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Chapter:

3. Framework conditions for R&I

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Abstract
RIO R&I International Country Reports analyse and assess the research and innovation system, including the main challenges, framework conditions, regional R&I systems, and international co-operation.
3. Framework conditions for R&I

3.1 General policy environment for business

Brazil’s growth has persistently decelerated in recent years. The impulse from decade-old reforms, expanding labour income, and favourable external conditions, which enabled a consumption and credit-led growth, has lost vitality. A major expansion in the operations of the National Development Bank (BNDES), in the last few years has failed to boost investment, which has been slow since 2011 when the economy has lost competitiveness, the business environment has worsened and commodity prices have fallen from record highs. Moreover, structural sources of pressure on fiscal spending have necessitated a high tax burden. At the same time, unnecessary microeconomic interventions have contributed to reduced dynamism and increased financial stress in key sectors. Likewise, a high regulatory burden slowed implementation of the infrastructure investment programme, especially in its initial phases (IMF, 2015).

The research system has effectively developed during the past decade – this, in spite of its still unbalanced geographic productivity and low network-based research execution. By contrast, the innovation system, which began to be structured in deep from 2005 with the passing of the federal innovation law, still presents key structural bottlenecks such as a small number of networks involving industry, regional and local authorities; weak private sector research in terms of number of firms and expenditures and government incentives with limited scope and reach.

According to the Doing Business Index, in 2015 Brazil was ranked as 111 and in 2016, 116, with a change in rank of -5 positions. Additionally, progress in reforming the regulatory framework has been uneven. Bureaucratic obstacles include lengthy processes for launching a business and obtaining permits. The non-salary cost of employing a worker adds to the cost of doing business, and labour regulations remain intimidating.

Likewise, according to a recent OECD Economic Survey published in November 2015, starting a business requires 12 procedures in Brazil and takes 83 days, while Chile, Colombia and Mexico require fewer procedures that can be accomplished in less than 11 days. With this result, Brazil ranks at 167 out of 185 economies surveyed for starting a business.

However, recent government initiatives are aiming to reduce these administrative burdens significantly in regard to the timing of opening a company in the country by allowing the beginning of operations while awaiting the formal license in the case of low-risk activities, which include about 90% of all activities.

An important factor behind the low productivity levels of Brazil’s industry is the low qualification level of the labour force. Skill shortages affect particularly the industrial sector, with 65% of industrial companies finding hiring high-skilled workers an obstacle to their productivity and growth in Brazil. The share of students both at the secondary and tertiary levels enrolled in professional and technical degrees in Brazil is low in international comparison and wage premiums of up to 20% for secondary level graduates with technical training over those without reflect Brazil’s dearth of technical skills (CNI, 2013). Brazil is addressing this issue by creating additional vocational training opportunities under the umbrella of the Pronatec programme. Further expanding the participation in vocational training programmes would alleviate the skill shortages faced by industrial (and other) companies and allow stronger productivity gains.

Key policy recommendations for improving the business climate and boosting industrial performance according to the OECD Economic Surveys on Brazil (2015) are: Consolidate indirect taxes at the state and federal levels and work towards one value added tax with a broad base, refunds for input VAT paid and zero-rating for exports; Reduce the level of

1 Available at: http://www.doingbusiness.org/data/exploreeconomies/brazil/.
trade protection steadily by lowering tariffs and scaling back local content requirements; Strengthen competition by streamlining regulation on product markets and implementing planned reductions in entry regulations; Improve the technical capacity and planning for infrastructure concessions and elaborate more detailed tender packages prior to launching tender calls; Further expand the participation in vocational training to alleviate skill shortages for technical workers.

### 3.2 Young innovative companies and start-ups

The Brazilian Institute of Geography and Statistics (IBGE) conducted a research on innovation (PINTEC) in 1998, releasing the first results in 2000. The following versions are 2003 (triennium 2000-2003), 2005 (triennium 2002-2005) 2008 (triennium 2006-2008) and 2011 (triennium 2009-2011). Innovation rate revealed in the latest survey was 35.7%, three percentage points less than in the previous version of the survey. The latest results available are from 2011. The results of the research conducted in are expected to be released in March 2016.

The PINTEC 2011 shows that industrial companies spent 0.71% of its net sales in research and development in 2011, higher than the 0.62% recorded in 2008. The investment in innovative activities of enterprises from all sectors came €16 billion, 2.56% of the net sales of enterprises. The survey also shows that between 2009 and 2011, 35.7% of the 128,699 companies with ten or more employees innovate in products and/or processes.

Among the main programmes, Startup Brazil ², National Programme for Startups Acceleration, is an initiative of the federal government through the Ministry of Science, Technology and Innovation (MCTIC) in partnership with accelerators to support the emerging technology-based companies, the startups. The programme works by editions with duration of one year. In each edition are released two public calls, one to qualify and enable accelerator, and one for the selection of startups with half-yearly rounds. The programme has the goal of leveraging the acceleration of a greater number of startups each year (150 by the year 2014), who's innovative products and services will reach international markets. In 2013, €5 million was allocated to the programme, in addition to €3.8 million allocated for infrastructure, workshops, consultancies, grants, etc. In 2013, more than 1,600 startups responded to the Start-Up Brasil call.

As a representative body of the segment of companies and innovative institutions, the National Association for Research and Development of Innovative Companies (Anpei) works with the government, the productive sector and opinion leaders, highlighting the importance of technological innovation for the competitiveness of companies and the development of Brazil.

The organisation consists of companies that continuously invest in research, development and innovation, of all sizes and sectors, with multisectoral nature. Another important initiative of Anpei is the Thematic Committees which consists of monthly meetings for discussion and exchange of experience. Currently, three committees are active: ICT-Enterprise Interaction Promotion; of Intellectual Property Management; and High Performance in the R & D Centre Management.

The National Association of Entities Promoting Innovative Enterprises (Anprotec) brings together about 300 members, including business incubators, technology parks, educational and research institutions, public agencies and other entities related to entrepreneurship and innovation. Leader of the movement in Brazil, the Association operates through the promotion of training activities, coordination of public policies, generating and disseminating knowledge. With the growing number of incubators in Brazil, Anprotec endeavoured to consolidate a model to encourage improvements in the results presented by these innovative environments.

Furthermore, there are in Brazil, the "S system". The system is the group of organizations focused on corporate entities for professional training, social assistance, consultancy, research and technical assistance, which besides having his name started with the letter S, have common roots and similar organizational characteristics. Some of the organizations that are part of the S System: National Industrial Training Service (Senai); Social Service of Commerce (SESC); Social Service for Industry (Sesi); and National Service of Commercial Learning (Senac). The system also has a network of schools, laboratories and technology centres throughout the country.

The Brazilian Support Service for Micro and Small Enterprises (Sebrae) is also part of the S System. It is a private entity that promotes competitiveness and sustainable development of micro and small enterprises - those with annual gross revenues of up to €1 million. It operates throughout the country focusing on strengthening entrepreneurship and accelerating the process of formalization of the economy through partnerships with the public and private sectors, training programmes, access to credit and innovation, stimulating associations, fairs and business rounds.

Sebrae created the Local Innovation Agents Programme (ALI), which, together with the National Research Council (CNPq), aims to promote the continued practice of innovation activities in small businesses through proactive, free and personalized guidance. This guidance is performed by the ALI, which are CNPq fellows, selected and trained by the Sebrae, to accompany a group of companies defined by the specific Sebrae unit in the Brazilian States.

The ALI programme thus, has national coverage and is consolidated as a differential and competitive strategy for small business. When the programme started in 2008, it counted with the support of only 396 Innovation agents, and attended about five thousand companies. Six years later, the programme had more than 1,400 agents and over 55,000 companies supervised annually.

### 3.3 Knowledge transfer and open innovation

Innovation in the business sector in Brazil, outside of the state-supported industries that are S&T leaders, is primarily through the acquisition of foreign technology that is adapted for developing products for local and regional markets. As the South American economy, Brazil’s in particular, has grown in the past decade; strong customer demand has enabled Brazilian companies to grow regionally without necessarily becoming more innovative or globally competitive. Companies are unmotivated to push the boundaries of technology, despite having a skilled and efficient engineering workforce. This reticence results in part from Brazil’s tradition of state-supported industrial development.

A key weakness in Brazil’s innovation system is the gap in university-industry interaction and collaboration, caused in part by companies’ lack of involvement in R&D driven innovation and the dearth of doctoral-level researchers in industry. Academic researchers are disconnected from activities related to commercialization and innovation, and they typically collaborate with industry over short-term consulting projects and training, not long-term collaboration.

Additionally, according to the Innovation Survey 2011 (Pintec/IBGE), the 71,500 people employed in RD&I activities in companies, 55,800 (78%) are researchers. PINTEC indicated that of the total number of researchers only 16.4% had graduate degrees, which shows the need for greater presence of masters and doctors in business innovation environments.

Among the main programmes in Brazil, the National Industrial Training Service (Senai) foresees the implantation of 26 Institutes of Innovation (ISIs), in order to stimulate the
integrated development of products, processes, applied research, the solution of complex problems and the anticipation of technological trends. 15 were already operating in 2015 with 122 contracted projects. The ISI are directed to different areas of knowledge, among which: production, microelectronics, surface engineering and photonics, materials and components, communication and information technology, construction technology, energy and defence, microelectronics and micromachining.

The Academic Industrial PhD programme (DAIA) of the Federal University of ABC (UFABC) in Santo André, São Paulo is a pioneer in Brazil. The programme started in 2013 and is a result of an agreement made with the National Research Council (CNPq). There are four ongoing projects, distributed in the areas of nanoscience in advanced materials and energy. For the company to be a partner in the programme it must have within its structure at least one professional acting with research, development and innovation. Thus, the project is designed in partnership between the university and the company. The company must provide the infrastructure for the development of the project and indicate an industrial supervisor who acts as a co-supervisor. At the same time, the student also has an academic advisor and the entire university infrastructure available.

As regard technology parks, in order to update the information on the current status of these initiatives in Brazil, the Secretariat of Technological Development and Innovation of the Ministry of Science, Technology and Innovation in partnership with the Centre for Technological Development of the University of Brasilia, held in 2013 the Study of High Complexity Projects – Technology Parks Indicators.3

According to the study, in 28 parks respondents who consider themselves in operational stage, 32,200 jobs were accounted in companies and resident research institutes and management team, mostly higher level. The 939 companies installed generate approximately 30 thousand formal jobs. The study also highlights the large number of teachers and doctors involved, approximately 4000 (13%), with the indication that considerable portion of these professionals acts directly in companies, in contrast to the Brazilian business sector whose workforce has little participation of masters and doctors.

Another important finding was that for every €1.00 invested by the federal government for the implementation and consolidation of technology parks, other €4.00 were invested by State and municipal governments and the private sector. This result is highly significant, with clear demonstration that the federal government is acting properly in its role of inductor in the implementation of these innovation habitats.

The South (43%) and Southeast (41%) concentrate 84% of respondent parks. The other areas add up to a percentage share of only 16% in the number of parks spread across the Northeast (7%), North (5%) and Midwest (4%). The survey results also show that the parks have generated skilled jobs, with high professional training. Of the 29,909 jobs generated by companies at the parks, 1,098 are occupied by professionals who hold the title of doctor, 2950 by professionals with master degree, and 2364 by graduates of specialisation courses and 17,630 for graduates.

One notes that the parks project receives proportionately fewer resources in all sources of funding. However, the federal government has the largest share of investment (€4.5 million - 54%) in parks in the design stage, overcoming state and local governments (€2.8 million - 34%) and the initiative private (€950 thousand - 12%). Once made in operation the main source of funds comes from the private sector (about €525 million - 55%). The resources of the federal government (€275 million - 29%) and state and local governments (€153 million - 16%) are still relevant to the parks in operation, but the private sector plays a significant participation in its development.

3.4 Assessment

The creation of cooperative controlled environments for technology companies places the country in a promising situation, especially when we are about to celebrate thousand companies located in 30 Technology Parks in operation. Another big boost to technological developments reflected at the ENCTI 2016-2019 is regarding the 400 incubators held in the country. Of them were born thousands of technology companies, generating billions in revenue for the economy. Considered an advanced and very promising tool to complete the governmental support system innovation, Embrapii reduces the risk of innovative projects demanded by companies in the pre-competitive stage, to act quickly enough to enable progress to promote business competitiveness even in an international market.