

# Scientific Collaboration between the Community of Portuguese Speaking Countries and that of Spanish Speaking Countries (2003-2007)

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## Background.

Portugal, Spain and other countries that speak Spanish or Portuguese share a common culture which often does not correspond to their level of scientific collaboration. Programmes such as the Iberoamerican Programme of Science and Technology for Development (CYTED) ([www.cytel.org](http://www.cytel.org)) and that of innovation (Iberoeka) have been set up to encourage multilateral cooperation, the transfer of knowledge and the harmonious and sustainable development of the region. The basic tools used by these programmes are the financing of research projects and the creation of thematic networks. The aim of this work is to analyse the scientific collaboration between the countries that make up the CPLP and SSC with the greatest international visibility.

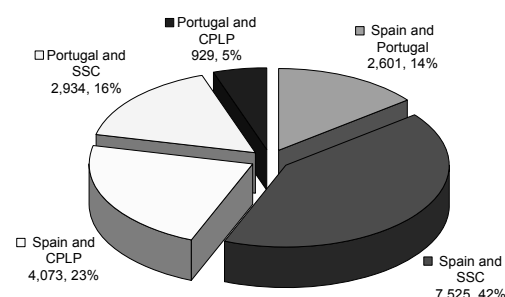
## Methods

A bibliographic search was carried out in June of 2008 in the SCI-E, SSCI and A&HCI databases of the Thomson Reuters' Web of Science (WOS) in order to determine the scientific collaboration. The search profile was limited in its documental typology to article, editorial material, letter and review and included the denomination of all the countries that made up the CPLP and the SSC over the period 2003-2007 in the field address.

## Findings

The scientific collaboration between the CPLP and the SSC over the specified period was of 12,345 documents, with an increase from 1,850 papers in 2003 to 3,094 in 2007. Graphic 1 shows the global rates of collaboration between countries, the greatest being between Spain and the SSC (42%), followed by Spain and the CPLP (23%) and that of Portugal and the SSC (16%); the collaboration was less significant between Spain and Portugal (14%) and between Portugal and the CPLP (5%). On the other hand, collaboration (Table 1) was greater

between Portugal and Spain (n=2,601), Mexico and Spain (n=2,259), Argentina and Spain (n=1,990) and Brazil and Spain (n=1,556).



**Graphic 1. Global rates of collaboration between countries**

In general, collaboration was also greater between American countries than between African countries, where Mozambique and Angola alone are worthy of note. A wide variety of collaborations with other countries has also been identified, of which we should mention The United States (n=1,871), The United Kingdom (n=1,641), Germany (n=1,106), France (n=1,092) and Italy (n=1,060). Table 2 shows global and specific collaboration rates of CPLP and SSC countries. The most productive countries like Spain, Brazil and Mexico have low percentages of collaboration, both globally and with CPLP and SSC countries, while small countries, such as Andorra, Paraguay, Cape Verde and El Salvador, have collaborative work rates of over 50% with CPLP and SSC. The subject areas with the greatest activity were Astronomy and Astrophysics, Physical Chemistry, Biochemistry and Molecular Biology, Food Science and Technology and Multidisciplinary Physics.

**Table 1. Collaboration between the CPLP and the SSC countries**

[illegible]

Table 2. Global and specific CPLP-SSC collaboration rates

Collaboration Rates							
COUNTRIES SSC and CPLP	Total productivity index 2003-2007	Collab. between countries SSC and CPLP	% Collab. between countries SSC and CPLP	Global Collab.	% Global Collab.	Natl. Collab.	% Natl. Collab.
Andorra	23	20	86,96%	22	95,65%	1	4,35%
Angola	73	25	34,25%	72	98,63%	1	1,37%
Argentina	24.791	5.168	20,85%	10.961	44,21%	13.830	55,79%
Bolivia	667	277	41,53%	610	91,45%	57	8,55%
Brazil	82.393	5.780	7,02%	24.280	29,47%	58.113	70,53%
Cape Verde	12	9	75,00%	12	100,00%	0	0,00%
Chile	14.940	3.233	21,64%	8.316	55,66%	6.624	44,34%
Colombia	4.649	1.480	31,83%	2.963	63,73%	1.686	36,27%
Costa Rica	1.508	411	27,25%	1.113	73,81%	395	26,19%
Cuba	3.244	1.242	38,29%	1.911	59,19%	1.333	41,09%
Dominican Republic	122	49	40,16%	119	97,54%	3	2,46%
East Timor	4	0	0,00%	4	100,00%	0	0,00%
Ecuador	1.072	405	37,78%	891	83,12%	181	16,88%
El Salvador	107	63	58,88%	99	92,52%	8	7,48%
Equatorial Guinea	15	7	46,67%	15	100,00%	0	0,00%
Gibraltar	14	12	85,71%	14	100,00%	0	0,00%
Guatemala	303	136	44,88%	264	87,13%	39	12,87%
Ghana-Bissau	113	1	0,88%	106	93,81%	7	6,19%
Honduras	137	60	43,80%	130	94,89%	7	5,11%
Mexico	41.839	4.643	11,10%	23.315	55,73%	18.524	44,27%
Mozambique	284	72	25,35%	248	87,32%	36	12,68%
Nicaragua	208	77	37,02%	197	94,71%	11	5,29%
Panama	1.306	283	21,67%	1.206	92,34%	100	7,66%
Paraguay	455	384	84,40%	440	96,70%	15	3,30%
Peru	1.938	651	33,59%	1.656	85,45%	282	14,55%
Portugal	23.804	3.707	15,57%	12.570	52,81%	11.234	47,19%
Puerto Rico	2.197	297	13,52%	2.197	100,00%	0	0,00%
Sao Tome and Principe	9	6	66,67%	9	100,00%	0	0,00%
Spain	148.205	11.255	7,59%	43.752	29,52%	104.453	70,48%
Uruguay	2.109	829	39,31%	1.409	68,61%	700	33,19%
Venezuela	5.217	1.198	22,96%	2.717	52,08%	2.500	47,92%

## Discussion

Scientific collaboration between Iberoamerican countries has increased over this five year period by 10 percentage points. Spain and Brazil can be considered the most important partners for most CPLP and SSC countries, and it has been observed that geographical proximity has a positive effect on collaboration:

South American countries tend to cooperate with adjacent, while the Central American and Caribbean tend to do so with Mexico, the second SSC after Spain with higher productivity. Small countries have high collaborative rates, maybe due to lack of economic resources, the lack of local

colleagues with whom to exchange ideas and special conditions such as the availability of special research materials (Thorsteinsdottir, 2000). As seen in other studies concentration of co-publications in several areas is the result of the existing tradition in international cooperation (Fernández et al., 1999). Limitations: Co-authored papers show only one part of the scientific collaboration (Laudel, 2002); one part of the research carried out in collaboration is published in national journals not included WOS databases.

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