

One country, two models

State expenditures on research and development reveal the gap between São Paulo and the other Brazilian states

Fabrcio Marques

PUBLISHED IN SEPTEMBER 2012

Brazilian states have made increasing investments in research and development (R&D) in recent years. However, São Paulo continues to make more substantial investments of this type, consistently spending significant sums on R&D in its three state universities. In contrast, the other states have university systems that are less developed and are sustained by modest investments. A survey published by the Ministry of Science, Technology and Innovation (MCTI) that assesses R&D in Brazil based on national science and technology indicators reveals this gap. This data compilation compared the states' expenditures on R&D by their respective higher education institutions. Of the R\$ 4.5 billion invested in this area by the Brazilian states in 2010, almost R\$ 3.9 billion, or 86% of the total, was provided by São Paulo. "São Paulo is a state that invests a lot in science and technology relative to the rest of the country," observes Marco Antonio Zago, the Dean of Research at the University of São Paulo (USP). "This is the result of a state policy that started a long time ago and not the strategy of one governor," he adds. Rio de Janeiro ranks second after São Paulo, with state expenditure of approximately R\$ 208 million on R&D by higher

education institutions in 2010. Paraná (R\$ 183 million), Bahia (R\$ 68 million), and Santa Catarina (R\$ 46.9 million) are ranked third, fourth, and fifth, respectively.

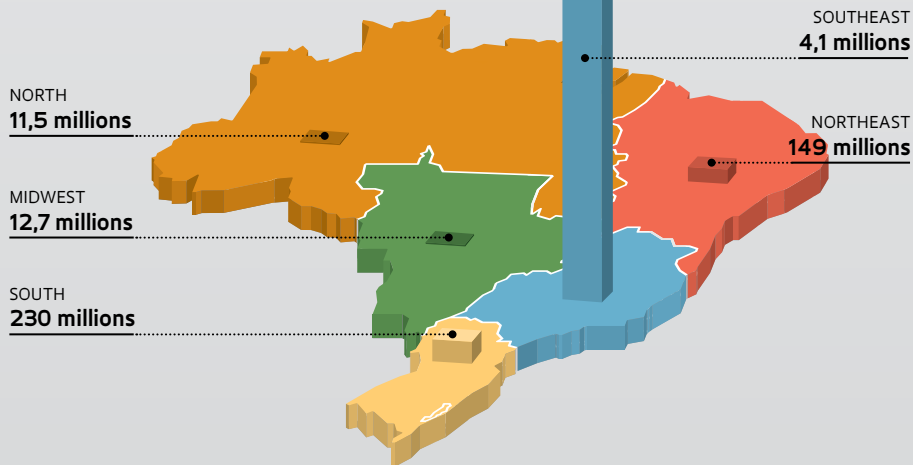
A total of 9.57% of the state tax on goods and services (*ICMS*) collected in São Paulo is used to maintain the state's three universities. These funds are distributed proportionally to the size of the institutions. Thus, 2.344% are distributed to Paulista State University (Unesp), 2.195% to the State University of Campinas (Unicamp) and 5.029% to USP. "These funds, which are managed autonomously, guarantee a very strong base for the state universities, providing quality laboratories, teachers who work full time for the universities, and research technicians," says Zago. However, Zago has one reservation: "Although money is distributed according to the size of the institution and not in a competitive way, FAPESP funds, invested in research projects and scholarships, fulfill this purpose. Researchers have to submit their projects and they're assessed. And it's only quality projects that are considered," says the Dean. In 2010, FAPESP disbursed R\$ 780 million in research projects, awarding just over R\$ 100 million more than was disbursed in 2009.

According to the MCTI indicators, USP (the

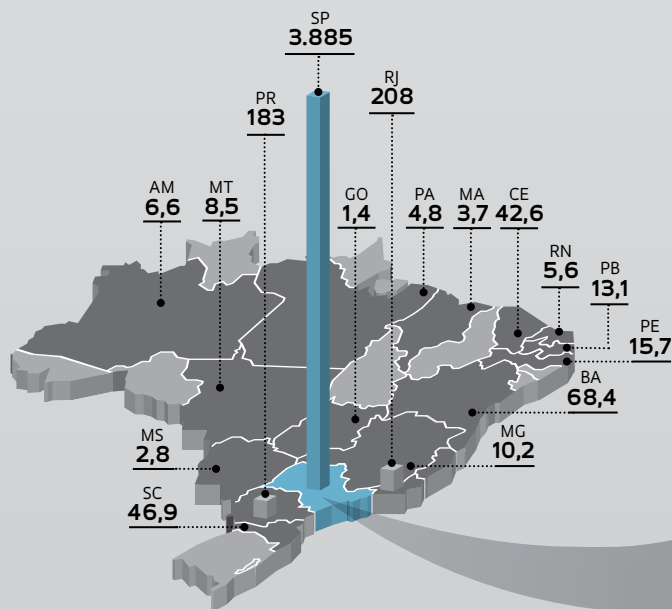
State investment in R&D

Estimated 2010 expenditure on research and development (R&D) conducted by state institutions of higher education

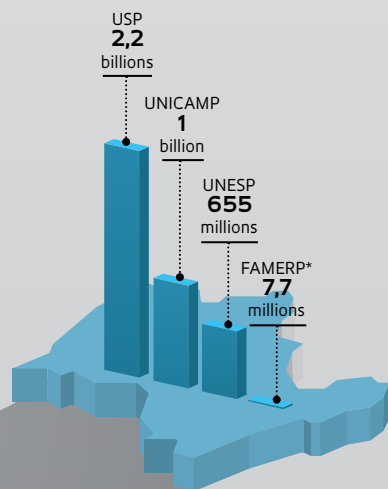
1 BY REGION (in R\$)



2 BY STATE (in millions R\$)



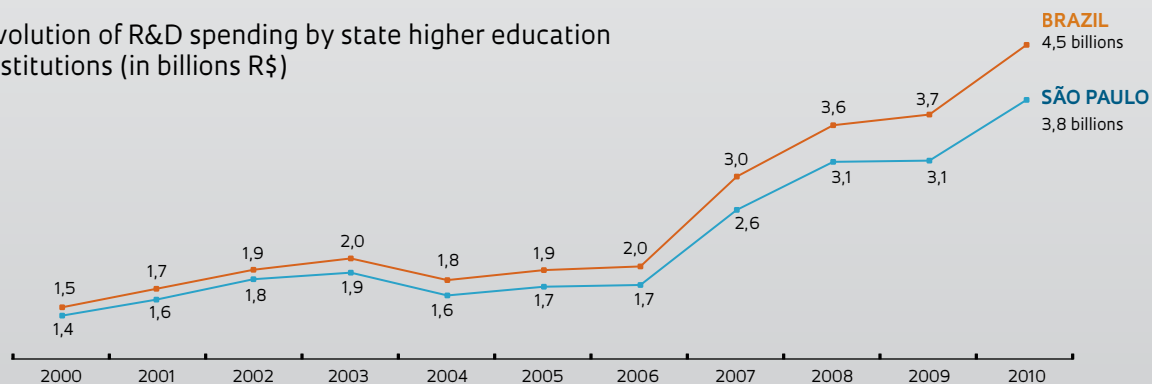
3 IN THE STATE OF SÃO PAULO (in R\$)



*School of Medicine of São José do Rio Preto

The contribution of São Paulo

Evolution of R&D spending by state higher education institutions (in billions R\$)



SOURCE NATIONAL SCIENCE AND TECHNOLOGY INDICATORS/MCTI

highest ranked Latin American university in the international rankings) received almost half of the funds invested in R&D within the state's university systems. In 2010, this percentage amounted to R\$ 2.2 billion in funding. Unicamp received R\$ 1 billion, and Unesp received R\$ 655 million. The School of Medicine in São José do Rio Preto also appears in the MCTI table, with R\$ 7.7 million invested in 2010. The MCTI data reflect spending on postgraduate study, which is the most research-oriented university activity. The MCTI calculates the ratio of the funds used by the institution in question to the number of teachers involved in postgraduate work. The funds allocated to technicians, facility maintenance and pensions are omitted from the Ministry's calculations because these are not considered to be R&D expenditures. According to the Organization for Economic Cooperation and Development (OECD), the term R&D "refers to the creative work carried out systematically with the objective of increasing the stock of knowledge and using it to develop new applications." R&D expenditure is the funding invested in science and technology to support basic and applied research, which thereby helps to provide countries with the skills that they require for innovation.

CONTINUITY

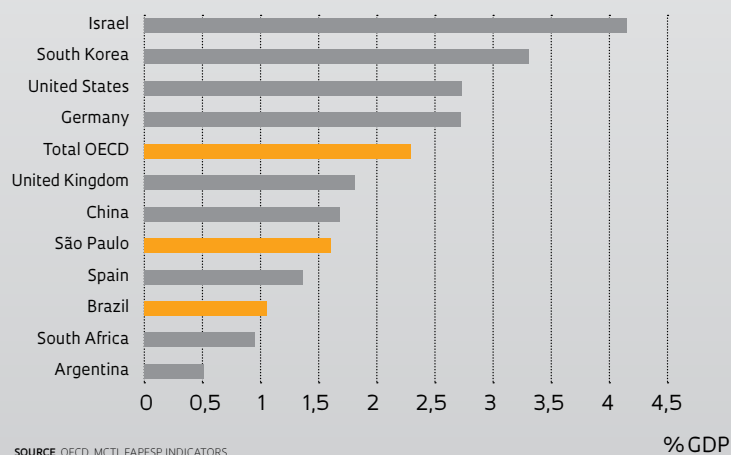
The Dean of Research at Unesp, Maria José Giannini, observes that one of the advantages of the São Paulo model is its continuity and dependability. "Obviously, there are many highly competent researchers in federal universities, but it's common for their work to suffer the impact of research funding restrictions. In state universities, we have ample conditions for encouraging researchers to present projects and look for funds because FAPESP always favors those who have merit," she says. According to data from Unesp, in the last four years, the number of regular and thematic projects approved by the FAPESP was twice the number approved in the previous four-year period. The Studies and Projects Funding Agency (Finep) increased the funding it awarded by 230% during this four-year period.

Ronaldo Pilli, the Dean of Research at Unicamp, emphasizes that São Paulo's state universities have played an important role in providing individuals with funding that would help to ensure the development of the country. "It comes as no surprise that the numbers show a predominance of investments in São Paulo. But an increase in corporate participation in the R&D sector would be welcome, because we have a human resource base to offer," he says.

Even so, São Paulo is a unique case: a Brazilian state in which the R&D investment by com-

International overview

Total expenditure on R&D relative to GDP – Brazil, São Paulo State and selected countries – 2010 or most recent year



panies exceeds the public investment (the former comprises 62% of the total according to the report Science, Technology & Innovation Indicators in the State of São Paulo, which was published in 2011 by FAPESP). Likewise, the state-level public expenditure on R&D in São Paulo, which amounted to R\$ 3.7 billion in 2008, exceeds that of the federal government in the state (which totaled R\$ 2 billion during that same year). This breakdown is very different from that of Brazil as a whole, where the federal investments in R&D account for most of the funding (*see the table on the opposite page*).

Regarding Unicamp, Pilli highlights the role of FAPESP, which is responsible for 40% of the research funds received by the university. "We increased fund-raising for research from R\$ 220 million in 2007 to R\$ 350 million in 2011. The funds from the Foundation grew from R\$ 80 million in 2007 to R\$ 131 million last year. In the same year, CNPq funding fell and those from Capes grew from R\$ 52 million to R\$ 61 million," he notes.

Although the R&D investment in São Paulo may appear most impressive, several other states have recently expanded their investments in science and technology. In 2008, Rio de Janeiro increased the share of taxes that is earmarked for the State Research Funding Agency (Faperj) to 2%. "With this, and also thanks to the increase in state tax collection, Faperj's budget jumped from R\$ 100 million to R\$ 300 million," says the

Various states have expanded their investment in science and technology in the recent past

State Secretary of Science and Technology, Luiz Edmundo Costa Leite. According to the MCTI survey, R&D funding by the Rio government for its two universities, the Norte Fluminense State University (Uenf) and the State University of Rio de Janeiro (Uerj), was R\$ 208 million in 2010, more than double the R\$ 100 million that was made available in 2005. Uerj was better funded in 2010, having received two thirds of the amount that was spent during that year. The number of

way. And Faperj invests a substantial part of its resources in federal university projects. We've only got one public bid notice, directed at equipping laboratories, which is only open to state universities," says the secretary. He notes that the Rio state university system has been shaped by its history. "Rio de Janeiro was the country's capital for 200 years and various universities were created by the federal government. Other research institutions with a great tradition also arose in

Rio, like the Oswaldo Cruz Foundation. In São Paulo, on the other hand, growth of the research system depended on the effort of the state and as it grew economically, state universities became consolidated," he explains.

The development trajectory of the universi-

In the state of São Paulo, corporate R&D investment exceeds public investment in this area

teaching faculty at Uerj – approximately 1,800 – is similar to that of Unicamp, although the number of graduate students (2,800) is a tenth of that of Campinas University. "With the increase in state tax collection, there has been an effort to recover the capacity of state universities," explains Leite.

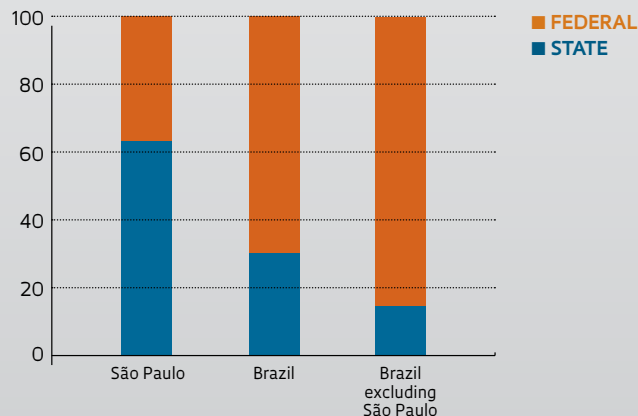
FEDERAL UNIVERSITIES

Most of the public universities in Rio de Janeiro are federal. These include the Federal University of Rio de Janeiro (UFRJ), the Fluminense Federal University (UFF), the Federal Rural University of Rio de Janeiro (UFRRJ) and the Federal University of the State of Rio (Unirio). "But the federal and state universities operate in an articulated

ties in Minas Gerais was similar to that of the universities in Rio. In 2010, the state invested R\$ 10.2 million in R&D at two institutions: the State University of Minas Gerais (Uemg) and the State University of Montes Claros (Unimontes). This amount, though modest, was more than triple the R\$ 2.9 million that was invested in 2007. The State Secretary of Science, Technology and Higher Education of Minas Gerais, Narcio Rodrigues, explains that this increase is the result of the government's 2007 decision to enforce the legal rule requiring that 1% of the taxes collected in the state be invested in science via the Research Funding Agency of Minas Gerais (Fapemig). Rodrigues explains, "Our strategy has been to guarantee that there's no going back on complying with this norm and to leverage the funds by partnering with the federal government and private initiative, which contribute equivalent amounts." He notes that there are only two state universities because in the past, the task of promoting the Minas Gerais university system fell to the federal government. "Our system has 14 higher education institutions, 12 of which are federal, but we function as an articulated system," he says. The largest of these institutions is the Federal University of Minas Gerais (UFMG). "Our universities work heavily in regional development. Unimontes, which is the main state institution, is pretty active in the poorest region in Minas Gerais. This regionalized system is important for the development of the state, but of course, the ideal thing would be to mix it with the current system in São Paulo, where the state government took over the mission of promoting higher education and has consolidated institutions that have nationwide influence," says Rodrigues. ■

Federal and state R&D expenditure

Breakdown of government R&D expenditure in the state of São Paulo, in Brazil, and in Brazil excluding the state of São Paulo – in %



SOURCE: SCIENCE, TECHNOLOGY AND INNOVATION INDICATORS IN SÃO PAULO, 2010