Processes or techniques		Technical papers (3)
		Registered or patented	Non-registered or non-patented	Registered or patented	Non-registered or non-patented	Classified/ registered	Non-classified / Non-registered	
Researchers								
1998	14.505	40	1.091	185	769	58	436	14.319
1999	16.103	40	1.256	205	919	85	539	16.619
2000	15.811	54	1.213	155	722	87	506	11.337
2001	14.201	58	905	175	587	103	395	11.347
Students								
1998	2.756	18	272	17	81	5	49	1.388
1999	3.598	5	358	20	109	4	86	1.688
2000	4.170	30	399	21	152	18	80	1.902
2001	4.730	16	429	29	148	28	81	1.717

Source: National Council for Scientific and Technological Development (CNPq) - Directory of Brazilian Research Groups, 2002 Census.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) consultancy, technical report, project elaboration, opinion, advisory, services for health area, etc
There is double counting in publications with co-authorship.

Table 33

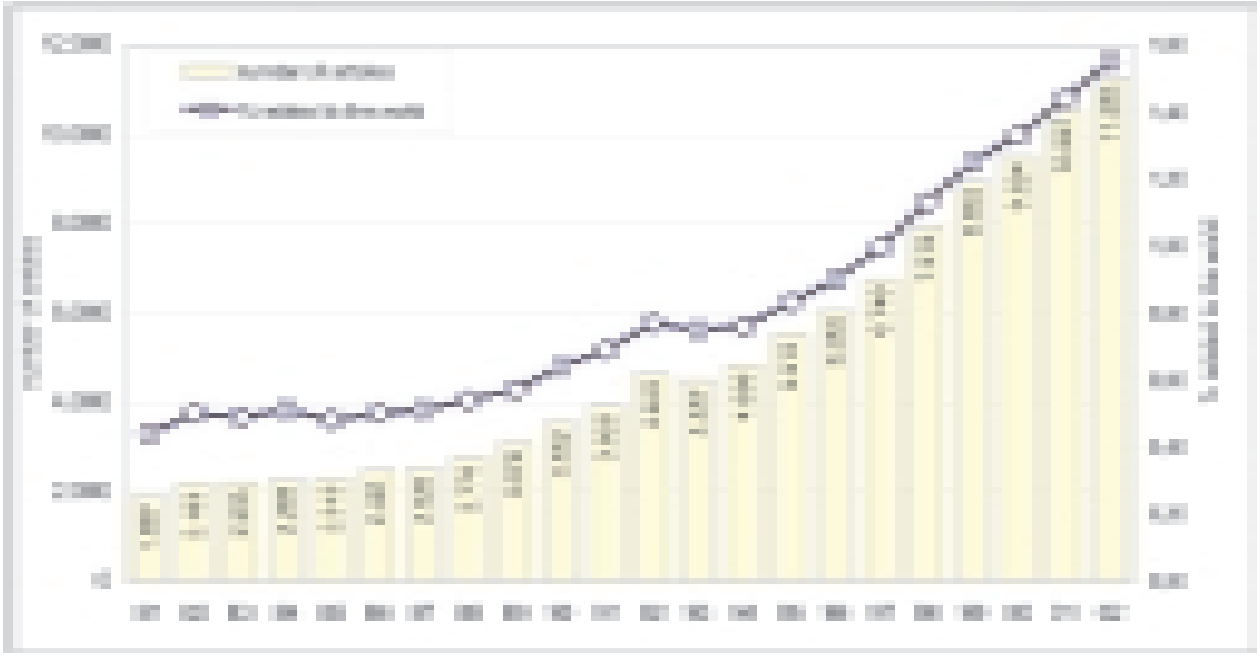
Percentage of articles by Brazilian residents published in international scientific periodicals indexed in the Institute for Scientific Information (ISI), proportionate to the world total for each area, according to selected areas, 2000-2002

Area	Percentage		
	2000	2001	2002
Agricultural Sciences	3,06	3,08	3,00
Physics	2,04	2,36	2,30
Microbiology	1,89	2,08	2,18
Animal/Plant Sciences	1,86	1,99	2,10
Space Sciences	1,95	1,77	1,99
Mathematics	1,42	1,55	1,89
Pharmacology	1,70	1,56	1,76
Biology and Biochemistry	1,55	1,51	1,76
Ecology/Environment	1,44	1,61	1,68
Chemistry	1,42	1,51	1,67

Source: Institute for Scientific Information (ISI). National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 30

Published articles in international scientific journals indexed by the Institute for Scientific Information (ISI) and percentage related to the world articles production, 1981-2002



Source: Institute for Scientific Information (ISI). National Science Indicators.
Produced by: Indicators Coordination - Ministry of Science and Technology.

PATENTS

Table 34

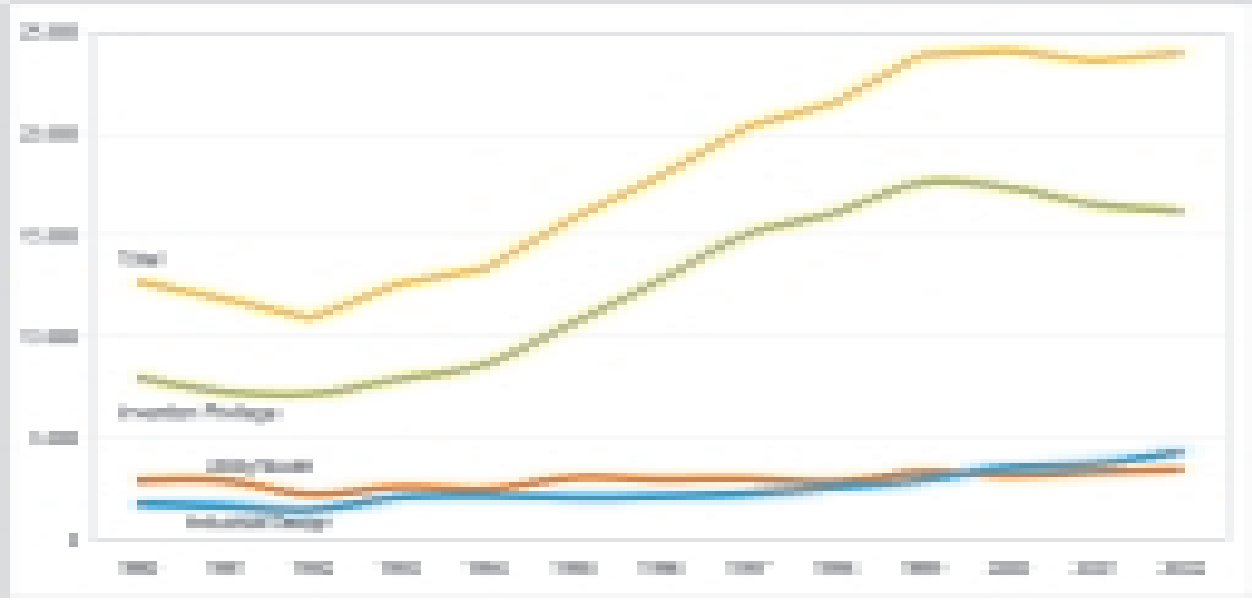
Patent orders submitted with the National Institute of Industrial Property (INPI), by submitter type and origin, 1990-2002

Types of Patent and Submitter Origin	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	12.744	11.891	10.909	12.439	13.362	15.439	17.916	20.354	21.536	23.677	24.117	23.630	23.995
Resident	5.629	5.472	5.293	6.402	6.279	7.153	7.008	7.111	6.991	8.261	8.838	9.840	10.902
Non-resident	5.115	5.419	5.516	6.257	7.083	8.507	10.908	13.243	14.521	15.636	15.139	14.190	13.993
Invention Privilege	8.206	7.306	7.204	7.936	8.671	10.584	12.757	15.201	16.099	17.803	17.373	16.537	16.184
Resident	2.389	2.319	2.190	2.429	2.299	2.711	2.636	2.698	2.596	2.879	3.098	3.311	3.913
Non-resident	5.817	4.990	5.104	5.501	6.401	7.973	10.167	12.357	13.543	14.724	14.275	13.226	13.063
Utility Model	2.908	2.896	2.133	2.688	2.506	3.094	2.975	3.006	2.885	3.333	3.189	3.586	3.463
Resident	2.867	2.885	2.107	2.575	2.446	3.084	2.911	2.936	2.963	3.147	3.104	3.280	3.416
Non-resident	41	41	26	43	59	50	64	94	73	76	85	86	46
Industrial Design	1.806	1.656	1.471	2.061	2.186	2.561	2.344	2.289	2.561	2.561	3.555	3.777	4.349
Resident	1.343	1.268	1.066	1.398	1.564	1.497	1.467	1.497	1.677	2.135	2.676	3.249	3.494
Non-resident	457	388	586	663	623	584	677	791	905	826	879	868	855

Source: National Institute of Industrial Property (INPI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 31

Patent requests submitted to the National Institute of Industrial Property (INPI), by type, 1990-2002



Source: National Institute of Industrial Property (INPI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 35

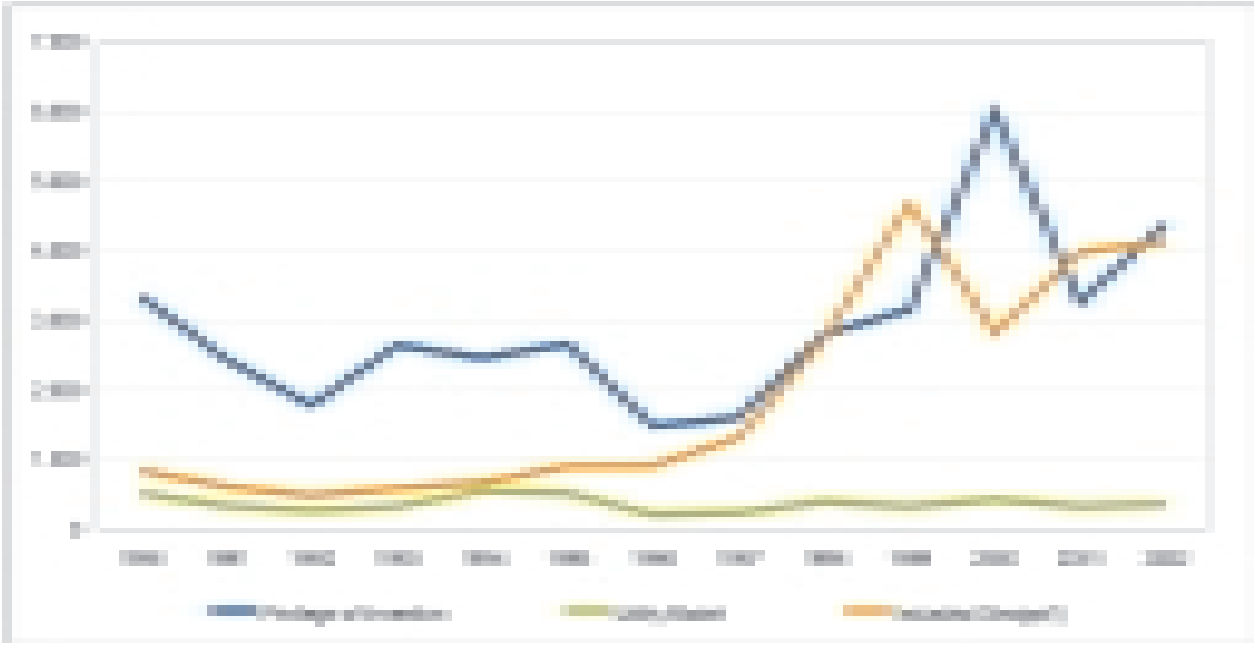
Granting of invention and utility model patents, certificates of registration for industrial design with the National Institute of Industrial Property (INPI), 1990-2002

Kinds of Patents and Registrations	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	4.713	3.385	2.548	3.549	3.678	4.069	2.600	3.156	5.925	8.085	9.259	7.576	8.864
Privilege of Invention	3.354	2.441	1.795	2.644	2.468	2.698	1.487	1.815	2.880	3.158	6.017	3.265	4.378
Utility Model	518	329	174	301	546	511	307	252	357	314	425	325	358
Certificate of Addition	-	-	-	-	-	-	-	-	-	-	1	3	3
Industrial Design[1]	841	615	481	584	664	899	906	1.089	2.738	4.676	2.815	3.983	4.125

Source: National Institute of Industrial Property (INPI).
Produced by: Indicators Coordination - Ministry of Science and Technology.
1) Up to 1996, Industrial Models (IM) are included in Industrial Designs (ID).

Graph 32

Invention patents granted by the National Institute of Industrial Property (INPI) for utility model and industrial design registrations, 1990-2002



Source: National Institute of Industrial Property (INPI).
Produced by: Indicators Coordination - Ministry of Science and Technology.
1) Up to 1996, Industrial Models (IM) are included in Industrial Designs (ID).

Table 36

Patents granted for inventions, addition certificates granted for utility models and industrial design models by the National Institute of Industrial Property (INPI), 1995-

Types of Patent and Registrations and Submitter Origin	1995	1996	1997	1998	1999	2000	2001	2002
Total	**4.849**	**2.600**	**3.156**	**5.925**	**8.185**	**9.259**	**7.576**	**8.864**
resident	1.445	924	1.292	2.513	3.606	3.035	3.609	3.724
non-resident	2.624	1.676	1.864	3.412	4.588	6.234	3.957	5.148
Invention Privilege	**2.658**	**1.487**	**1.615**	**2.800**	**3.185**	**6.017**	**3.285**	**4.378**
resident	526	192	232	485	426	659	386	342
non-resident	2.132	1.295	1.383	2.315	2.758	5.358	2.879	4.036
Utility Model	**512**	**207**	**232**	**397**	**324**	**426**	**325**	**368**
resident	478	190	219	386	315	404	314	339
non-resident	34	17	13	11	9	22	11	19
Addition Certification	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**3**
resident	-	-	-	-	-	1	3	2
non-resident	-	-	-	-	-	-	-	1
Industrial Design	**899**	**906**	**1.389**	**2.728**	**4.676**	**2.815**	**3.963**	**4.115**
resident	441	542	841	1.723	3.864	1.961	2.906	3.043
non-resident	458	364	548	1.005	1.812	854	1.057	1.094

Source: National Institute of Industrial Property (INPI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

TECNOLOGICAL BALANCE

Table 37

Remittances abroad by technology transfer and correlated contracts, 1980-2002

(in thousands of US dollars)

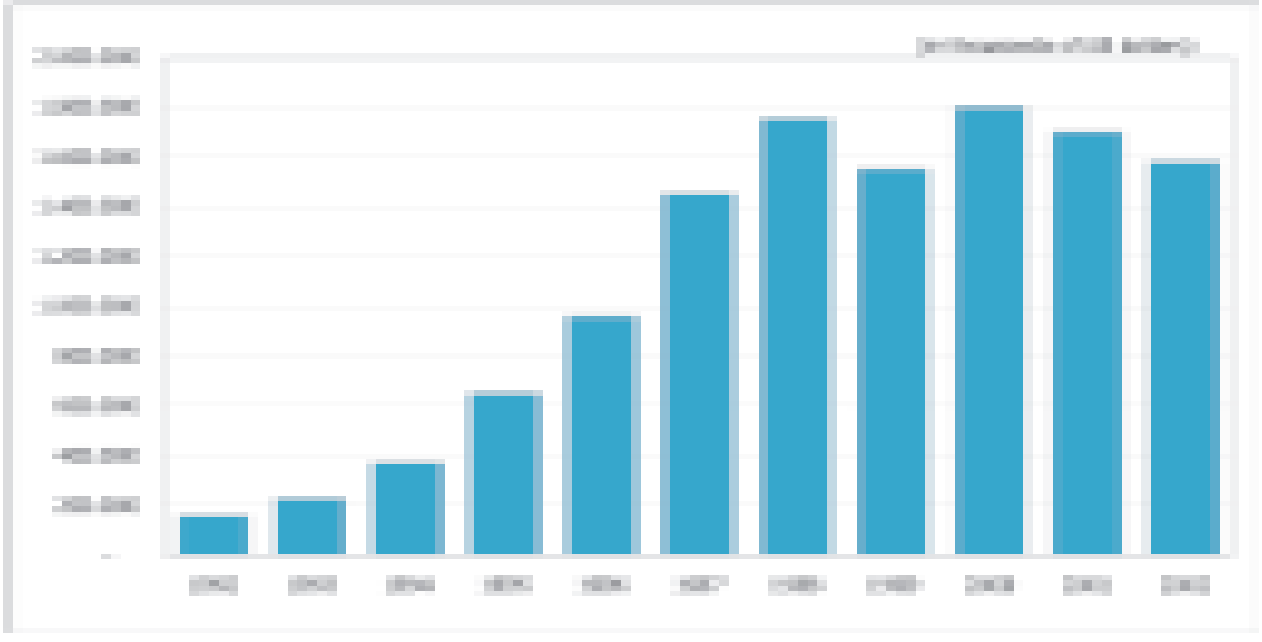
Year	Total	Modalities of Contract:				
		Supply of Technical Assistance Service (1)	Technology Supply	Trademarks: license of use / cession	Patents: license of exploitation / cession	Franchising
1992	160.484	126.352	31.250	2	2.880	_
1993	227.415	146.018	41.660	44	39.687	_
1994	373.222	244.096	48.266	1.756	79.104	_
1995	652.814	286.217	222.164	5.013	138.630	_
1996	960.964	368.749	378.154	13.237	200.424	_
1997	1.454.268	760.971	512.545	14.080	166.684	_
1998	1.756.327	1.017.958	540.113	12.529	182.747	2.979
1999	1.553.354	931.798	482.266	37.939	97.083	4.275
2000	1.882.231	1.045.747	619.476	31.160	94.436	11.412
2001	1.784.521	1.085.642	505.126	28.134	75.089	10.530
2002	1.581.915	1.085.203	485.439	22.163	59.182	10.088

Source: Central Bank of Brazil / Economic Department (DEPEC) / Balance of Payments Division (DIBAP).
Produced by: Department of Statistics - Ministry of Science and Technology

Note: 1) Includes Specialized Technical Services and Project Implementation and Installation. Not all accounted contracts under this item are registered with the Instituto Nacional de Propriedade Industrial - INPI (National Institute of Industrial Property) because they were not considered as a technology transfer.

Graph 33

Remittances abroad by technology transfer and correlated contracts, 1992-2002



Source: Central Bank of Brazil / Economic Department (DEPEC) / Balance of Payments Division (DIBAP).
Produced by: Department of Statistics - Ministry of Science and Technology

INTERNATIONAL COMPARISONS

Table 38

National expenditures on research and development (R&D), in relation to the gross domestic product (GDP), per capita and by researcher, in available recent years, selected countries.

Countries	Year	Research and development expenditures (R&D) / (current million PPP$)	Research and development expenditures (R&D) in relation to the gross domestic product / percentage	Research and development expenditures (R&D) per capita / (current PPP$ per capita)	Research and development expenditures (R&D) by researcher (full time equivalent) / (current PPP$ by researcher)
Germany	2001	55.854,6	2,51	667,9	205.786,0 [1]
Argentina	2001	1.568,3	0,39	43,8 [1]	59.836,7
Australia	2001	7.881,7	1,55	404,9	118.098,8
Brazil	1999	12.482,9	1,06	73,2	193.833,7
Canada	2001	17.348,3	1,82	552,8	146.987,5 [2]
China	2001	72.876,8	1,29	44,9 [1]	88.936,1
Singapore	2001	3.139,7	2,19	477,4 [1]	117.511,1
Korea	2001	22.868,3	2,92	464,9	182.433,3
Spain	2001	8.222,3	0,96	204,3	182.736,0
United States of America	2001	277.888,9	2,67	982,7	193.481,9 [3]
France	2001	36.143,8	2,28	598,3	208.874,2 [1]
Israel	2001	6.358,7	4,73	1.068,8 [1]	..
Italy	2001	15.475,3	1,07	267,9	154.884,1
Japan	2001	101.898,4	3,06	801,3	153.643,1
Mexico	1999	3.585,6	0,43	35,9	148.799,3
Portugal	2001	1.714,4	0,83	165,4	86.357,5 [4]
United Kingdom	2001	39.363,6	1,89	668,3	152.477,0 [4]
Russian Federation	2001	14.158,4	1,24	98,1 [1]	28.845,6

Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro); Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000 to Resident population: www2.ibge.gov.br/pub/Estimativas_Projecoes_Populacao/Estimativas_1980_2010/Estimativas_e_taxas_1980_2010.zip, extract on 04/13/2004. The World Development Indicators (WDI).

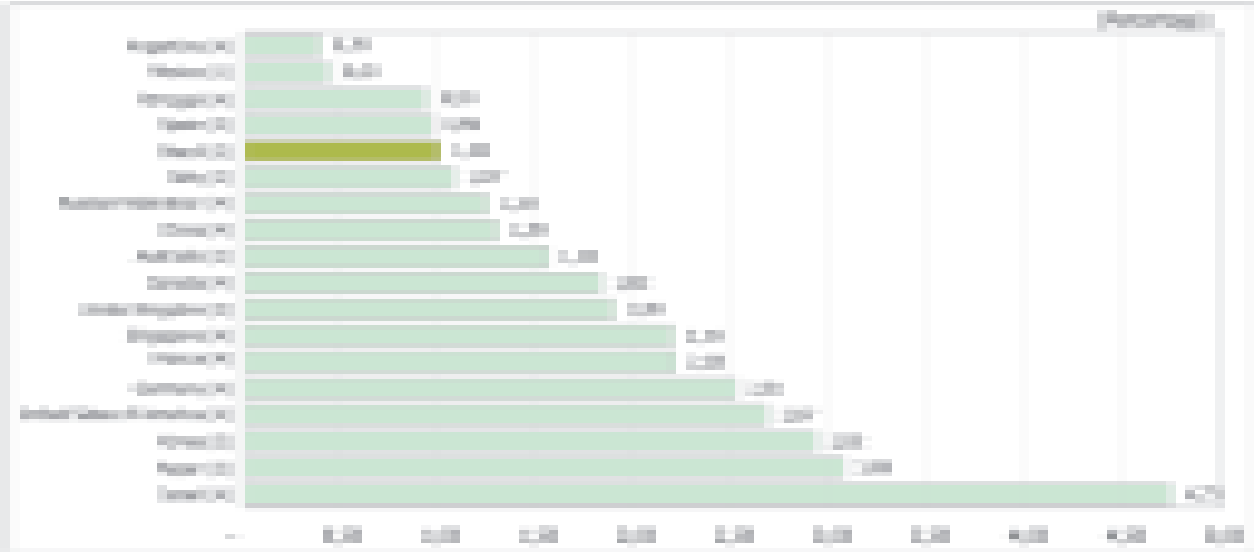
Produced by: Indicators Coordination - Ministry of Science and Technology

PPP - power purchase parity

Note: 1) 1999 reference year; 2) 2001 reference year; 3) 1998 reference year.

Graph 34

National expenditures on research and development (R&D), in relation to the gross domestic product, in available recent years, selected countries

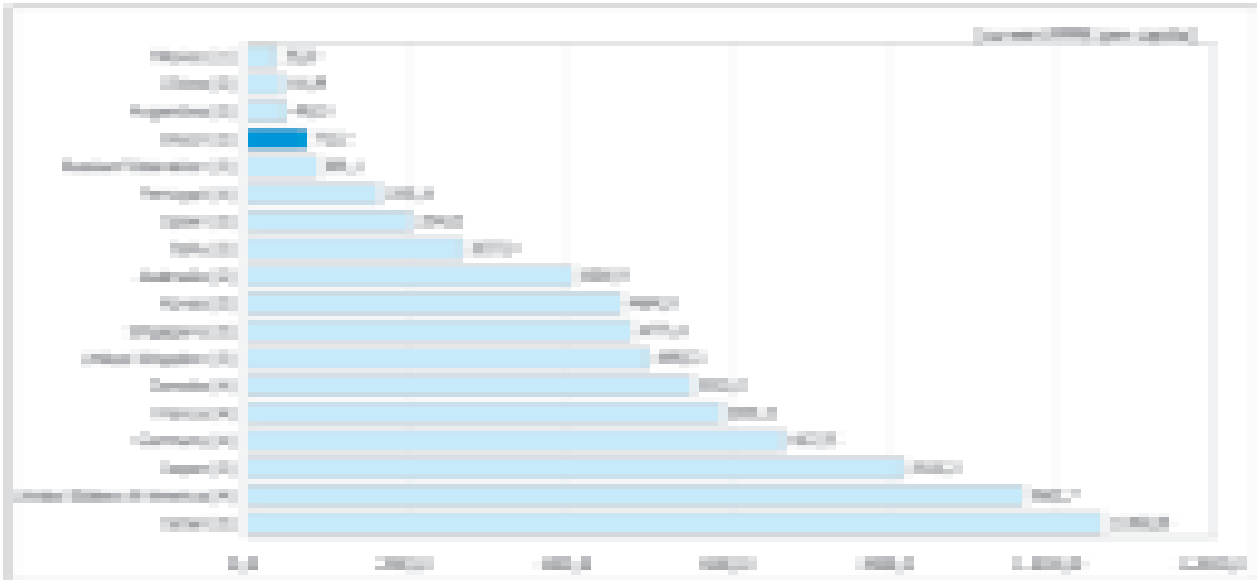


Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro); Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000. The World Development Indicators (WDI).
Produced by: Indicators Coordination - Ministry of Science and Technology

Notes: 1) 1999; 2) 2000; 3) 2001 and 4) 2002.

Graph 35

National expenditures on research and development (R&D), per capita, in available recent years, selected countries.

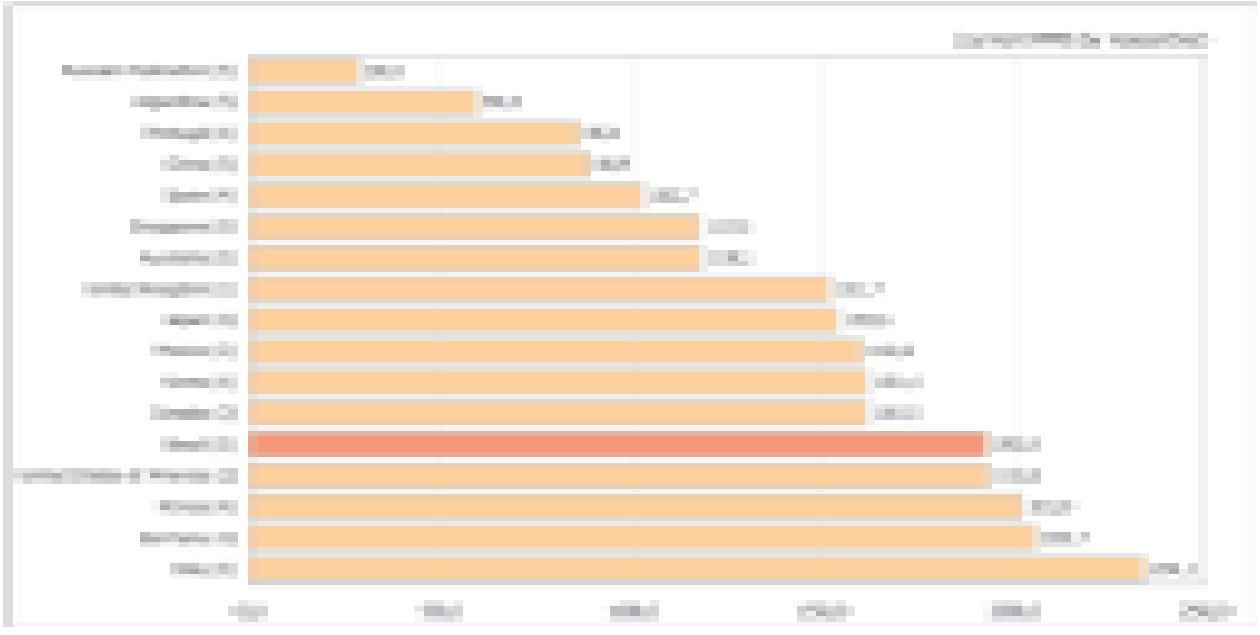


Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro); Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000. The World Development Indicators (WDI)
Produced by: Indicators Coordination - Ministry of Science and Technology

Notes: 1) 1999; 2) 2000; 3) 2001 and 4) 2002.

Graph 36

National expenditures on research and development (R&D), by researcher, in available recent years, nuntries.



Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro); Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000. The World Development Indicators (WDI).
Produced by: Indicators Coordination - Ministry of Science and Technology

Notes: 1) 1998; 2) 1999; 3) 2000; 4) 2001 and 5) 2002.

Table 39

Percentage of national expenditures on research and development (R&D), by financing sector, in available recent years

(percentage)

Countries	Year	Government	Companies
Germany	2002	31,8	65,1
Argentina	2002	70,2	24,3
Australia	2000	45,7	46,3
Brazil	**2000**	**58,4**	**41,6**
Canada	2002	33,2	40,9
China	2000	33,4	57,6
Singapore	2002	39,3	53,1
Korea	2001	25,0	72,5
Spain	2001	39,9	47,2
United States of America	2002	30,2	64,4
France	2001	36,9	54,2
Israel	2000	24,7	69,6
Italy	1991	49,6	44,4
Japan	2001	18,5	73,0
Mexico	1999	61,3	23,6
Portugal	2001	61,0	31,5
United Kingdom	2001	30,2	46,2
Russian Federation	2002	58,4	33,1

Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by Federal Data Processing Service (Serpro) and Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) - 2000.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 40

Nacional expenditures on research and development (R&D) as percentage of Gross Domestic Product (GDP), by financing sector, in available recent years.

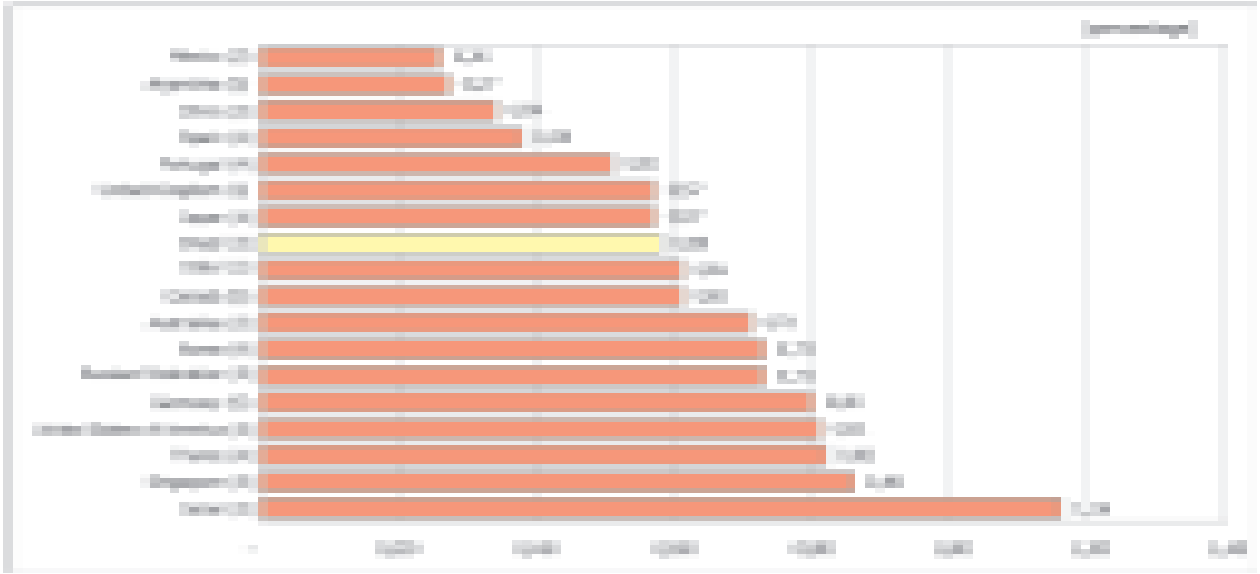
[percentage]

Countries	Year	Government sector	Enterprise sector
Germany	2002	0,80	1,64
Argentina	2002	0,27	0,09
Australia	2000	0,71	0,72
Brazil	**2000**	**0,58**	**0,42**
Canada	2002	0,61	0,73
China	2000	0,34	0,59
Singapore	2002	0,86	1,16
Korea	2001	0,73	2,12
Spain	2001	0,38	0,45
United States of America	2002	0,81	1,72
France	2001	0,82	1,21
Israel	2000	1,16	3,36
Italy	1991	0,61	0,54
Japan	2001	0,57	2,24
Mexico	1999	0,26	0,10
Portugal	2001	0,51	0,37
United Kingdom	2001	0,57	0,88
Russian Federation	2002	0,73	0,41

Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro) and Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) - 2000. The World Development Indicators (WDI).
Produceb by: Indicators Coordination - Ministry of Science and Technology.

Graph 37

Nacional expenditures on research and development (R&D) financing by government sector as percentage of Gross Domestic Product (GDP), in available recent years.

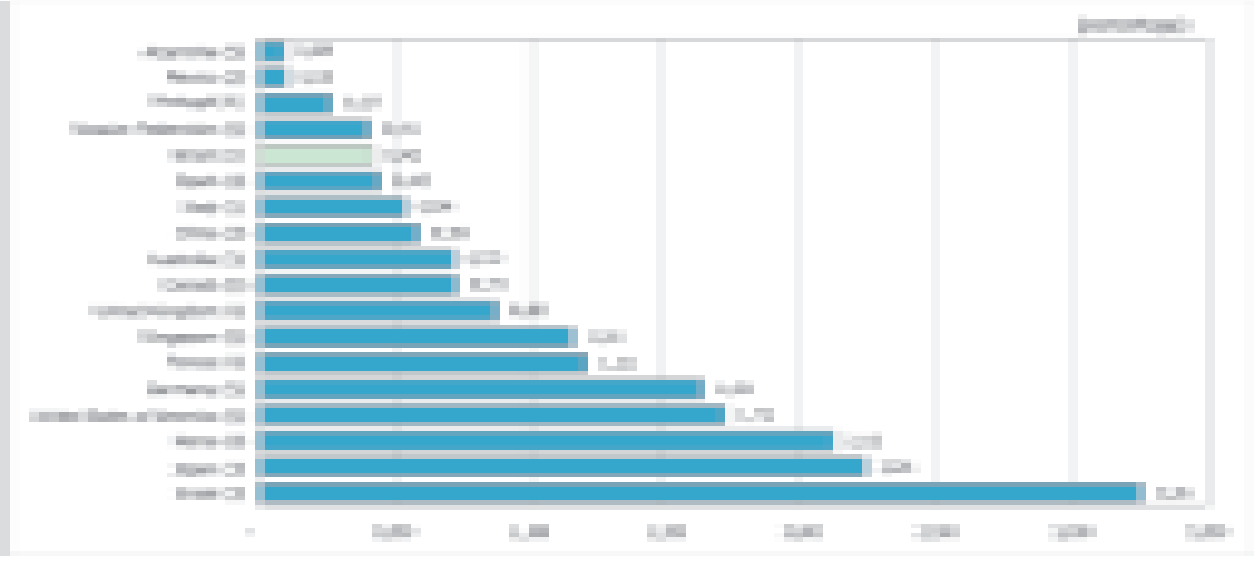


Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro) and Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) - 2000. The World Development Indicators (WDI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) 1991; 2) 1999; 3) 2000; 4) 2001 and 5) 2002.

Graph 38

Nacional expenditures on research and development (R&D) financing by enterprise sector as percentage of Gross Domestic Product (GDP), in available recent years.



Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro) and Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) - 2000. The World Development Indicators (WDI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) 1991; 2) 1999; 3) 2000; 4) 2001 and 5) 2002.

Table 41

Enterprise expenditures on research and development (R&D) by sectors, in available recent years

(percentage)

Countries	Year	Instruments industry	Eletronic industry	Pharmaceutical industry	Office machinery and computer industry	Enterprise expenditures on research and development of the companies (current million PPP$)
Germany	2001	4,8	18,7	6,8	1,9	37.987,2
Australia	2000	2,7	5,7	6,6	1,8	3.786,8
Brazil	**2000**	**1,7** (1)	**12,3** (2)	**4,6** (3)	**3,8** (4)	**5.177,5**
Canada	2001	2,6	29,0	6,3	3,7	9.398,5
Korea	2001	1,4	36,2	2,3	7,8	16.767,4
Spain	2001	1,5	5,7	9,8	1,1	4.388,3
United States of America	2000	9,6	13,9	6,9	5,2	198.534,8
France	2001	6,4	12,9	12,1	1,3	23.637,3
Italy	2001	3,8	18,0	8,8	1,0	8.651,6
Japan	2001	4,3	35,3	7,1	11,0	76.587,7
Mexico	1999	0,3	8,9	3,2	6,9	885,1
Portugal	2001	1,2	6,1	..	8,2	486,9
United Kingdom	2001	3,8	8,2	24,0	6,8	18.781,4

Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro) and Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: (1) medical instruments, precision, optic and jewelry store makes reference
(2) regarding to manufacture of the: basic eletronic material and communication equipment and devices
(3) regarding exclusively to the manufacture of pharmaceutical products
(4) regarding exclusively to the manufacture of machines, devices and equipments

Table 42

Percentage distribution of the national expenditures on research and development (R&D), by execution sector, in available recent years.

(percentage)

Countries	Year	Government	Companies	Higher Education	Private non-profit
Germany	2002	13,8	69,1	17,1	..
Argentina	2002	37,2	36,1	23,9	2,8
Australia	2000	22,5	47,5	26,8	2,7
Brazil	**2000**	**30,3**	**39,8**	**30,1**	**0,6**
Canada	2002	12,6	54,2	33,5	0,3
China	2002	28,7	61,2	10,1	..
Korea	2001	12,4	76,2	10,4	1,0
Spain	2001	15,5	52,4	30,9	0,8
United States of America	2002	8,8	70,2	15,9	5,1
France	2002	16,5	62,2	19,5	1,4
Japan	2001	9,5	73,7	14,5	2,3
Mexico	1999	45,8	25,5	26,3	3,1
Portugal	2002	19,8	34,5	35,6	10,2
Russian Federation	2002	24,5	69,9	5,4	0,2

Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro) and Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 43

Public national expenditures on research and development (R&D) by civil and defense sectors, selected countries, in available recent years

Countries	Year	Value (million PPPs)	% civil	% defense
Germany	2003	17.766,7	93,3	6,7
Australia	2003	3.642,9	92,7	7,3
Brazil	**2000**	**7.275,4**	**99,6**	**0,4**
Canada	2000	4.644,2	95,2	4,8
Korea	2002	7.011,5	84,7	15,3
Spain	2001	5.962,1	62,7	37,3
United States of America	2003	117.474,7	46,3	53,7
France	2002	16.883,0	75,8	24,2
Italy	2001	10.518,6	96,0	4,0
Mexico	2001	2.127,6	100,0	0,0
Portugal	2003	1.230,8	98,0	2,0
United Kingdom	2001	18.568,1	69,5	30,5

Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro). General Balance of States.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 44

Percentage distribution of the civil public national expenditures on research and development (R&D), by socio-economic objectives, in available recent years

(percentage)

Countries	Year	Knowledge advance	Economic development (3)	Health and environment (2)	Space programme
Germany (3) (5)	2003	55,9	19,1	13,7	4,9
Australia	2003	42,4	30,5	19,8	8,8
Brazil	**2000**	**71,4**	**15,3**	**10,4**	**2,6**
Canada	2000	34,5	25,8	23,1	6,6
Korea	2002	21,7	45,3	14,6	3,2
Spain	2001	27,9	22,7	9,7	2,4
United States os America	2003	6,6	5,6	26,3	8,4
France (5)	2002	42,8	12,3	10,2	8,9
Italy	2001	57,0	16,1	15,5	7,3
Mexico (4)	2001	53,9	33,5	12,5	-
Portugal (5)	2003	43,4	35,4	16,7	8,5
United Kingdom	2001	36,3	5,4	22,4	2,1

Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: Federal Government Integrated Financial Administration System (Siafi). Special extraction produced by the Federal Data Processing Service (Serpro)
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) Economic Development includes: agriculture, industrial technological development, energy and infrastructure;
2) Health and Environment includes: environment protection and control, health, social development, land and atmosphere exploration.
3) as note (v) of the OCDE, the parcels addition not correspond to the total;
4) as note (h) of the OCDE, the values refers only to expenditures of the central government; and5) as note (p) of the OCDE, the values are provisory.

Table 45

Full time equivalent researchers and personnel in research and development (R&D), related to the economically active population, in available recent years

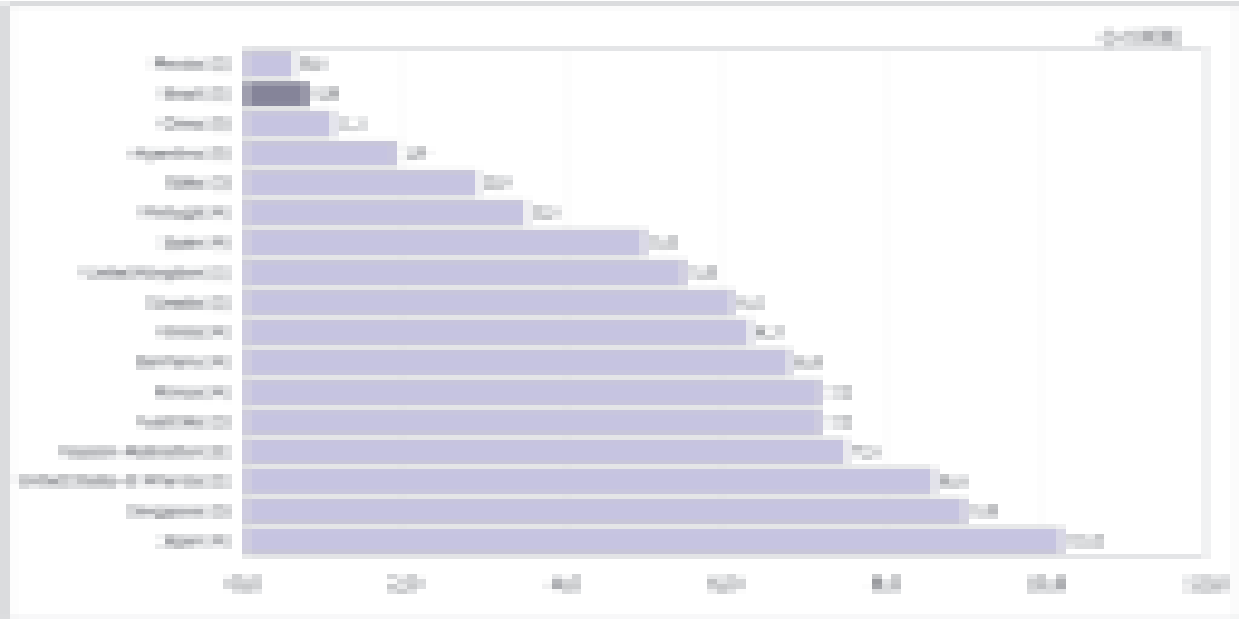
Countries	Year	Researchers (FTE)	Researchers in relation to the economically active population in 1.000	Personnel in research and development (R&D) (FTE)	Personnel in research and development (R&D), in relation to the economically active population in 1000
Germany	2001	294.284	8,8	480.606	12,4
Argentina	2002	26.080	1,9	37.412	2,7
Australia	1998	66.099	7,2	95.710	10,5
Brazil	**2000**	**59.838**	**0,8**	**117.541**	**1,5**
Canada	1999	88.818	6,1	140.440	9,5
China	2001	810.525	1,1	1.815.197	1,4
Singapore	2001	18.128	8,0	31.871	10,8
Korea	2001	126.107	6,3	165.715	7,7
Spain	2001	88.081	5,0	135.790	7,8
United States of America	1999	1.261.227	8,6	---	---
France	2001	177.372	7,1	213.518	13,5
Italy	1999	86.118	2,9	190.866	6,5
Japan	2001	675.898	11,1	892.857	13,5
Mexico	1999	21.879	0,6	39.736	1,0
Portugal	2001	17.724	3,5	22.870	4,6
United Kingdom	1998	157.662	5,5	(1) 261.800	(1) 9,4
Russian Federation	2002	491.984	7,5	886.854	15,8

Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: for companies: Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000; for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC; and for the rest: National Council for Scientific and Technological Development (CNPq) - Directory of Brazilian Research Groups, 2002 Census.
Produced by: Indicators Coordination - Ministry of Science and Technology

Note: 1) 1991.

Graph 39

Full time equivalent researchers in research and development (R&D), in relation to the economically active population, in available recent years

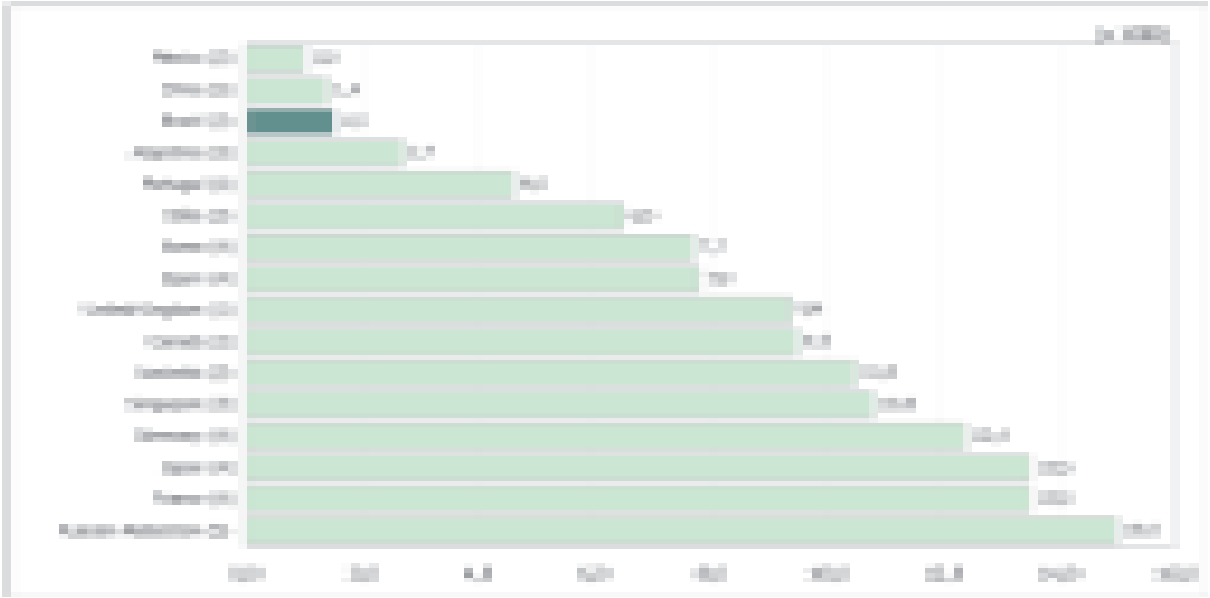


Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: for companies: Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000; for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC; and for the rest: National Council for Scientific and Technological Development (CNPq) - Directory of Brazilian Research Groups, 2002 Census.
Produced by: Indicators Coordination - Ministry of Science and Technology

Notes: 1) 1998; 2) 1999; 3) 2000; 4) 2001 and 5) 2002.

Graph 40

Full time personnel in research and development (R&D), in relation to the economically active population, in available recent years



Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: for companies: Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000; for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC; and for the rest: National Council for Scientific and Technological Development (CNPq) - Directory of Brazilian Research Groups, 2002 Census.
Produced by: Indicators Coordination - Ministry of Science and Technology

Notes: 1) 1991; 2) 1999; 3) 2000; 4) 2001 and 5) 2002.

Table 46

Full time equivalent researchers distribution, by institutional sectors, from selected countries, in available recent years.

Countries	Year	Sectors		
		Government	Companies	Higher education
Germany	2001	14,6	59,7	25,7
Argentina	2002	37,6	11,3	49,3
Australia	2000	13,6	24,4	58,8
Brazil	**2000**	**7,9**	**26,7**	**64,7**
Canada	1999	8,2	54,5	36,6
China	2002	23,3	54,7	22,0
Korea	2001	8,8	73,5	16,9
Spain	2001	16,7	23,7	58,6
United States Of America	1999	3,8	80,5	14,7
France	2001	12,9	49,8	35,2
Italy	2000	21,7	39,5	38,9
Japan	2001	5,0	63,7	29,6
Mexico	1999	34,5	16,2	48,7
Portugal	2001	28,6	15,4	56,4
United Kingdom	1998	9,1	57,9	31,1
Singapore	2002	7,2	50,8	42,0
Russian Federation	2002	29,6	56,3	14,1

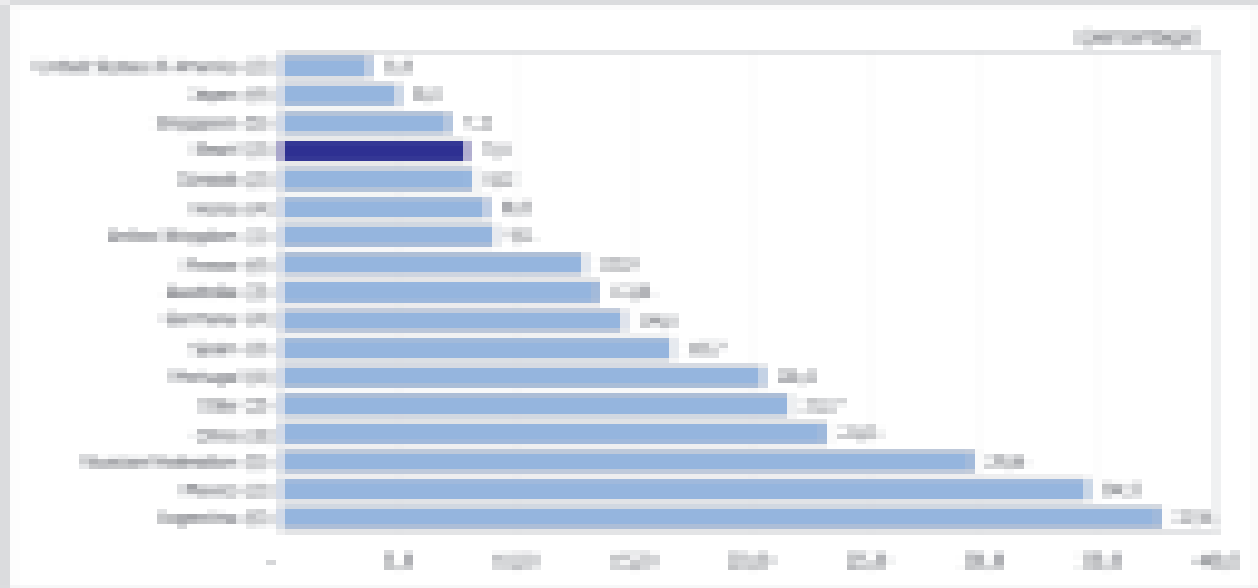
Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: for companies: Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000; for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC; and for the rest: National Council for Scientific and Technological Development (CNPq) - Directory of Brazilian Research Groups, 2002 Census.

Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: Researches in full time equivalent: neste no cálculo, in Brazil case, the hypoteses are considered: researches from the third-level education institutions and master and PhD students who belong research groups, have 50% of time dedicated to research. The researches from the research institutions and non-profit, have 100%. In case of the researches in companies, consider the devotion informed by the Pintec.

Graph 41

Percentage of full time equivalent researchers in government, from selected countries, in available recent years.



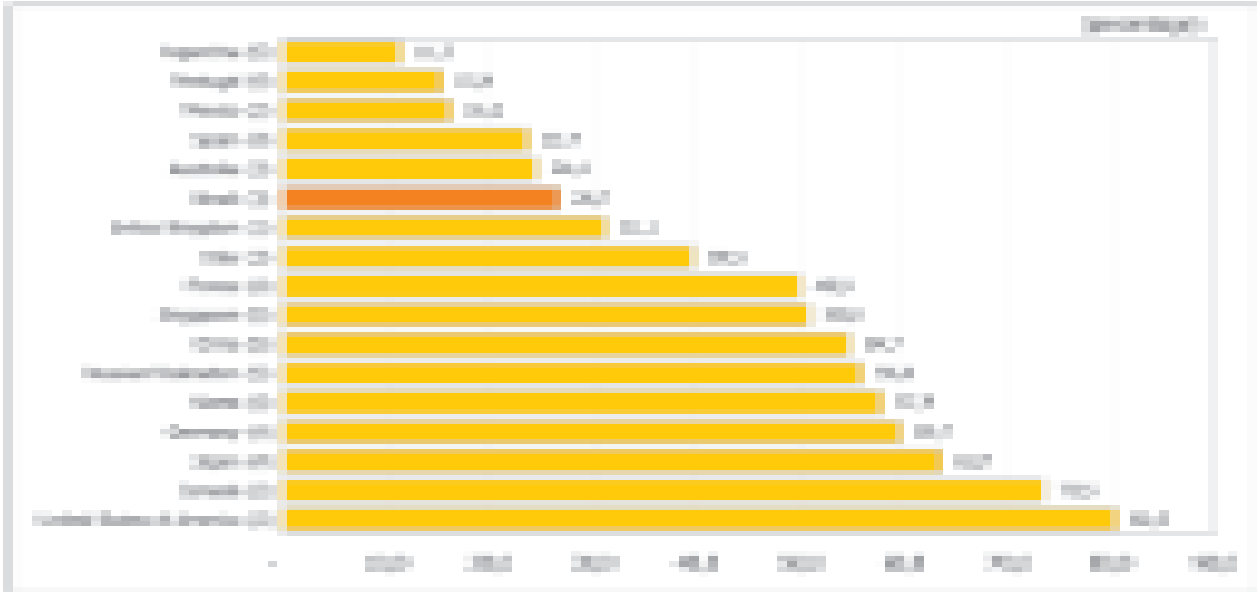
Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: for companies: Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000; for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC; and for the rest: National Council for Scientific and Technological Development (CNPq) - Directory of Brazilian Research Groups, 2002 Census.

Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) 1998; 2) 1999; 3) 2000; 4) 2001 and 5) 2002.

Graph 42

Percentage of full time equivalent researchers in companies, from selected countries, in available recent years.

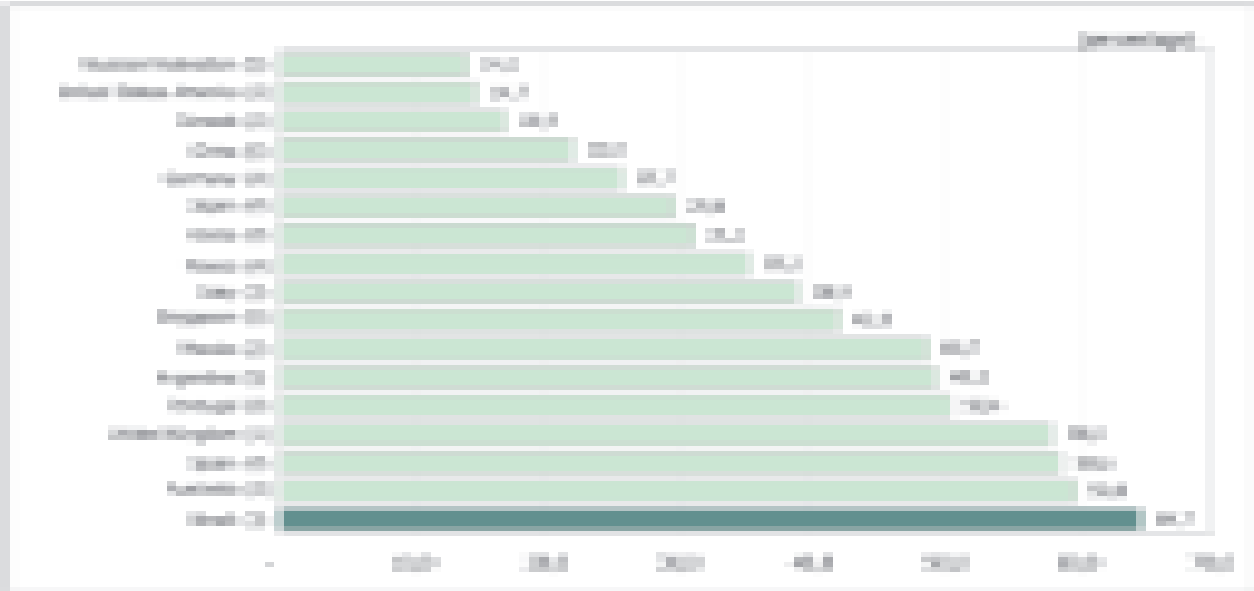


Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: for companies: Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000; for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC; and for the rest: National Council for Scientific and Technological Development (CNPq) - Directory of Brazilian Research Groups, 2002 Census. Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) 1998; 2) 1999; 3) 2000; 4) 2001 and 5) 2002.

Graph 43

Percentage of full time equivalent researchers in higher education, from selected countries, in available recent years.



Source: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators, November 2003 and Brazil: for companies: Industrial Research on Technological Innovation (Pintec) of the Brazilian Institute of Geography and Statistics (IBGE) – 2000; for doctorate students: Foundation for the Coordination of Improvement of Higher Education Personnel (Capes) from the Ministry of Education - MEC; and for the rest: National Council for Scientific and Technological Development (CNPq) - Directory of Brazilian Research Groups, 2002 Census. Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) 1998; 2) 1999; 3) 2000; 4) 2001 and 5) 2002.

Table 47

Availability of human resources in science and technology (S&T) of some countries, according to its components, in relation to the economically active population - 1995/1999

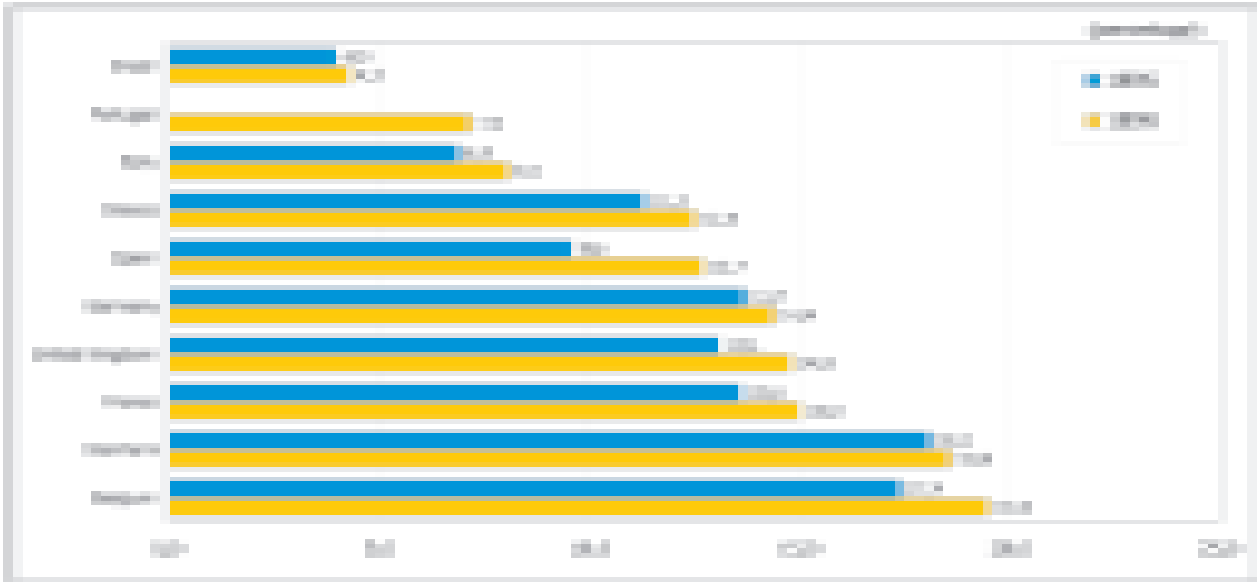
(percentage)

Countries	Human resources in an S&T - HRST		Human resources with third-level education and employed in an S&T occupation - HRSTn		Human resources with third-level education - HRSTe		Human resources employed in an S&T occupation - HRSTo	
	1995	1999	1995	1999	1995	1999	1995	1999
Brazil	15,8	15,7	4,0	4,3	6,7	7,5	13,3	13,5
Portugal	..	16,1	..	7,2	..	10,2	..	13,1
Greece	25,1	27,8	11,3	12,5	21,1	23,7	15,3	16,6
Italy	25,2	27,8	6,9	8,1	12,0	14,1	20,1	21,8
Spain	28,4	36,2	9,6	13,7	35,6	31,6	13,4	17,2
United Kingdom	32,9	36,5	13,1	14,8	35,0	38,1	21,8	23,3
France	36,5	39,6	13,6	15,8	36,3	30,6	21,9	24,6
Denmark	38,5	41,5	18,1	18,6	29,6	29,8	27,8	30,3
Germany	43,2	45,4	13,7	14,4	39,0	30,6	27,9	29,8
Belgium	43,4	47,1	17,4	19,5	35,3	38,5	25,4	28,1

Source: Eurostat and Indicators Coordination - Ministry of Science and Technology.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 44

Human resources with third-level education and employed in an S&T occupation - HRSTh of some countries, in relation to the economically active population, 1995/1999



Source: Eurostat and Indicators Coordination - Ministry of Science and Tech
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 48

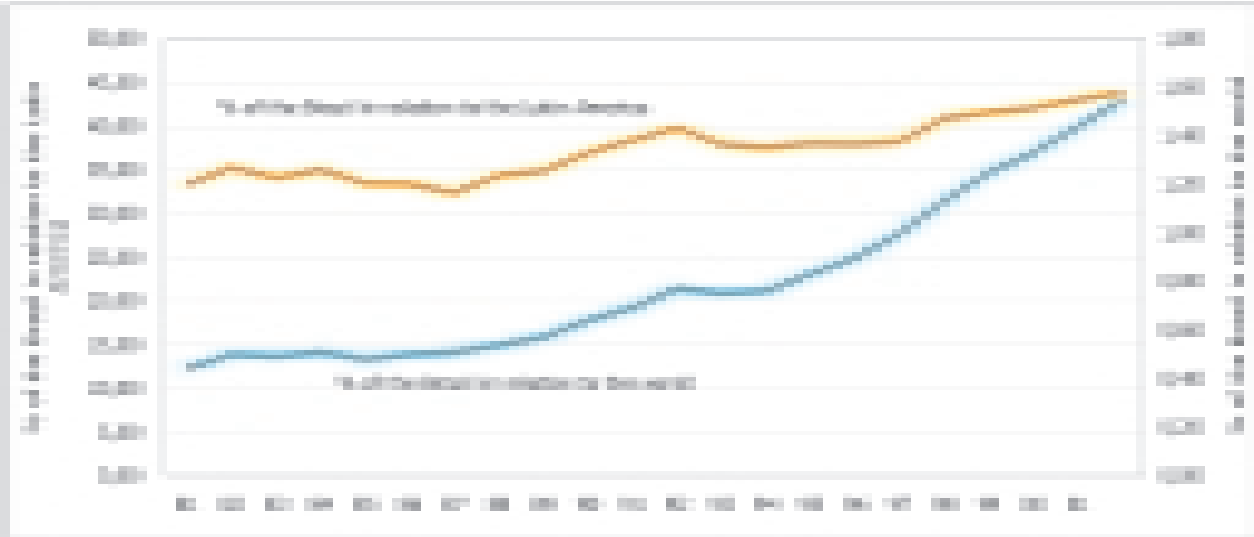
Number of Brazil articles, from Latin América and world published in indexed international scientific periodics in the Institute for Scientific Information (ISI), 1981-2002

Year	Brazil	Latin America	World	% of the Brazil in relation to the Latin America	% of the Brazil in relation to the world
1981	1.887	5.669	429.263	33,29	0,44
1982	2.183	6.190	439.911	35,27	0,50
1983	2.185	6.469	448.681	34,08	0,49
1984	2.269	6.481	448.675	35,01	0,51
1985	2.333	6.916	480.729	33,44	0,48
1986	2.481	7.430	498.474	33,39	0,50
1987	2.525	7.798	497.146	32,38	0,51
1988	2.778	8.047	517.284	34,42	0,54
1989	3.078	8.825	538.589	34,88	0,57
1990	3.552	9.614	553.749	36,95	0,64
1991	3.925	10.223	587.082	38,38	0,89
1992	4.643	11.659	685.519	39,82	0,77
1993	4.487	11.839	597.962	37,90	0,75
1994	4.838	12.871	632.988	37,59	0,76
1995	5.512	14.501	665.317	38,01	0,83
1996	6.053	15.946	674.061	37,96	0,90
1997	6.748	17.670	677.798	38,18	1,00
1998	7.503	19.336	782.844	40,55	1,13
1999	8.954	21.531	716.875	41,59	1,25
2000	9.534	22.615	714.566	42,11	1,33
2001	10.557	24.516	734.751	43,06	1,44
2002	11.285	25.743	730.229	43,84	1,55

Source: Institute for Scientific Information (ISI), National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 45

Published articles percentage in indexed international scientific periodics in the Institute for Scientific Information (ISI), in relation to the Latin America and world, 1981-2002



Source: Institute for Scientific Information (ISI), National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 49

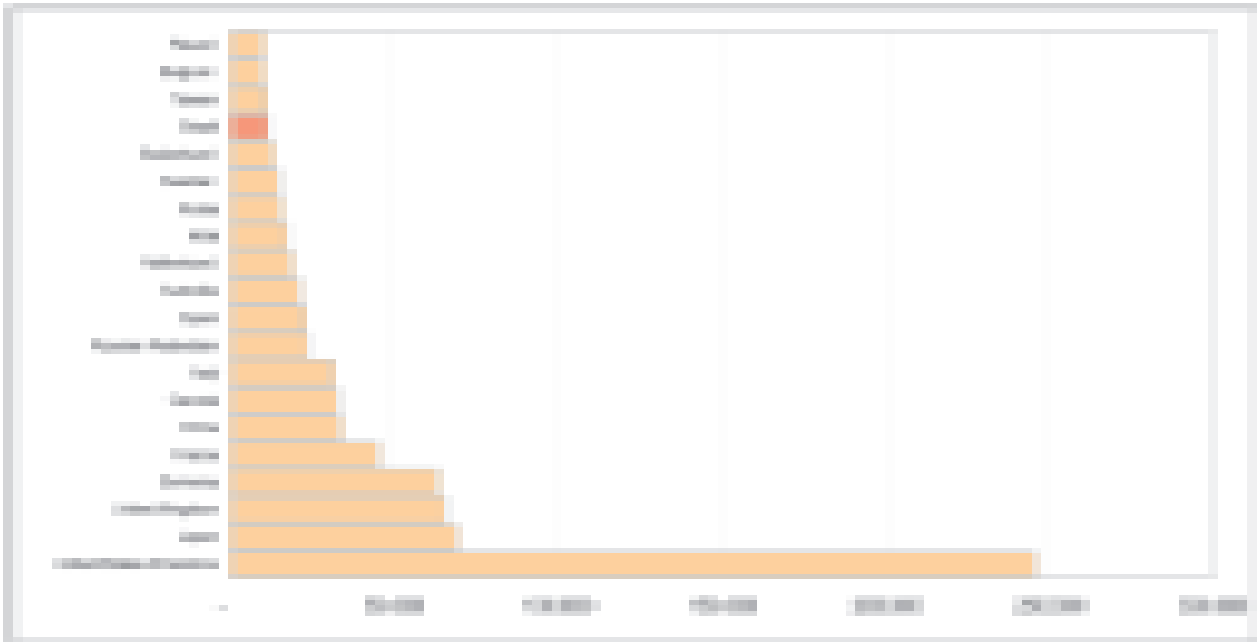
Number of articles published in indexed scientific periodic in the Institute for Scientific Information (ISI), twenty top countries - 2002

	Countries	2002
1	United States of America	245.578
2	Japan	69.183
3	United Kingdom	65.395
4	Germany	63.428
5	France	44.999
6	China	33.561
7	Canada	32.533
8	Italy	31.562
9	Russian Federation	23.441
10	Spain	22.901
11	Australia	21.078
12	Netherland	18.823
13	India	17.325
14	Korea	15.643
15	Sweden	14.846
16	Switzerland	13.192
17	**Brazil**	**11.285**
18	Taiwan	10.831
19	Belgium	10.103
20	Poland	10.046

Source: Institute for Scientific Information (ISI), National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 46

Number of articles published in indexed scientific periodic in the Institute for Scientific Information (ISI), twenty top countries - 2002



Source: Institute for Scientific Information (ISI), National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 50

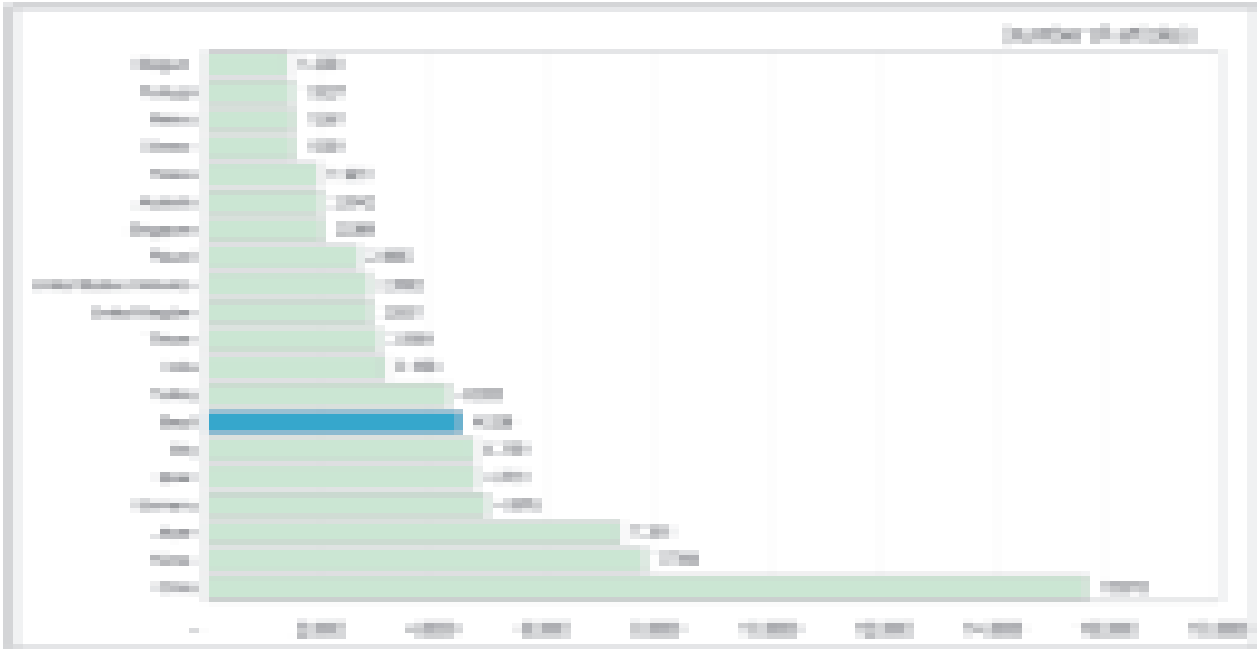
Articles largest growth in indexed scientific journals in the Institute for Scientific Information (ISI) - top twenty countries, 1997/2002

	Countries	1997	2002	Absolute growth 2002/1997
1	China	17.888	33.561	15.673
2	Korea	7.845	15.643	7.798
3	Japan	61.832	69.183	7.351
4	Germany	58.452	63.428	4.976
5	Spain	18.120	22.901	4.781
6	Italy	26.813	31.562	4.749
7	**Brazil**	**6.749**	**11.285**	**4.536**
8	Turkey	3.437	7.737	4.300
9	India	14.157	17.325	3.168
10	Taiwan	7.767	10.831	3.064
11	United Kingdom	62.464	65.395	2.931
12	United States of America	242.686	245.578	2.892
13	Poland	7.351	10.046	2.695
14	Singapore	2.232	4.301	2.069
15	Australia	19.036	21.078	2.042
16	France	43.018	44.999	1.981
17	Greece	3.784	5.135	1.551
18	Mexico	3.586	5.137	1.551
19	Portugal	2.040	3.567	1.527
20	Belgium	8.664	10.103	1.439

Source: Institute for Scientific Information (ISI), National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 47

Articles largest growth in indexed scientific journals in the Institute for Scientific Information (ISI) - top twenty countries, 1997-2002



Source: Institute for Scientific Information (ISI), National Science Indicators (NSI)
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 51

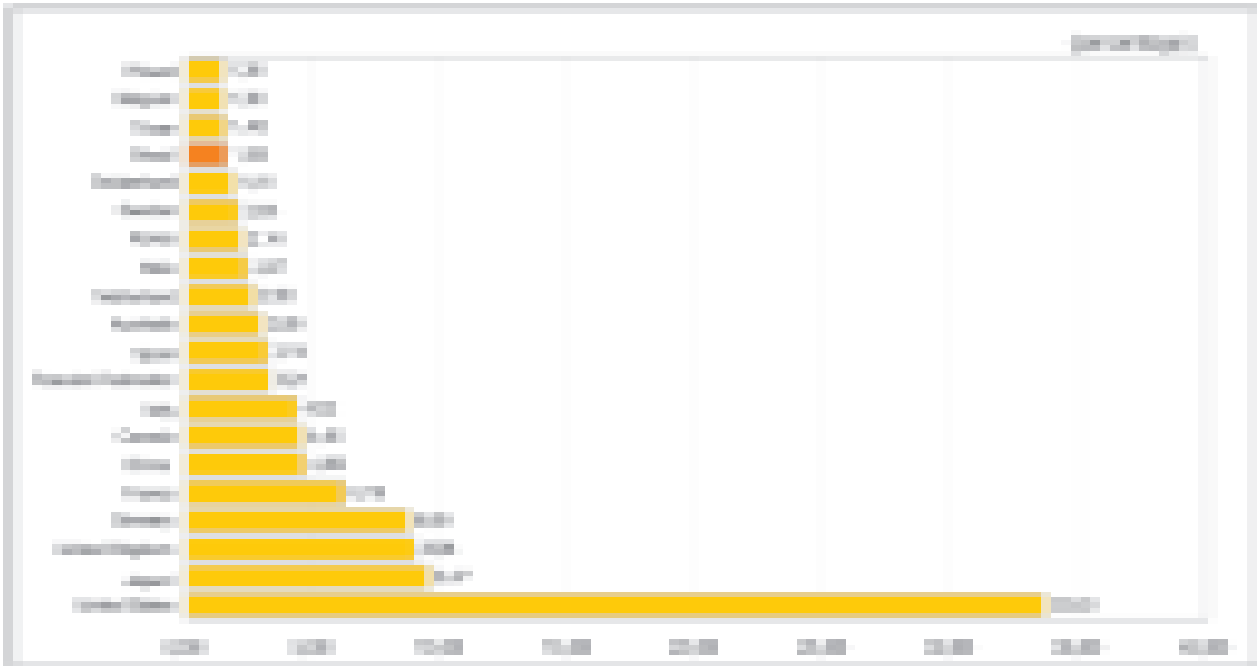
Articles published in indexed international scientific journals in the Institute for Scientific Information (ISI) as a percentage of the world total, main countries, 2002

	Countries	2002	Percentage participation in relation to the world-wide
1	United States	245.578	33,63
2	Japan	69.183	9,47
3	United Kingdom	65.395	8,96
4	Germany	63.428	8,69
5	France	44.999	6,16
6	China	33.561	4,60
7	Canada	32.533	4,46
8	Italy	31.562	4,32
9	Russian Federation	23.441	3,21
10	Spain	22.901	3,14
11	Australia	21.078	2,89
12	Netherland	18.823	2,58
13	India	17.325	2,37
14	Korea	15.643	2,14
15	Sweden	14.846	2,03
16	Switzerland	13.192	1,81
17	**Brazil**	**11.285**	**1,55**
18	Taiwan	10.831	1,48
19	Belgium	10.103	1,38
20	Poland	10.046	1,38
World Total, no Double-Count		**730.229**	

Source: Institute for Scientific Information (ISI), National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 48

Articles published in indexed international scientific journals in the Institute for Scientific Information (ISI) as a percentage of the world total, main countries, 2002



Source: Institute for Scientific Information (ISI), National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology.

Table 52

Patent applications with national offices in relation to the gross domestic product (GDP) - 2001

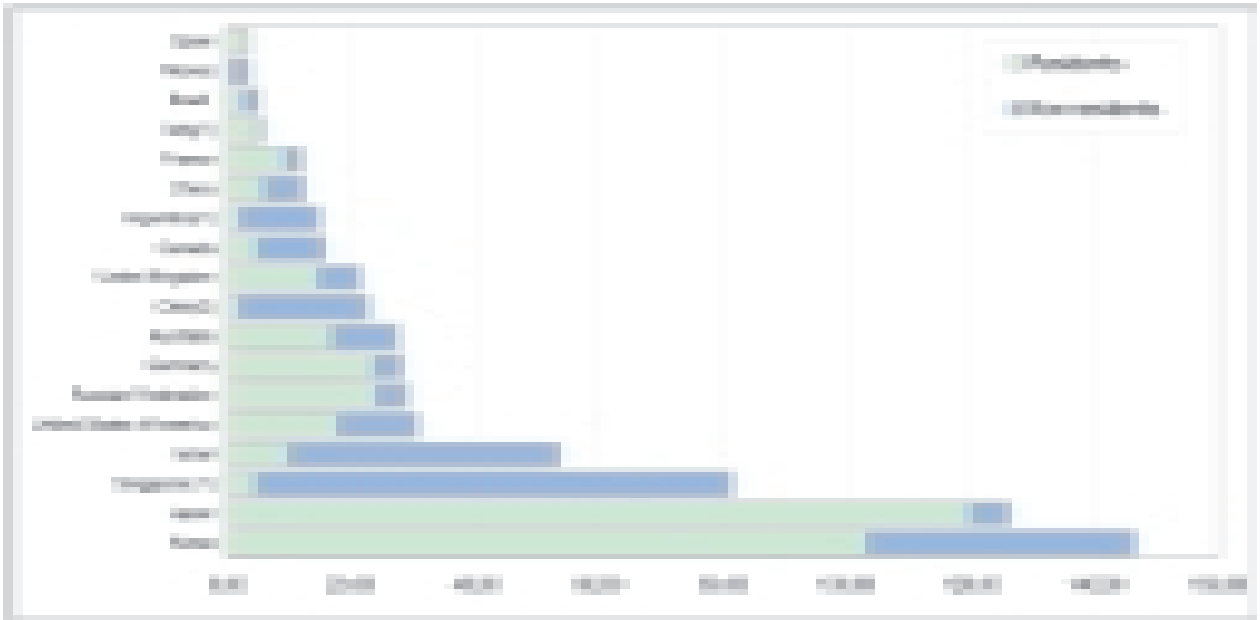
Countries	GDP in current billions (PPP$)	Patent applications			Patent applications for billions of current GDP, PPP$		
		Total	Resident	Non-resident	Total	Resident	Non-resident
Korea	714,24	104.612	73.734	30.898	146,47	103,21	43,26
Japan	3.190,01	400.436	382.805	20.630	126,15	119,99	6,46
Singapore [1]	81,93	5.679	304	6.305	81,52	4,56	76,95
Israel	115,91	5.758	1.248	5.531	53,76	9,81	43,95
United States of America	9.792,47	302.121	174.979	127.242	30,86	17,87	12,98
Russian Federation	1.817,85	33.988	24.777	5.212	33,18	24,21	5,07
Germany	2.166,83	58.967	48.583	9.465	38,36	21,71	4,54
Australia	491,84	13.561	8.309	5.212	37,57	16,96	18,62
Chile[2]	135,98	3.128	241	3.879	32,64	1,77	25,17
United Kingdom	1.429,32	30.577	21.084	9.483	31,53	14,85	6,68
Canada	843,17	13.396	3.963	9.433	15,89	4,70	11,19
Argentina[1]	428,17	6.457	899	5.558	15,08	2,10	12,98
China	5.111,24	63.094	38.008	33.366	12,37	5,88	6,49
France	1.429,02	17.104	13.499	3.805	12,04	9,51	2,54
Italy[1]	1.313,02	7.453	6.281	1.172	5,68	4,78	0,89
Brazil	**1.268,61**	**6.587**	**3.298**	**3.289**	**5,19**	**2,60**	**2,59**
Mexico	838,13	2.903	503	3.460	3,55	0,61	2,92
Spain	828,41	2.984	2.523	361	3,51	3,05	0,46

Sources: for patents deposit: World-wide organization of Intelectual Propertie WOIP, except in the Brazilian case whose data are also of National Institute of Industrial Property (Instituto Nacional de Propriedade Intelectual - INPI); for the gross domestic product in Purchase Power Parity: World development indicators, 2003 and World Bank atlas ; on CD-ROM, World Bank.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) 1999 reference year; 2) 2000 reference year.

Graph 49

Patent applications with national offices in relation to the gross domestic product (GDP) - 2001



Sources: for patents deposit: World-wide organization of Intelectual Propertie WOIP, except in the Brazilian case whose data are also of National Institute of Industrial Property (Instituto Nacional de Propriedade Intelectual - INPI); for the gross domestic product in Purchase Power Parity: World development indicators, 2003 and World Bank atlas ; on CD-ROM, World Bank.
Produced by: Indicators Coordination - Ministry of Science and Technology.

Notes: 1) 1999 reference year;
2) 2000 reference year.

Table 53

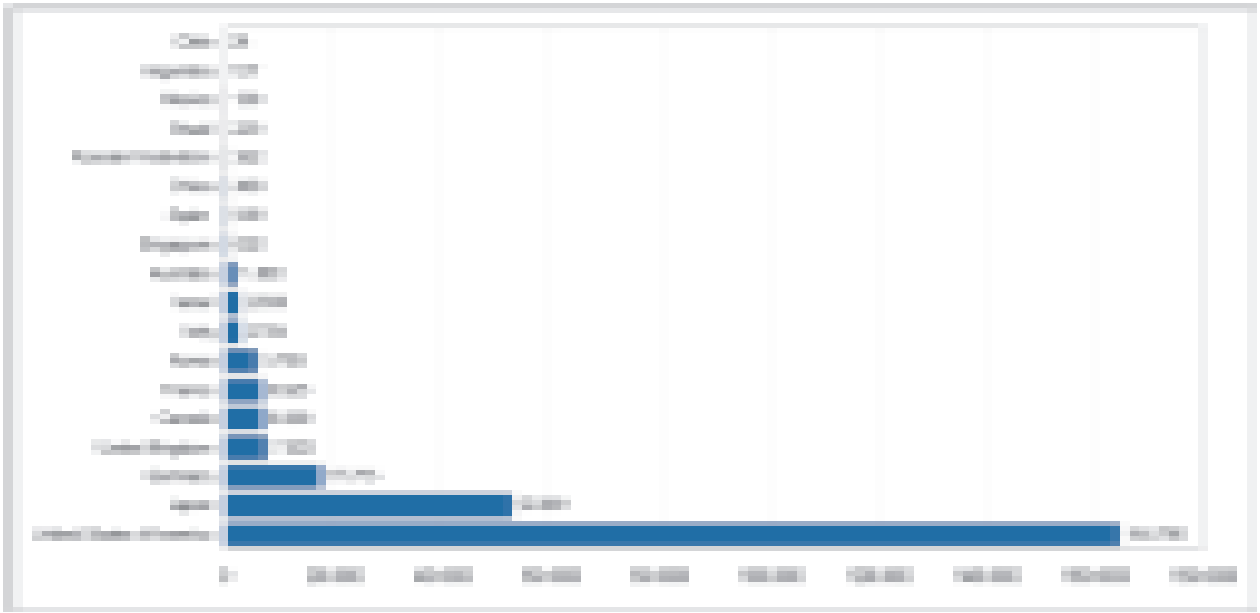
Patent applications with United States Patent and Trademark Office – USPTO for selected countries 1980/1990/2000

Countries	1980	1990	2000	1980/1990 (%)	1990/2000 (%)
United States of America	62.098	90.643	184.795	46,0	81,8
Japan	12.951	34.113	52.891	163,4	55,0
Germany	9.669	11.281	17.715	16,5	57,3
United Kingdom	4.178	4.559	7.523	18,7	51,7
Canada	1.969	3.511	6.899	78,3	93,9
France	3.331	4.771	6.623	43,2	38,8
Korea	38	775	5.785	2.248,5	636,1
Italy	1.901	2.093	2.784	38,4	39,2
Israel	253	688	2.589	148,3	312,7
Australia	517	811	1.880	56,9	131,9
Singapore	6	36	632	508,0	1.655,6
Spain	142	289	549	103,5	90,0
China	7	111	469	1.485,7	322,5
Russian Federation	..	..	382	..	..
Brazil	**53**	**88**	**220**	**66,0**	**150,0**
Mexico	77	76	190	-1,3	150,0
Argentina	56	56	137	0,0	144,6
Chile	8	13	24	62,5	84,6

Source: United States Patente and Trademark Office (USPTO)
Produced by: Indicators Coordination - Ministry of Science and Technology.

Graph 50

Patent applications with United States Patent and Trademark Office – USPTO for selected countries 2000



Source: United States Patente and Trademark Office (USPTO)
Produced by: Indicators Coordination - Ministry of Science and Technology.