Universities, Organizational Structure of the Research Activity and the Spin-off Formation: Lessons From Brazilian Case

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Brazil Overview

Area - 8.514.876,599 km²
Population – 187 Millions
GDP 2007 – US$ 1.067 billion
Flag -

Population per region:
1) South Region – 14,8%
2) South east Region – 42,6%
3) North east Region – 28,1%
4) Middle west Region – 6,9%
5) North Region – 7,6%

Source: IPEA data (2008)
Government policy for the innovation system
Brazilian System of Innovation

Source: Resende (2005) III Conferência Nacional de C&T&I
Government Policy

CAPES
MEC

University reform law
(2006)

MCT

Finep / CNPq
Fundos setoriais

MDIC

Sebrae
BNDES
Associations

Universities


Research
Institutes

Interface
Universities
Enterprises

Enterprises

State Innovation Agencies
HEIs in Brazil and their relation with the Innovation System
<table>
<thead>
<tr>
<th>Period</th>
<th>Features of Industrialization</th>
<th>University Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920-1950</td>
<td>Heterogeneous industrialization, with offshore technology incorporated in imported equipment, and the immigration of foreign technicians.</td>
<td>Scarcity of Institutions of higher Education (schools of engineering)</td>
</tr>
<tr>
<td>1950-1970</td>
<td>Industrialization based on import substitution, with the creation of subsidiary companies for production by multinational corporations and state-owned companies in primary sectors and public services</td>
<td>Training of human resources (engineering) of as part of the process of industrialization</td>
</tr>
<tr>
<td>1970-1990</td>
<td>Diversification of the industrial base. Leading edge Industries based on endogenous technology and the increasing number of Brazilian employees at the managerial levels of multinational corporations</td>
<td>Training of specialized human resources and research scientists for the learning process</td>
</tr>
</tbody>
</table>

Source: Maculan (1996)
HEIs in Brazil (2006)

<table>
<thead>
<tr>
<th>HEIs Type</th>
<th>Universities</th>
<th>Other HEI</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>52</td>
<td>45</td>
<td>97</td>
</tr>
<tr>
<td>States</td>
<td>33</td>
<td>42</td>
<td>75</td>
</tr>
<tr>
<td>Municipals</td>
<td>5</td>
<td>54</td>
<td>59</td>
</tr>
<tr>
<td>Total Publics</td>
<td>90</td>
<td>141</td>
<td>231</td>
</tr>
<tr>
<td>Pro-profit</td>
<td>25</td>
<td>1495</td>
<td>1.520</td>
</tr>
<tr>
<td>Non-profit</td>
<td>61</td>
<td>353</td>
<td>414</td>
</tr>
<tr>
<td>Total Privates</td>
<td>86</td>
<td>1848</td>
<td>1.934</td>
</tr>
<tr>
<td>Total HEI</td>
<td>176</td>
<td>1989</td>
<td>2.165</td>
</tr>
</tbody>
</table>

Source: INEP (2007) – Census
## Graduation programs in Brazil

<table>
<thead>
<tr>
<th><strong>Lato Sensu</strong></th>
<th><strong>Stricto Sensu</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Around</td>
<td>- Nº of programs: 1.819</td>
</tr>
<tr>
<td>350,000 enrolled students</td>
<td>- Nº of courses: 2.861</td>
</tr>
<tr>
<td>45% of HEIs offer lato sensu courses</td>
<td>- Institutions: 196</td>
</tr>
<tr>
<td></td>
<td>- 35,000: MSc/year</td>
</tr>
<tr>
<td></td>
<td>- 11,000: PhD/year</td>
</tr>
</tbody>
</table>

Source: INEP / CAPES (2006)
Under graduation programs x fields of knowledge

Graduation programs x fields of knowledge

The contributions of universities for the innovation systems

- Indirect contributions
  - Human resources formation in strategic areas (teach mission);
  - Knowledge production in strategic areas (research mission);

- Direct contributions
  - Technology/knowledge transfer; spin-off formation (third mission)
Teach, Research, (high level), Services, Technologies.

Teach, Research, (low level), Services.

Teach, Research

Teach

Direct participation in the innovation process

Participation in the production of “relevant” knowledge

More Endogenous Knowledge

More Exogenous Knowledge
The Coordination of graduation programs in Engineering from Federal University of RJ (COPPE/UFRJ)

- 3,000 students MSc and DSc
- 300 full time professors (teach and research)
- 100 laboratories
- Business incubator (46 enterprises)
- Technology transfer office (66 patents)
- Research centres (Petrobras; Embratel; Eletrobras; Mining RC)
Theoretical framework

- Resource base view
  - How the research structure affects the resources necessary for the spin-off formation?

- Institutional Approach
  - Trajectory of the department; research group; researches;
Thank you!

Thiago Renault