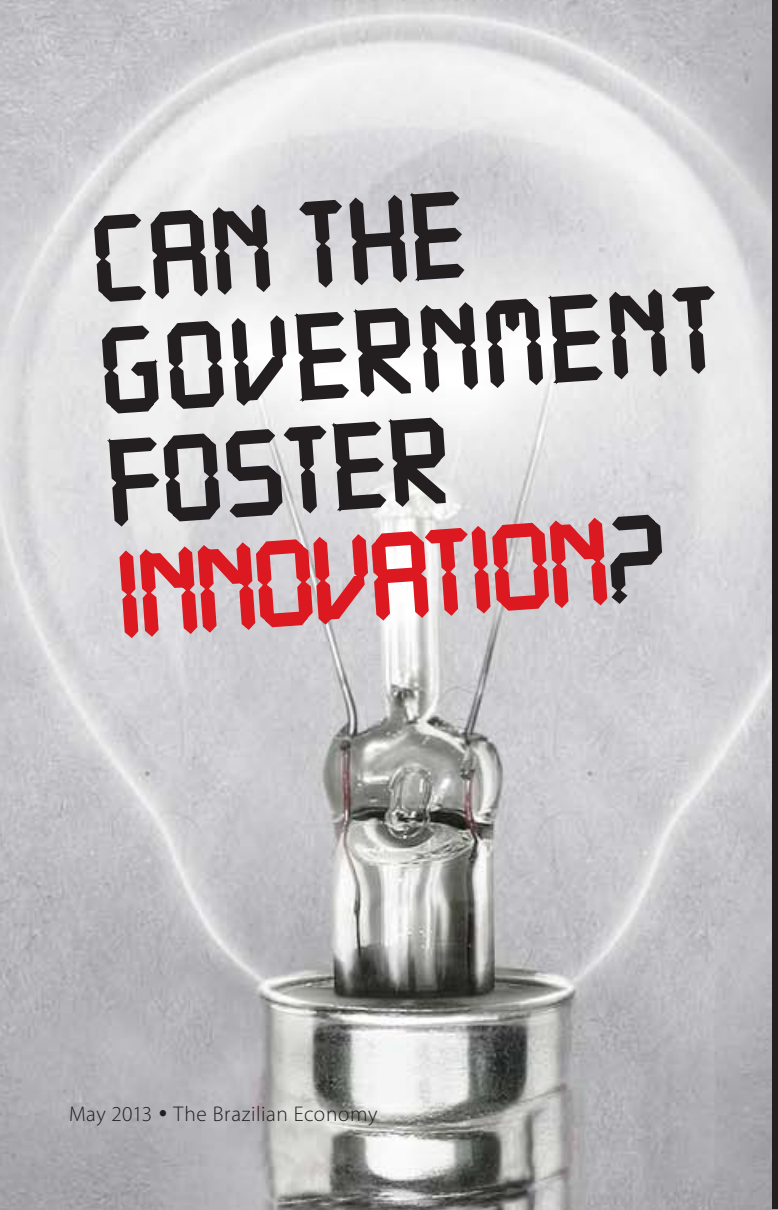
The government announces a multibillion-real plan to encourage companies to invest in innovation, but the business environment needs work to ensure that there will be a return on those investments.



CAN THE GOVERNMENT FOSTER INNOVATION?

Solange Monteiro, Rio de Janeiro

AN UNPRECEDENTED MULTIBILLION-REAL PLAN is the latest federal government initiative to stimulate investment in research, development, and innovation (RD & I), diversify the production of goods and services, and improve productivity. The government seems to have realized that without private investment in innovation, Brazil's loss of competitiveness will accelerate.

The Business Innovation Plan (*Plano Inova Empresa*) announced in March is expected to attract R $ 28.5 billion in direct investment from the government, plus R$4.4 billion from the national petroleum agency (ANP) , Electric Energy (ANEEL), and the Brazilian Service of Support for Micro and Small Enterprises (Sebrae). It is also expected to boost private investment in RD&I to correct a major imbalance: too much basic scientific research and too little applied research. Today, although Brazil's public spending on RD & I as a share of GDP is very similar to that of other countries, private companies spend less than in members of the Organization for Economic Cooperation and Development (OECD).

"University researchers focus on publication of articles; our productive environment is somewhat averse to taking the risks of an innovative strategy," says economist David Kupfer, coordinator of the Industry and Competitiveness Team of the Federal University of Rio de Janeiro (UFRJ). "Now, however, the government has opted to focus on technological development from the point of view of future profit generation—profitability," Kupfer says. He added that makes the new policy "implicitly very attractive."

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Some analysts, however, speculate that, although the measure is clearly relevant, the results will be less than expected if the government does not significantly improve the business environment to reduce the cost of innovation and ensure it earns a return. "If the business environment is hostile to fixed investments, innovation becomes even riskier," says economist Mauricio Canêdo, Brazilian Institute of Economics (IBRE), noting that a timid recovery of fixed investment has only just begun after several quarters of falling investment. "Today, there is a trend for the government to invest money to fix everything. It has become clear that this policy alone does not guarantee results," adds Claudio Frischtack, president of InterB consulting.

THE INNOVATION PLAN

The new plan has two parts. The first is funding. In addition to the government commitment for 2013–14, the plan gives businesses access to resources, and existing grant, loan, and venture capital programs can be accessed for the same project, using a one-stop shop, the Brazilian Agency for Innovation. The plan also creates the Brazilian Enterprise for Research and Industrial Innovation (Embrapii), which will be launched with R$1 billion to support cooperation between companies and technological institutes on innovative projects. The new plan is directed to seven areas: agriculture, energy, oil and gas, health, aerospace and defense, information technology and communication (ICT), and environmental sustainability.

"While Brazil has a relatively complete menu of innovation policies, they lacked strength. Allocating more resources, with well-defined target sectors, makes a major breakthrough, "says Fernanda de Negri, Director for Studies and Sectoral Policies for Innovation, Regulation and Infrastructure (Diset), Institute of Applied Economic Research (IPEA). The Funding Authority for Studies and Projects (FINEP), the government agency responsible for 40% of the government's share of resources in the new plan, will streamline processing and approval of resources for projects. "With the new innovation plan, our budget increased by R$6 billion, and

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we need to respond efficiently to private sector requests," says Glauco Arbix, FINEP President.. "We expect to announce in July that any project submitted will receive a reply within 30 days."

The National Bank for Economic and Social Development (BNDES), which accounts for R$ 15.3 billion of the total government commitment for the plan in 2013–14, also wants to approve project funding within 30 days. Maurício Neves, superintendent of the BNDES industrial area, expects that the magnitude of projects will be very different from what had been usual, pointing out that "we went from R$100 million in five years to R$3 billion after announcement of the plan to support innovation in the sugarcane industry (the PAISS)." Neves notes that the New Innovation Plan specifies certain deadlines, and helps the bank define the best funding instruments.

The Sugarcane Technology Center (CTC), in Piracicaba, São Paulo state, is one of 25 companies selected to receive PAISS funding. In 2011, the CTC submitted 22 projects to FINEP-BNDES. "It took time to analyze the projects. But in the end we approved six projects for grants and loans and contributed R$4 million to the University of Campinas' research institute partner," said Diego Ferrés, CTC director of strategic planning. Now, CTC collects royalties per hectare planted with the 30 new sugarcane varieties developed.

Publicity photo.

National Institute of Technology (INT), Rio de Janeiro state.

NEW PARADIGM

Paulo Mol, director of innovation, National Confederation of Industries (CNI), is responsible for the Embrapii pilot project. He says the new agency will not only bridge industry and research institutes but is also focused on markets because it has a financing tripod: enterprise resources, Embrapii grant, and research center contributions of infrastructure and researchers. Research institutes will be responsible for assessing the merits of projects they participate in, which was once done by the financing agencies, so that the process should be faster and more flexible. To claim their share of the

one billion reais available, research institutes must not only have an excellent research track record but also be able to identify how each project will serve the market.

Testing of the new strategy began in April 2012 with the National Institute of Technology (INT) under the Ministry of Science and Technology in Rio de Janeiro, the Institute Technological Research (IPT) in São Paulo state, and the Center for Integrated Manufacturing and Technology (Cimatec), a private nonprofit organization connected to the National Service of Industrial Learning (Senai). The results underscored some of the challenges that the new system must meet to bring private investment in innovation up to OECD standards. "Senai-Cimatec performed better than the other institutes because market focus was already intrinsic to its operations," Mol says. Senai-Cimatec closed the first year of the pilot with 12 contracted manufacturing and automation projects with a total value of R$18 million and another six projects being negotiated.

In the IPT in São Paulo, where 60% of revenue (R$132 million in 2012) is derived from appraisals, quality control, and metrology services to markets, the focus is on process improvement. "We are introducing a system to evaluate the performance of researchers in terms of five criteria, including market knowledge and negotiating skills," says Flavia Gutierrez Motta, IPT coordinator of planning and business. The institute was accredited to work in biotechnology, nanotechnology, and microtechnology and this year added new metallic materials, polymers. and ceramics. By April 2013 IPT had eight projects contracted, totaling R$7.5 million, and is about to close on another

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Photo: Nelson Campos.

Sugarcane Technology Center (CTC), Piracicaba, São Paulo state.

Publicity photo.

Institute for Technological Research (IPT), São Paulo state.

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R$15 million contract. According to De Negri, in all cases projects were processed faster: "Negotiations with Funtec [the BNDES Technological Fund], involving R&D and intellectual property, used to take 10 months to more than a year. Negotiations with Embrapii took just three to five months."

Carlos Alberto Marques Teixeira, INT coordinator, embraces the efficiency of the new model as well as the allocation of resources: "Embrapii makes [the whole funding] available when 80% is committed, not just when they are executed, as has been traditional for FINEP. This is better suited to market reality." His institute, whose specialties are energy and health, had five contracts totaling R$9 million signed by April, and had asked Embrapii for R$15 million for new contracts that it expects to close this year.

When fully operational, Embrapii will investigate whether other technology research centers throughout Brazil can participate effectively in the new research plan. However, the Ministry of Science and Technology has not yet announced the relevant criteria. CNI's Mol says, "The criteria should follow the guidelines we have used so far: qualification of laboratories and human resources, results of previous cooperative projects involving companies, and success in private fundraising."

According to an IPEA survey of 196 laboratories and infrastructure authored by Fernanda De Negri, 37% had not provided technology services to businesses in 2011. "Those who manage to build scale and specialization will win," she says. Another

Brazil lags behind in number of researchers and patents.

	Researchers in R&D	Patents (per million inhabitants)	Engineers and scientists	Patents per researcher (1,000)
Germany	3,780	203.6	4.5	53.9
Argentina	1,046	1.1	3.9	1.0
Brazil	696	2.8	3.5	4.0
Chile	355	3.8	4.7	10.7
China	1,199	6.5	4.4	5.4
South Korea	4,947	161.1	4.9	32.6
United States	4,673	137.9	5.4	29.5
Japan	5,189	210.7	5.7	40.6
Mexico	347	1.6	4.0	4.7

Sources: UNESCO and World Economic Forum (2010); data for engineers and scientists refer to 2012.

factor essential to Embrapii's success that has not been defined is the source of funds for its own operations, especially after the 1 billion *reais* announced is spent.

IBRE's Canêdo sees another stumbling block: the shortage of trained professionals. He notes that in the World Economic Forum competitiveness study, under innovation Brazil's worst rating is for availability of scientists and engineers, 113 among 144 countries. The institutes that participated in the pilot innovation project increased the demand for scientists and engineers. Canêdo thinks the new plan will "encourage greater exchange of people between companies and universities, give students more incentives to go into engineering and the sciences, and even attract skilled labor from abroad."

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NETWORK PARADOXES

Companies are also responding positively to the creation of Embrapii. The partnership of Theraskin, which produces dermatological and skin care products Theraskin, with IPT in the pilot has speeded development of a new drug, leveraging the infrastructure of the IPT laboratories in São Paulo. "We have 650 employees, including 50 researchers, and we invest about 5% of our revenue in R&D.

Technology complex on the campus of the Federal University of Rio de Janeiro.

In Brazil, the government invests more in R&D than corporations. In contrast, in developed countries corporations invest more in R&D than the government.

	Corporations % of GDP	Corporations % of Total	Government % of GDP	Government % of Total	Total % of GDP
Germany	1.9	66	0.8	29	2.8
Argentina	0.1	21	0.4	73	0.6
Brazil	0.5	45	0.6	52	1.2
Chile	0.2	43	0.1	33	0.4
China	1.2	71	0.4	23	1.6
South Korea	2.7	71	1.0	26	3.7
United States	1.8	61	0.9	31	2.9
Japan	2.5	75	0.6	17	3.4
Mexico	0.2	43	0.2	46	0.4

Source: UNESCO (2010).

But research on new molecules involves high risk, and each month postponed is one more chance for the competition," says Aeissa Alves Sardagna, Theraskin director of medical and regulatory affairs. In its Embrapii project, "negotiations took only five months. In 20 months, we expect to have completed development, testing, and clinical study and be ready to request product registration."

The story of Theraskin and other companies would have an even happier ending if the macroeconomic, regulatory, and sectoral issues that make investing in innovation more expensive were resolved. For Theraskin, the principal obstacle is how long it takes to get a new medicine approved. As Sardagna explains, "We have recently seen a positive change in the National Health Surveillance Agency (ANVISA), which relieves some of the overlap with the National Institute of Intellectual Property (INPI), but we still do not know if it will take two to five years to get approval. We urgently need a regulatory change." She notes that Brazilian pharmaceutical manufacturers can sell their products in the Southern Cone countries before they can do so in Brazil.

Dante Alário Jr., CSO of Biolab Pharmaceuticals, says that "despite some progress, the industry needs clarity. For example, ANVISA rules do not address the innovation made in Brazil. For pricing drugs fully controlled by the government, the rules of the Chamber of Regulation of the Drug Market (CMED) do not allow for any item for RD&I made in Brazil." Biolab has 186 products in the works, all self-funded. One of the most advanced products is

a new antimycotic, whose final tests should be completed soon. To get the tests done fast, however, the company had to have enough of the product manufactured in China to test on 240 patients. Alário says that "It would have taken six months to import the raw materials in the quantities needed; by doing manufacturing in China, we had the drug ready in half the time."

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For InterB's Frischtak, these obstacles show the need for innovation without boundaries. "In Brazil, for historical reasons, we think about innovation in the same way as import substitution, setting high tariff barriers, innovation was viewed as having a native, endogenous outcome. But today innovation is carried out in several countries simultaneously," he says. "The implications of this are huge. Companies face a huge tax on imported technological services, for example. Another thing: Companies do not have the same benefits of a university, which thanks to the Romário Law can buy used research equipment .... We need to reduce taxes on the private innovation process."

The problem for an innovation policy is not the lack of progress, but the lack of perspective, and the lack of a more supportive business environment. IBRE's Canêdo explains that "Since the technology policy of the Lula administration, launched in 2004, the government has created several public policy instruments aimed at private companies. However, if we do not give the business environment the same attention, we will continue to be less productive than we could be and put the return on new investments at risk."