



Increased vitality

Academic production hits new highs in the country, although its impact is not yet very expressive

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Academic production in Brazil marked a new record in 2006. The country was responsible for 1.92% of the articles published in periodicals registered in the database of ISI (Institute of Scientific Information), a collection assembling the most noteworthy publications on the planet. In absolute number, Brazilian researchers published 16,872 articles, approximately a thousand more than in 2005. As a result of such a performance, the country rose from position 17 to position 15 in the ranking of the 25 most productive nations, leaving behind, even if by a small margin, developed countries, such as Sweden and Switzerland. The data was disclosed by the Coordination Center for the Perfection of Higher-Learning Personnel (Capes), a department of the Ministry of Education that evaluates post-graduation programs. "In 2002, we were ranked number 20; in 2005 we rose to number 17. The current threshold was expected only in 2009", stated Jorge Almeida Guimarães, president of Capes. What is most impressive is the speed at which Brazilian production has advanced. Between 2004 and 2006, the increase represented 33%. "Growth is exponential and results, among other factors, from the strategy of Capes to strictly demand the publication of articles", claims Rogério Meneghini, scientific coordinator of the electronic library of SciELO Brazil.

The areas displaying the highest increase in academic production between 2005 and 2006 were those of immunology (23%), medicine (17%), animal e vegetable production (13%), economics (12%), ecology and environment (12%) and engineering. (11%). As expected, the United States leads the ranking with 32.3% of global scientific production.

However, there were changes in position within the highest-ranked contingent compared to 2005. Germany outstripped Japan and became the runner-up with 8.1% of all articles. China emerged as fourth with 7.9% of all articles, for the first time ahead of England with 7.27%.

Capes also disclosed a second ranking, which takes into account the citations of Brazilian articles in the texts of other researchers between 2002 and 2006 (a well known indicator of the significance of the research) and the quality of the publications in which they were disclosed. In the so-called "impact ranking", the country's position falls to the 20th place, being outstripped by Switzerland, whose articles merited 551,537 citations (vis-à-vis Brazil's 206,231) and even by countries that published a significantly lower number of articles, such as Sweden, Poland, Belgium, Israel, Scotland, Denmark and Austria. The Brazilian position was only not lower because, in terms of impact, it managed to outstrip countries like Russia, India and even China, which published more articles. As regards the Chinese, the number of articles published is four times as many as those published by Brazilians. "The significance of our articles is superior to that of the group of developing countries with whom we compete", states Jorge Guimarães of Capes. "In a number of articles, Brazil is at a disadvantage when it comes to technological areas, but in some cases, this difference disappears in the impact index."

The difference between the two rankings has given rise to the interpretation by means of which the Brazilian research seems to display more vitality regarding the quantity rather than the quality requisite. However, according to specialists, the truth might well be situated between the two surveys. "In the

ory, if an article does not receive citations, it is because it did not add anything to knowledge. But there could be some distortion when one analyzes the impact index individually, given that countries with a limited production may benefit from the extraordinary significance of a smaller number of articles", observes the physicist José Fernando Perez, former scientific director of FAPESP.

Tradition - Rogério Meneghini observes that Scandinavian countries outstrip Brazil due to their tradition in certain areas. "Sweden is strong in several areas. Denmark, for example, was home to the physicist Niels Bohr, who helped develop generations of researchers", he claims, referring to the scientist, who died in 1962, and whose works contributed decisively to the comprehension of the atom's structure and to that of quantum physics. "They are countries that inherited science at the highest level, by means of which they maintain their influence and dictate directions in certain fields", explains Meneghini.

But the principal distortion in the impact of such indices could be from another origin. Various studies in the field of scientific method, a subject that generates information to stimulate the enormous challenges of science, have raised a "psychosocial effect" in the logic of such citations: "North Americans tend to cite other North American, Germans cite the Germans, and so forth. The strictness which scientific magazines impose on their authors is the same, independent of their origin. But the citations of articles from countries such as Brazil, India and China are invariably less than those from developed countries", says Meneghini. ■

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