

The Scientific Collaboration in Brazil: an Overview

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Introduction

The Brazilian scientific production is growing around 8% every year in the ISI databases and corresponds for 45% of all Latin America production (LETA; GLÄNZEL & THIJS, 2006). Scientific collaboration is developing an important role in this scenery, once a big parcel of these papers is published in collaboration between individuals from different institutions and countries. The scientific collaboration was measured through data from ISI (LETA; MEIS, 1996; LETA; CHAIMOVICH; 2002) and also Pascal (MUGNAINI; JANNUZZI; QUONIAM, 2004), specially at macro level. The importance of better understanding, the national scientific production and the scientific collaboration is supported by many Brazilian authors (VELHO, 1986; PACKER & MENECHINI, 2006). In this sense, the main objective of this study is verifying Brazilian scientific collaboration through co-authorship, comparing the results in micro, meso and macro level.

Methodology

The results were based on data from 2004-2006 Science Citation Index (SCI). Only Articles that were assigned to Brazil or Brasil on the basis of their corporate addresses were taken into consideration. A manually process was done to standardize the institutions' and country's names. Data has been analyzed by Bibexcel and Excel 2007. Considering subject classification, the papers were arranged into 12 major fields according to Glänzel and Schubert (2003) subject classification scheme.

Data analysis

The data collected resulted in 49,046 papers with at least one Brazilian address. The collaboration was analyzed in macro, meso and micro level and showed interesting patterns. The international collaboration decreased from 30.8% in 2004 to 29.9% in 2006. Contrastingly, the meso and micro level collaboration grew during the period: co-authorship between Brazilian institutions grew from 41.4% to 44.3% of all papers and individual co-

authorship raised from 95.7% to 96.7% of them, as showed in Table 1.

Table 1. Brazilian co-authorship results

		2004	2005	2006
Mean per article	Authors	5.9	6.4	6.5
	Institutions	2.3	2.4	2.4
	Countries	2.6	2.6	2.6
Articles	International co-authorship	30.8%	30.1%	29.9%
	Brazilian interinstitutional co-authorship	41.4%	43.4%	44.3%
	Individual co-authorship	95.7%	95.8%	96.7%

A stable tendency was observed in the mean number or countries involved in each paper (2.6), meanwhile the mean number of institutions grew 0.1 from 2004 to 2006. The mean number of authors involved in each paper grew from 5.9 in 2004 to 6.5 in 2006, reinforcing the predominance of individual collaboration in Brazilian science. To investigate different patterns the analysis was carried by area:

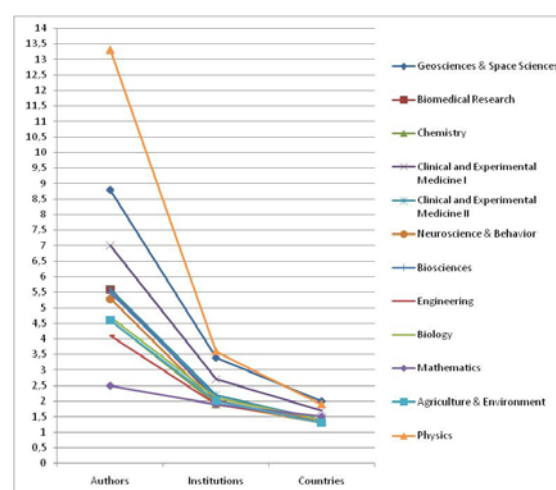


Figure 1. Mean number of authors, institutions and countries by area, 2004-2006

Table 2. Brazilian co-authorship by area

	Mean per article
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	Authors	Institutions	Countries
Geosciences & Space Sci.	8.8	3.4	2.0
Biomedical Research	5.6	2.0	1.3
Chemistry	4.6	1.9	1.3
Clinical and Exp. Medicine I	7.0	2.7	1.7
Clinical and Exp. Med. II	5.6	2.2	1.4
Neuroscience & Behavior	5.3	1.9	1.3
Biosciences	5.5	2.1	1.4
Engineering	4.1	1.9	1.4
Biology	4.7	2.1	1.4
Mathematics	2.5	1.9	1.5
Agriculture & Environment	4.6	2.0	1.3
Physics	13.3	3.6	1.9
Total mean	6.3	2.4	1.5

The results also showed that the mean number of authors, institutions and countries per article differs across different areas. Physics presented the biggest mean of authors per paper (13.3) and Geosciences & Space Sciences presented the biggest number of countries (2). Mathematics is the area that presents the minimum mean variation, for all other areas the line decreases substantially from author mean to institution mean and country mean. The Brazilian total mean of authors (6.3) is bigger than the international mean in 2000 (4.2), according to Glänzel and Schubert (2004).

Conclusion

These results suggest that co-authorship is a popular practice in Brazilian scientific community, especially at individual level. Total articles co-authored by 2 or more scientists grew during the period and also the mean number of authors per paper. When the mean was compared across areas, the same result was obtained and the graphic showed a line that decreases from mean number of author to institution and countries. The popular phenomenon of publish or perish and especially the politics instaurated in many Brazilian funding agencies may be a pressure for publication. A deeper analysis is necessary to investigate the co-authorship.

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References

- Glänzel, W.; SCHUBERT, A. (2003). A new classification scheme of science fields and subfields designed for scientometric evaluation purposes. *Scientometrics*, 56, 3, 357-367.
- Glänzel, W.; Schubert, A. (2004). Analysing scientific networks through co-authorship. In Moed, H.; Glänzel, W.; Schmoch, U. *Handbook of Quantitative Science and Technology Research* (pp. 257-276). Netherlands: Kluwer Academic.
- Leta, J.; Meis, L. (1996). A profile of science in Brazil. *Scientometrics*, 35, 1, 33-44.
- Leta, J.; Chaimovich, H. (2002). Recognition and international collaboration: the Brazilian case. *Scientometrics*, 53, 3, 325-335.
- Leta, J.; Glänzel, W.; Thijs, B. (2006). Science in Brazil. Part 2: sectoral and institutional research profiles. *Scientometrics*, 67, 1, 87-105.
- Mugnaini, R.; Jannuzzi, P.; Quoniam, L. (2004). Indicadores bibliométricos da produção científica brasileira: uma análise a partir da base Pascal. *Ciência da Informação*, 33, 2, 123-131.
- Packer, A.L.; Meneghini, R. (2006). Articles with authors affiliated to Brazilian institutions published from 1994 to 2003 with 100 or more citations: I – The weight of international collaboration and the role of the networks. *Anais da Academia Brasileira de Ciências*, 78, 4, 841-853.
- Velho, L. (1986). A avaliação do desempenho científico. *Cadernos USP*, 1, Oct. 22-40.