

ETHIOPIAN TRIPLE HELIX CONFERENCE

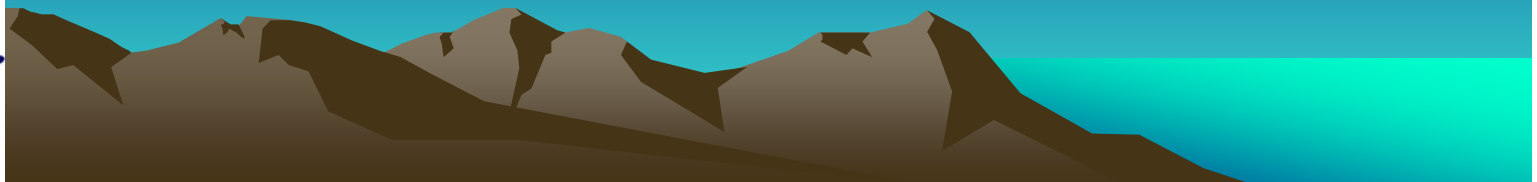
**Integrating entrepreneurial initiatives in
Brazilian universities**



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I -Brazilian Higher Education System: an overview



- First HEI created only at the first half of the XIX century (isolated schools)
- First universities created at the beginning of the XX century, as teaching universities;
- Institutionalization of the research activity at universities starting at the end of the 1960 decade



- A major Governmental Legal Framework for the higher education system established by law in 1968



CLASSES OF UNIVERSITIES

Private or Public HEIs;

Publics HEIs: Federal; States;
Municipals

Private HEIs: For-profit and non-for
profit

Non for profit HEIs: communitarian;
Confessionals; Philanthropists



Academic organization

Legal classification of the HEIs:

Universities (Full universities)

Specialized Universities

Universities Centers

Centers for Technological Education

Integrated Schools

Isolated Schools and Institutes of

Higher Education



HEI in Brazil 2003

HEIs type	Univ.	Spe. Univ / Univ. Center	Integrated Schools.	Isolated Schools / Inst.	Cent for Tech	Total HEI
Federal	44	1	1	6	31	83
States	31	0	0	26	8	65
Municipals	4	2	3	50	0	59
Total Publics	79	3	4	82	39	207
Pro-profit	26	47	95	1080	54	1302
Non-profit	58	31	20	241	0	350
Total Privates	84	78	115	1321	54	1652
Total HEI	163	81	119	1403	93	1859

Table 1 - Higher Education Institutions in Brazil, 2003
Source: INEP (2004) Census

It's a system in expansion:

- The total number of undergraduate students went from 93,200 (1960) to 1,437,232 (1985) reaching 3,887,022 in 2003
- Total number of HEIs from 900 (1997) to 1859 in 2003, a growth of 106%
- Number of universities from 39 in 1964 to 163 in 2003



But with problems:

- Atomization: more than 44% HEI with less than 500 students;
- Expansion at a rate lower than desirable:
The number of undergraduate students enrolled at the HEIs in 2003 (3,887,022) comprised only 11% of their age group (18-25 years), the same proportion achieved in 1985



An expansion based on the fast expansion of the private HEIs

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 2 - Evolution of the distribution of Public and Private HEI

Source: INEP (2004) Census

II -THE BRAZILIAN UNIVERSITY SYSTEM AND THEIR GENERIC CONTRIBUTION TO DEVELOPMENT



UNIVERSITIES ARE LEGALLY DEFINED AS INSTITUTIONS MULTI DISCIPLINARY, PUBLIC OR PRIVATE, THAT DEVELOPS REGULAR ACTIVITIES OF TEACHING, RESEARCH AND EXTENSION AND THAT ENJOY MANAGERIAL, SCIENTIFIC AND DIDACTIC AUTONOMY



UNIVERSITY TEACHING MISSION

- Universities offer a large range of courses, including undergraduate courses, postgraduate courses *stricto sensu* (master and doctorate degrees), postgraduate courses *lato sensu* (specialization and MBA) and short term courses of continuous education



- Undergraduate enrollment at universities

Total HEI enrollment	Universities enrollment	Non-universities enrollments
3,887,022 (100%)	2,276,281 (58,6%)	1, 610, 741 (41,4%)

Table 4. Undergraduate enrollments in 2003; Source MEC (2005)

Total HEI undergraduate courses	Universities undergraduate courses	Non-universities undergraduate courses
16,453 (100%)	9,396 (57,1%)	7,057 (42,9%)

Table 5. Undergraduate courses in 2003. Source MEC (2005)



Areas of Knowledge undergraduate enrollment

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

Table 3 - Areas of Knowledge enrolment distribution
Source: Cavalcante (2005)

- Postgraduate level: around 8,000 Doctorate and 28,000 Master degrees were awarded in 2003
- Around 11,000 Doctorate students and 35,000 Master students were enrolled at 2003 year



UNIVERSITY RESEARCH MISSION

- Universities perform research activities, contributing to knowledge generation and diffusion
- Knowledge generation may be expressed by publications at prestigious scientific journals, indexed at Science Citation Index



- Brazilian universities are the major responsible for the expressive results in terms of papers published in journals indexed at SCI, around 1,55% of the total papers published in the world and around 40% of the total published by Latin American countries



UNIVERSITY EXTENSION MISSION

- University extension is an educative, cultural and scientific process that articulate teaching and research in a combined way to meet societal needs.
- It includes community services programs such as medical care, law assistance, radio broadcasting and so on



- Medical care is one of the most important community service delivered by the universities, through their hospitals. At the year 2003, the number of attendances at universities health services reached the figure of 175,268,971, a number practically equals to the Brazilian population



- It includes also a third stream of activities, more directly concerned with economic development, like technical assistance to industry, transfer of knowledge and technology, incubators, science parks etc



III – BRAZILIAN UNIVERSITIES AND A NEW CONCERN WITH REGIONAL DEVELOPMENT



- Attempts have been made by Brazilian universities authorities aiming a more proactive role, for development purposes, related to the emergence of a concern with regional development
- Two important courses of action under the regional development concern should be pointed out



- A first one comes from the federal government sphere. Federal government is creating federal universities precisely to act regionally. Moreover, federal government is stimulating the openness of campus in municipalities closed to existing federal universities



- Regional federal universities are being created to operate regionally, and have their areas of competence defined according to the regional needs, taken in account all major players in the region
- They will probably integrate in a better way societal and economic development missions, adapting their core functions of teaching, research and extension, to address regional needs.



- Nine regional federal universities and thirty six campi have been created or are in phase of implementation.
- One example of regional federal university in process of implementation:



- **The Federal University of ABC (UFABC)**
- The region of ABC is formed by three municipalities, Santo André, São Bernardo do Campo e São Caetano do Sul, and it is a prosperous industrial region of the State of São Paulo.
- UFABC it is born with potential for innovation and diversification. It comes with a structure that conjugates academic and curricular flexibility with high standards of quality. Beyond activities of education, this new university comes to develop research in the diverse areas of the knowledge and to promote the extension activities.



- The university is born with the mission to form professionals of high qualification in strategical areas for the regional / national development: natural sciences, mathematics and computer science and technology (dealing with seven engineering areas).
- Courses of formation of professors for the secondary education level in the areas of physics, chemistry, biology, mathematics and computer sciences will be offered.



- About one thousand students will be enrolled in the first year of functioning. When the institution will be fully installed, there will be twenty thousand students of graduation, 2,500 of master and 1,000 in programs of doctorate.
- There will be around 600 professors and also around one thousand monitoring scholarships to be provided for students. The campus will be installed in Santo André, in a land of seven thousand square meters.



Brazilian Federal Universities Campi (2006)



- **Campus of Imperatriz - Federal University of the Maranhão - State of Maranhão**

- With a population of 231.950 inhabitants, Imperatriz, at 696 kilometers of São Luís, capital of the state of Maranhão, is the bigger city of the south of the Maranhão.
- Its region concentrates 16 municipalities and a population of 491.405 inhabitants.
- The consolidation of the campus of Imperatriz, with the creation of the courses of food processing engineering, nursing, physical education and social communication, will allow to extend and to diversify offers of places for students, contributing for the formation of the necessary human resources to the economic and social development of the region.



- A second important courses of action under the regional development concern comes in form of a button up initiative, not from the governmental sphere but from the civil one. It results from the efforts of one class of universities, the so-called communitarian universities, for the development of their communities and of their regions



- Communitarian universities have their roots with the immigration process that happens in Brazil mainly at the end of the XIX century and beginning of the XX century, in the South and South east, with the arrival of the Europeans, mainly Italians and Germanys.
- They soon realize that they were abandoned by the Brazilian government and that they should do everything by their own means, all services usually provided by the state was to be done by themselves.



- **The communitarian and regional University of Caxias do Sul**
- 1950 decade: mobilization of the society to create faculties
- 1960 decade: five faculties created offering courses of Economic Sciences, Philosophy, Painting and Music, Nursing and Law, among others
- 1967: All five faculties were integrated forming the University of Caxias do Sul.



- The University of Caxias do Sul (UCS) is maintained by the Foundation University of Caxias of the Sul, legal entity of Private Status.
- The Foundation has a Managing Advice Council formed by the Rector of the UCS; two representatives of the Chamber of Industry, Commerce and Services of Caxias do Sul; two representatives of the Ministry of the Education; one representative of the Municipal City Hall of Caxias do Sul; one representative of the Government of the State of the Rio Grande do Sul; one representative of the Miter Diocesana de Caxias do Sul and one representative of the Cultural and Scientific Association of Caxias do Sul



- Currently, its performance extends to a geographic area of seventy municipalities, a region of important economic performance, with a population of more than a million of inhabitants, which consider the University as an important allied in the search of new bases to transform economic development into social progress for its population.



University of Caxias do Sul (2006)

UCS in numbers:

36,444 students; 942 employees 1,141 professors with 388 being full time and where 232 has doctorate degree; 563 master degree;

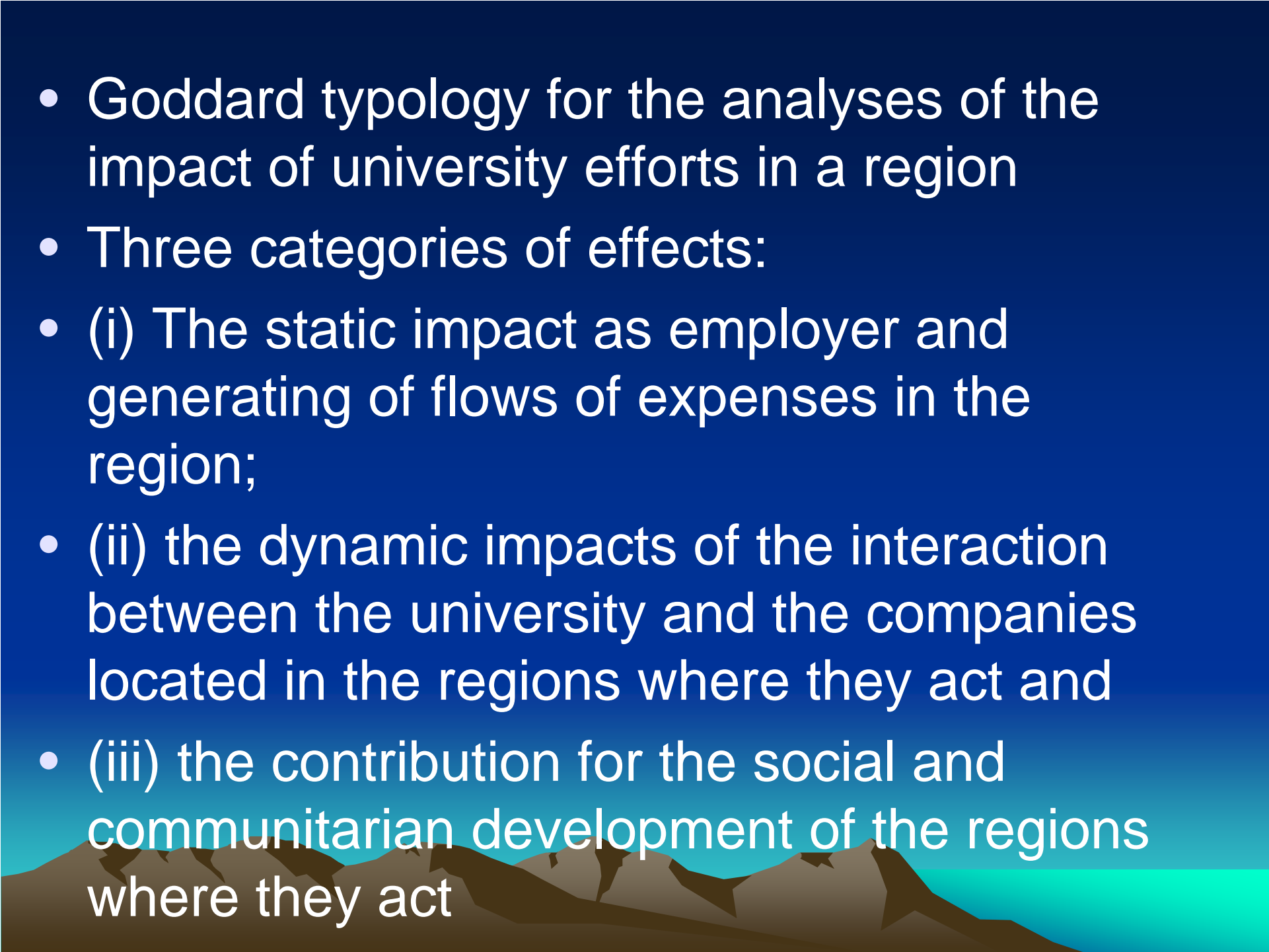
Budget of 90,000,000 USD (2005) [Students fees annual average of 2,400 USD]

65 graduate courses; 59 sequential courses; 51 courses of postgraduate lato sensu

Master and Doctorate programs in:

Biotechnology; Law; Tourism; Letters and Regional Culture; Science of the Materials; Administration; Nursing and Chirurgic

94 Research Groups registered at the Brazilian Research Council (CNPq)

- Goddard typology for the analyses of the impact of university efforts in a region
 - Three categories of effects:
 - (i) The static impact as employer and generating of flows of expenses in the region;
 - (ii) the dynamic impacts of the interaction between the university and the companies located in the regions where they act and
 - (iii) the contribution for the social and communitarian development of the regions where they act
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University of Caxias do Sul

Effects of the first Type:

(Employer and generating of flows of expenses in the region - static impact)

- The movement of a budget of 90,000,000 USD and employer of approximately 2000 people
- The budget of the UCS is greater than many municipalities budgets in their region.



Effects of the second type:

Refers to the dynamic impacts of the interaction between the university and the companies located in the regions where they act. These impacts occur through the activities of teaching, research and extension



Technological Initiatives

- **Exploitation of Residues of the Civil Construction**
- **Standardization of the System of Production of Cheese Serrano and Treatment of the Residues**
- **Recycling of Residues of the Leather- Shoes Sector**
- **Re utilization of residues of confections industry**
- **Evaluation of the concentration of chemical residues in water**
- **Development of stationary engines for use of *biodiesel* and vegetal oil *in natura***
- **Development of vacuum-oven for cementation and steel hardness.**



Training Initiatives

- **School of Gastronomy UCS-ICIF**
- **Program of Familiar Agro-Industry**
- **Capability in modeling – Fashion Pole**
- **Programs of Network Cooperation**
- **Programs of Extension for Enterprise Qualification and Exportation.**



Effects of the third type

Deals with the contribution for the social and communitarian development of the regions where they act, through its general influence on the local cultural environment and the formation of leaderships, as well as by means of its role in the formularization of a strategical vision on the economy of the region.



- Pole of Computer Science of Caxias of Sul and the Technological park
- Design Incubator of the UCS
- Technological Transfer Office of the UCS
- Entrepreneurship programs
- Technological Incubator of Caxias do Sul (UCS, Municipality of Caxias do Sul, Industry association)



- *Metal – Mechanical for Car Assembly Industry Cluster*

- Participation in projects like:

- Center of Homologation and Tests

- Center of Reference for Gas fuel for Car Assembly Industry

- School of Metallurgy

- Qualification of Suppliers



Cluster of Wood and Furniture

Participation in projects like:

- SIC – System of Competitive Information
- Management of Design
- Modeling of system of information for furniture sector
- Diagnosis of the Generation of Residues of the Furniture Pole



- Joint Regional Programs with the Municipality Department of Education and Regional Coordinators of Education.
- Center of Familiar Agriculture (UCS, Municipality of Varanópolis; and Federation of the Agriculture FEPAGRO)
- Fashion Pole of Caxias do Sul



- Museum of Natural Sciences
- Symphonic orchestra of the UCS
- String Quartet of the UCS
- Institute of Municipal Administration
- Institute of Historical and Cultural Memory



CONCLUSION

- Nowadays there is a growing national concern with the contribution of the universities to innovation and economic performance, demanding more from the universities besides human resources formation. However, in development countries like Brazil, this contribution is severely limited due to a low dynamism of innovation presented by Brazilian industrial enterprises.



- The results of two Innovation surveys published by the Brazilian Agency for Geography and Statistics (PINTEC) may summarize this low dynamism
- (i) Innovation rates (percentage of firms that introduced in the market new or improved products and/or process in the 3 year prior to the survey) are very low and declining for most sectors;
- (ii) R&D expenditures by firms are not only small, but seems to be declining.



- That is the Brazilian innovation paradox: “We have science and technology development at the universities, but we don’t have innovation at the industrial enterprises”.



Number of patents registered at Brazilian Patent Office

DEPOSITANTE	1999	2000	2001	2002	2003*	TOTAL
UNICAMP	17	39	22	60	53	191
PETRÓLEO BRASILEIRO S A - PETROBRAS	30	25	30	43	49	177
ARNO S A	26	37	14	28	43	148
MULTIBRAS ELETRODOMÉSTICOS S A	12	12	27	28	31	110
SEMEATO S A IND E COM	14	13	16	16	41	100
VALE DO RIO DOCE CO	16	06	15	27	25	89
FAPESP - FUNDAÇÃO DE AMAPARO A PESQUISA S. PAULO	01	01	10	36	35	83
BRASIL COMPRESSORES S A	14	13	29	09	16	81
DANA IND LTDA	01	20	23	21	06	71
UNIV FED DE MINAS GERAIS	02	09	17	23	15	66
JOHNSON & JOHNSON IND COM LTDA	12	16	11	12	05	56
UNIV SÃO PAULO	07	07	08	13	20	55
JACTO MÁQUINAS AGRÍCOLAS	15	23	04	07	05	54
MINAS GERAIS SIDERURGIA - USIMINAS	07	14	11	06	10	48
ELECTROLUX DO BRASIL S A	19	06	08	09	03	45
EMBRAPA	09	09	10	11	03	42
CONSELHO NAC DE DESNV - CNPq	06	08	03	10	15	42
UNIV FED DO RIO DE JANEIRO - UFRJ	02	04	02	17	13	38
UNIV EST PAULISTA JULIO DE MESQUITA FILHO	03	02	03	13	13	34
DIXIE TOGAS S A	00	04	09	16	02	31