The Higher Education System in Brazil and its Developmental Role

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Brazil

- Area 8,514,876,599 km2 (6.4% of the world surface area)
- Estimated population of 183,847,658 inhabitants (2.8% of the World population in 2005)
- GDP equals to US$ 478 billions (2004) (1.9% of the World GDP).
- Brazil, United States, Russia and China are the four countries in the world with more than 4,000,000 km2, 100,000,000 inhabitants and US$400 billions GDP.

Brazilian Higher Education System

- Higher education in Brazil only started at the first half of the XIX century, with the foundation of isolated undergraduate professional schools.

- Only at the first half of the XX century Brazilian universities started to be implemented, after the proclamation of the Republic (1889).

- The total number of undergraduate students went from 93,202 (1960) to 1,437,232 (1985), reaching 3,887,022 in 2003;

- the number of universities growth from 39 (1964) to 163 in 2003, a growth of 64%,

- during the last years, the total number of HEI growth from 900 (1997) to 1,859 (2003), a growth of 106% (INEP 2004).

Higher Education Institutions in Brazil

HEIs type	Universities	Others HEIs	Totals
Federal	44	39	83
States	31	34	65
Municipals	4	55	59
Total Publics	79	128	207
Pro-profit	26	1,276	1,302
Non-profit	58	292	356
Total Privates	84	1,568	1,652
Total HEI	163	1,696	1,895

- This expansion, however, were favoring atomization, with more than 44% HEI with less than 500 students, and with the high predominance of specialized schools and institutes.

- In addition, the expansion was lower than desirable, since the number of undergraduate students enrolled at HEIs in 2003 (3,887,022) comprised only 11% of their age group (18-25 years), the same proportion achieved in 1985.

- Government plan is to increase that proportion to 30% up to the year of 2010, what looks very unlike, take in account today figures

The more distinguished phenomenon is the fast expansion of the private institutions during the last decades, what puts Brazil at the leadership in Latin America in number of institutions and of students enrolled in private institutions.

Number of HEI (%)	1994	1998	2002	2003
Public	25.6	21.5	11.9	11.1
Private	74.4	78.5	88.5	88.9

Table 3 - Evolution of the distribution of Public and Private HEI

Data from the enrollment of tertiary students confirm the uncontestable hegemony of the private sector.

Year	Total	Public %	Private %
1994	1.661.034	690.450 (41,6)	970.584 (58,4)
1998	2.125.958	804.729 (37,9)	1.321.229 (62,1)
2002	3.482.069	1.053.811 (30,3)	2.428.258 (69,7)
2003	3.887.771	1.137.119 (29,2)	2.750.652 (70,8)

Table 4 - Enrollment at undergraduate courses

Undergraduate students enrolment related to the areas of knowledge - A disturbing picture appears :

Nearly 70% of the students are enrolled at undergraduate courses in Human and Social sciences and only 11% in Engineering and Technologies, data for the year 2003.

Areas	Human & Social Sciences	Life Science	Exact Sciences	Agriculture Science	Engineering & Technology	Others
% enrolment	69%	13%	4%	2%	11%	1%

Table 7 - Areas of Knowledge enrolment distribution

- The evolution of the Brazilian Higher Education system was not without inequalities, varying from regional, social and racial terms, based on the enrolment of undergraduate students in HEIs.

- Equality has been recently achieved in terms of gender, with female enrolment (2,193,246) even a little bit higher than male enrolment (1,693,776), for the year 2003.

- However, gender inequality still prevails in engineering and technology areas, with a male share around 80%.

- Inequalities are also present in relation to HEIs distribution along the five Brazilian regions, reflecting, by the way, the same pattern of economic inequalities We may see in the table bellow the disproportional concentration of HEIs and of enrolment of undergraduate students in the Brazilian regions

Region/Indicators	Population (%)	Number of HEIs (%)	Tertiary enrolment (%)
North	14.048.422 (7,6)	101 (5,4)	230.227 (5,9)
Northeast	51.661.192 (28,1)	304 (16,4)	624.692 (16,1)
South	27.209.453 (14,8)	306 (16,4)	745.164 (19,2)
Southeast	78.319.102 (42,6)	938 (50,5)	1.918.033 (49,3)
Middle west	12.685.488 (6,9)	201 (10,8)	368.906 (9,5)
Total Brazil	183.847.658 (100)	1.859 (100)	3.887.022 (100)

Table 5 - Regional inequalities

Racial inequalities: at the Brazilian universities the share of black, white and mixed people is different that at the society. The next table shows the result of MEC research in the Brazilian universities:

	White People	Black People	Mixed People
Universities	72,9%	3,6%	20,5%
Society	52,0%	5,9%	41,0%

Table 6 - Share of white, black and mixed people in the Brazilian society and HEIs

Modern university, institutionalization of the research mission and the first movements towards the third mission

Until the 1950 decade: nearly all of the HEIs were involved only with the human capital formation (teaching oriented HEIs) at the undergraduate level. That reflects partially the low level of qualified workforce demanded by the productive sector at that epoch.

From the beginning of the sixties the Brazilian scenario was shacked with the appearance of a left-centrist government (1961).

- For one side social movements put forward demands for structural reforms – agrarian reform, banking reform, juridical reform and university reform.
- From the other side there were government efforts for an economic growth sustained by an industrial sector more technologically advanced.

- creation of the University of Brasilia, a federal university.
- a modern university conception, more akin with a research-oriented institution, with a new administrative organization based on centers, departments and courses, a new faculty career, full time and exclusive dedication requirements and so on.
- The bases for the modern Brazilian university were launched.

- The Brazilian National Bank for Economic Development (BNDE), launched one funding program to support firms technological activities - FUNTEC (fund for technological development).
- Nearly no demands arose from the industrial firms - due mainly to the lack of high trained engineering.
- (FUNTEC) becomes directed to support the creation of postgraduate engineering programs research-based.
- The bases for the modern postgraduate and research system were launched, rooted in a university-industry context, with government support.

- At the same time, a deeper reform of the Brazilian university was being advocated by the National Students Union, inspired by the so called "*Manifiesto de Cordoba*", launched by the Cordoba Student Union, in 1918, proclaiming the necessity of a university being autonomous, self-governed by professors, students and ex-students, in a tripartite equality, open admission criteria for professors, open careers for professors, curriculum flexibility, etc.

- Moreover, for the Brazilian Students Union, the university should have a neat compromise with the popular classes, should have an extension mission linked to the popular needs, helping their emancipation.

- The debate about the extension mission of the university was launched.

This fertile period of ideas and initiatives was halted by a military takeover (1964). The military regime comes under the double compromise Security & Development.

On the security axe, social movement was put under severe vigilance; leaders were arrested, civil rights suspended. Brazilian universities, mainly the public ones, were damaged by the forced retirement of hundred of professors who were exiled or expulsed.

Governmental programs were created for community services by utilizing students

By other hand, on the development axe, the proposal was ambitious, to transform Brazil in a great power, to develop technological capability and autonomy in strategic areas, to modernize the industrial park as a whole. National development programs associated with Scientific and Technological programs has been launched

The supplier of highly trained scientists and engineering as well as the generation and diffusion of knowledge and technology becomes a priority for that development model. The organizational structure of the University of Brasilia was the base for the (re)structuring of the Brazilian university system, based for the first time on an effort to nationally integrate the university system.

The previous steps towards the institutionalization of the research at universities associated with the creation of postgraduate programs were accelerated; there was a widely available financial resources and support for those initiatives. It included training young students on a massive level by providing scholarships to study abroad in masters and doctorate programs in foreign universities.

Research institutionalization and performance

- The 1968 Law of the Higher Education System provided the legal framework for the implementation of this integrated university system, contemplating also the integration of teaching and research.
- From the 1970s one big research and postgraduate system at Brazilian universities were put in place and becomes a very successful enterprise.

A large higher degree system was set-up, which awarded in 2003 some 8,000 PhD's and 28,000 Master's degrees. Table 8 below shows the evolution of that system over the period 1987-2003

	1987	1989	1991	1993	1995	1997	1999	2001	2003
Ph.D. degrees	868	1.047	1.489	1.803	2.528	3.620	4.853	6.040	8.094
MsC degrees	3.647	4.727	6.811	7.609	9.265	11.922	15.380	20.032	27.630
Ph.D. new students	1.786	2.416	3.509	4.132	5.331	6.199	7.903	9.101	11.343
MsC new students	9.440	11.432	12.768	13.633	17.746	17.570	23.837	28.074	35.305

Table 8 - Expansion of Brazilian Pos Graduation System 1987 – 2003
Source: CAPES (2004)

Brazil has some 15 000 research groups distributed within 268 institutions. The majority of the research groups are under the responsibility of universities.

	1993	1995	1997	2000	2002
Institutions	99	158	181	224	268
Groups	4.404	7.271	8.632	11.760	15.158
Researchers (C)	21.541	26.799	34.040	48.781	56.891
Ph. D. holders (D)	10.994	14.308	18.724	27.662	33.947
(D)/(C) in %	51,04	53,39	55,01	56,71	59,67

Table 9 - Number of institutions, research groups, researchers and Ph.D. holders, Brazil, 1993, 1995, 1997, 2000, 2002
Source: CNPq, 2004, www.cnpq.br

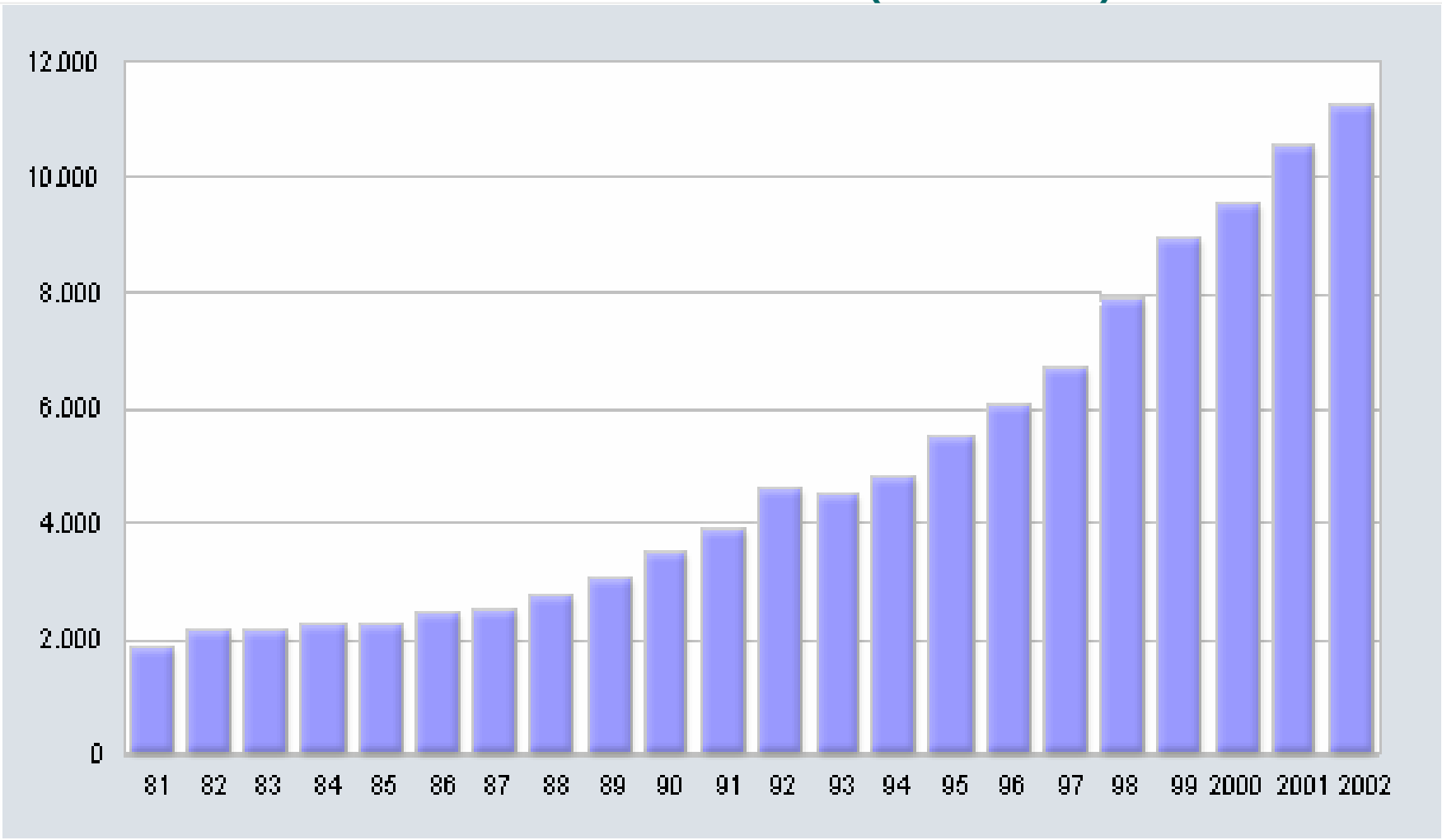
Nowadays there are 196 institutions (mostly universities) that offer 1.819 programs of post graduation (MSc / PhD) in Brazil.

Pos Graduation Stricto Sensu:
99.339 students (year 2002)

86% Masters and doctorate programs at public HEI and 14% private HEI

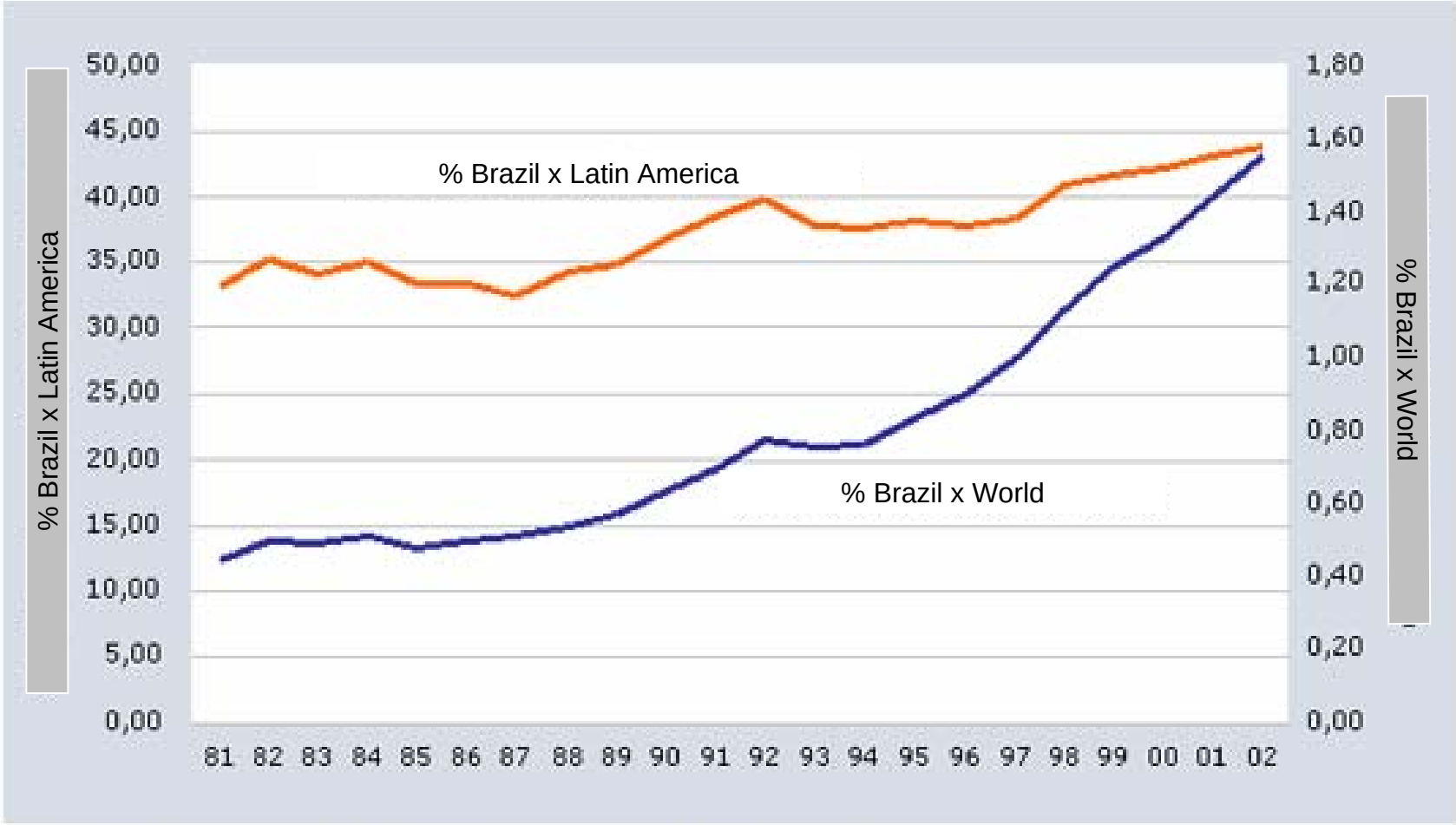
Year 2003:
22.735 M.Sc.
6.843 D.Sc.

Brazil: Papers Published in Journals Listed in the Institute for Scientific Information - ISI (1981 – 2002)



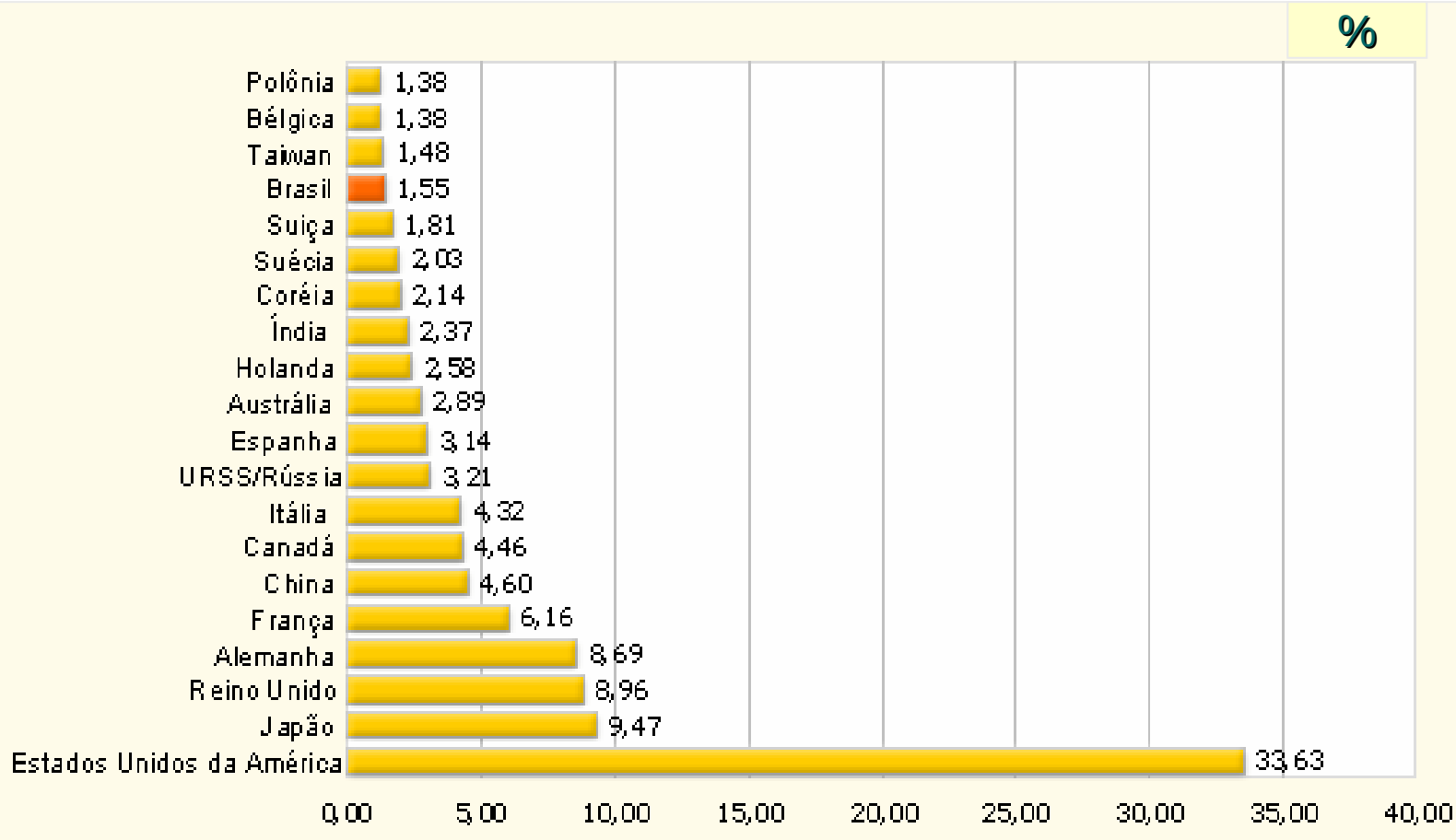
Source: MCT 2005

Brazil: % of papers published in scientific journals listed in the Institute for Scientific Information - ISI (1981 – 2002)



Source: MCT 2005

% off the total world scientific production published in journals listed in the Institute for Scientific Information - ISI (2002)



Source: MCT 2005

Universities & Dual Third Mission

- The socio-historical development of the Brazilian universities reveals a dual configuration of university third mission. Both stimulated by governmental agencies and both generating differentiated internal organization structures at the universities to favor the accomplishment of those respective third missions.

Social perspective

- One first type of third mission is the one with a social inclusion perspective. It reflects a tendency to push university more closely to social movement demands, trying to recover the original ideas behind the 1960s student unions aspirations.

Economic perspective

- A second type of third mission was persuade, relate to the transfer of knowledge and technology to the industry.

Vice-rector of extension

Community service ideal (predominant until recently)

Social development with Social inclusion ideal (a return to the 1960s ideal)

- There is an on-going process, a tentative to make the academic community sensible, to configure their research and teaching activities akin to that social inclusion mission.
- However, even nowadays, the vice-presidency of extension is still processing a large set of activities varying from events, community services up to special programs for social inclusion.

	Number	%
Universities	175.268.971	97.9
Others HEIs	3.787.809	2.1
Total	179.056.780	100.0

Table 13 - Number of attendances in HEI Health Units in 2003
Source: INEP (2004)

	Number	%
Universities	346.629	73.4
Others HEIs	125.704	26.6
Total	472.333	100.0

Table 14 - Number of attendances in law assistance by HEI in 2003
Source: INEP (2004)

Vice-rector of pos graduation and research

Knowledge and technology transfer

To deal with the activities of technology services management, contracts negotiation, contracts elaboration, patenting, technology commercialization, human resources capacity training and technological diffusion, Technological Transfer Offices has been created at the universities. A recent survey showed 30 TTOs in operation in Brazilian universities.

Knowledge and technology transfer also goes by high qualified professional graduated at the institution, which are subject to a process of learning by doing research, taking with them the tacit and codified knowledge acquired.

Knowledge and technology also can be transferred by spin-offs or start-ups firms. Usually incubators are the structure utilized for that purpose. Firm formation process may involve others mechanisms and activities, like entrepreneurial teaching, junior enterprises, pre-incubation process etc.

university incubation process strategies:

-Introduction of entrepreneurship teaching in all levels (undergraduate, graduate);

-Prospecting of technologies that can be developed by spin-offs firms of the university research, in the incubators and in the science parks;

-Utilization of the incubator's management expertise to enhance the services and management consultancy to local SMEs.

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There are 107 technological incubators and 10 science parks in operation in Brazil nearly all linked and installed at universities.

Conclusions

In analyzing the Brazilian universities third mission role, we recognized two different third missions role, one as an extension of the research mission towards technical advance in industry and the other characterized by the extension of the teaching and research mission towards social inclusion.

The first one is under the umbrella of the vice-rector of pos graduation & research and may be considered to have a generative role;

The second one is under the umbrella of the voce-rector of extension and may be considered to not fulfill totally the developmental role, since it not contemplate any entrepreneurial role.

The exercise of a developmental role presumes an active engagement of the university with its community, that is, a strong link to their local and regional economies.

In fact, municipal, state and regional governments are taking a close interest and involvement in the contribution of the universities for the regional economic and societal development.

This separation may prevent a full engagement of the university, in all social and economic dimensions, with the surrounding state and region.

A tendency towards convergence may be detected throughout the creation of technology transfer complex units at some Brazilian universities (Universidade Federal do Rio Grande do Sul, for instance), mostly linked to the presidency of the university, which centralizes the management of not only activities concerning university-industry interaction, but also some other activities concerning university-society interactions (like the incubators of popular cooperatives and regional development projects)

We close showing up another challenge for the Brazilian universities:

How to balance national, state and local interests and the diversity of socio-economic roles?

It appears that national, state and local issues will have to be carefully balanced with some universities having a national or international focus (more akin to a generative role) while others will develop strong state and regional ties (more akin to a developmental role).

Thank you for your attention