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BRAZIL INSTITUTE SPECIAL REPORT

INTERNATIONAL STRATEGIES FOR INNOVATION: A STUDY OF SEVEN COUNTRIES AND BRAZIL

EXECUTIVE SUMMARY

For countries seeking to build a dynamic, highly-competitive economy capable of sustainable, long-term growth, innovation—or the capacity to transform knowledge into new products and methods of production and service—has become the engine for national strategies of development. Seven of the world’s most notably innovative countries—United States, Canada, Ireland, France, United Kingdom, Finland and Japan—have recognized knowledge as a key element for improving productivity and competitiveness, as well as advancing social and economic development. Understanding how these countries have succeeded in applying policies, adapting institutions, and using economic incentives and instruments to construct knowledge-based economies was the purpose of an in-depth, ten-month research project, *Mobilização Brasileira para a Inovação* (Mobit – Brazilian Innovation Mobilization). Intended to translate statistics into discernable trends, identify patterns in the national innovation strategies of these seven countries, and establish guidelines of action for the Brazilian government, the Mobit project was the focus of a recent seminar coordinated by the Brazil Institute and Prospectiva International in conjunction with the Brazilian Agency for Industrial Development (ABDI).

Hosted and co-sponsored by the Institute for Advanced Studies (IEA) of the University of São Paulo on April 25, 2008, the conference featured a keynote address by the General Coordinator of the Mobit study and the Observatory for Innovation and Competitiveness, Glauco Arbix. A group of leading Brazilian researchers, economists, and public officials joined the discussion to debate the findings of the Mobit Final Report and analyze its implications for Brazil’s national innovation system. Paulo Sotero, director of the Brazil Institute, and César Ades, director of the IEA, provided introductory remarks. Participants noted that while Brazil’s innovation performance is fast improving—leading in deep-water oil exploration technology and in the production and use of renewable fuels—it is far from entering the ranks of top international innovators. This report synthesizes the findings of the Mobit study and the proceedings from the seminar.

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Glauco Arbix,
General Coordinator of the Mobit Study

DEFINING INNOVATION

Through a series of 90 international and 30 domestic interviews and eight workshops with government officials, business leaders and academics, the Mobit research team¹ compiled a cross-section analysis of seven of the world's most advanced economies (United States, Canada, Ireland, France, United Kingdom, Finland and Japan). Seven preliminary reports were issued prior to the culmination of the Mobit Final Report. Publicly launched at the April 25, 2008 seminar, the Mobit Final Report presented a set of comparable standards and practices through which to gauge the development and future projection of the Brazilian innovation system. Although the purpose of the project was not "to compare these countries in order to dictate policies to be implemented in Brazil," as Glauco Arbix stressed, the profile of these innovative economies that emerged from their research presented a framework of concrete policy, institutional and strategic recommendations aimed at guiding Brazilian decision-makers to improve the country's national innovation system and advance the vision set forth in late 2003 with the implementation of the Industrial, Technological and International Trade Policy (PITCE)².

While each of the seven countries studied have significant historical, geographical, cultural and institutional differences, as well as disparate social and economic structures, there is an undeniable consensus in and among each nation that innovation

is at the heart of their strategies of growth and competitiveness. Arbix explained that "each country has transitioned to a new paradigm—a paradigm where knowledge is the central element of the production and reproduction of new social and economic relations." Innovation is no longer understood simply as research and development (R&D) and science and technology. That is not to say that science, technology, and research investment are relegated to some "secondary plane"; along with education, each of these factors are essential parts of a country's development plan. Innovation, however, is now viewed in a much broader sense. It is seen as the development of new products, technologies, services, processes, business models, logistical and organizational structures, and strategies. This broader meaning is particularly germane considering each country must be cautious of the "Swedish Paradox," or investing heavily in R&D without producing commensurate results in terms of increased economic dynamism.

Innovation is no longer treated as merely one additional component of economic development and business competitiveness. Rather, as Arbix noted, innovation is seen as the central point through which all government actions (including "traditional" policies such as those focused on infrastructure) and business efforts converge. The United Kingdom's drive to become the financial capital of the world serves as a telling example of this convergence. To become the world's biggest financial player, Arbix noted, the UK needed to

1. The Mobit research project is comprised of General Coordinator Dr. Glauco Arbix, USP Professor; Executive Coordinator, Demétrio Toledo, Master in Sociology, USP and CEBRAP; Technical Consultant, Dr. Mario Salerno, USP Polytechnic School Professor; Research Coordinator, Zil Miranda, PhD student, USP and CEBRAP; and Logistics Coordinator, Joana Ferraz, PUC-SP, Mackenzie. The group's researchers are Alexandre Abdal, M.S. student, USP and CEBRAP, and Maria Carolina Oliveira, M.S. student, USP and CEBRAP. The project's senior researchers are Dr. Paulo Todescan Lessa Mattos (FGV); Dr. Charles Kirschbaum (FEI); Dr. Osvaldo Lopez-Ruiz (FGV); and Laura Parente (PhD student, Lattes-França). To learn more about the study's methodology and structure, follow this [link](#) to access the full report in Portuguese.

2. PITCE is the backbone of the country's current innovation policy framework. It focuses on promoting R&D in the business sector, seeking to better integrate the government's foreign trade and industrial policies. In an effort to accelerate PITCE's goals, President Lula renamed the initiative Productive Development (PDP) and relaunched the program on May 2008.



Paulo Sotero and Cesar Ades

spur innovation in its financial sector. Federal and state governments, business leaders, research centers and universities all coalesced to develop new metrics to measure innovation in the services industry in order to design better public policies that diffuse best practices between all actors in the British financial sector. As Arbix further demonstrated, translating these efforts into concrete results (making the United Kingdom the center of finance) required more than investing in R&D and technology; innovation in this field required even greater creativity—“new and old knowledge had to be combined in an original way to produce processes that could be exploited in all sectors.”

INTERNATIONAL STRATEGIES

Arbix presented a set of features common to all seven national innovation systems. He opened the discussion by noting that in each country, the concept of how innovation is created has been rethought—underscoring the transformation taking place in the national innovation strategies of all countries and leading each to develop policies distinct from those carried out in the past. At the core of this transfor-

mation is an ever-present concern that their respective legislative, judicial and executive branches of government are ill-equipped to manage the changing social and economic dynamics of the international economy. Rather than breeding complacency, this sentiment prompts officials, politicians, business leaders and scholars to press for change—demanding the country do more to stay ahead of the competitiveness curve. The goal of ensuring their economies are capable of meeting the demands of the global marketplace in the 21st century has produced a policy consensus centered on innovation. This consensus, Arbix added,

is always forward-looking, never intended “to rescue failing enterprises today.”

Arbix argued that the most important point highlighted in the study is the recognition that business is the most crucial player in the innovation process. This means that all public policies are

“INNOVATION IS NO LONGER UNDERSTOOD SIMPLY AS R&D AND SCIENCE AND TECHNOLOGY; IT IS SEEN AS THE DEVELOPMENT OF NEW PRODUCTS, SERVICES, PROCESSES, BUSINESS MODELS, LOGISTICAL/ ORGANIZATIONAL STRUCTURES, AND STRATEGIES.”

International Strategies for Innovation:



Glauco Arbix presenting Mobit study before audience members at the Institute for Advanced Studies (IEA), USP

oriented towards advancing companies' ability to "produce and generate goods and processes with higher added value; increase technical skills and human capital; and to foster competitiveness and productivity by boosting entrepreneurship and improving management skills." While universities, not-for-profit organizations and government laboratories certainly contribute to the innovation process, Arbix stressed that the business sector is truly the one capable of turning knowledge and ideas into products, services, strategies and new business models. Successful businesses improve society's standard of living by driving economic growth, generating jobs and increasing wages. For precisely these reasons, all seven countries create incentives, direct funds and attention towards improving the formation of a capable workforce and promote research, development and innovation activities in private enterprises. In sum, whether by improving infrastructure or streamlining and maximizing the scope of legal and regulatory systems, all of these countries seek to create a "friendlier market for innovation."

The new ways in which knowledge is acquired and applied have pressured countries to make insti-

tutions more dynamic; governments are now forced to follow and comply with the shape of the global innovation system. Arbix explained that, for these seven countries, this means that they pursue "world-class research and innovation." In other words, innovation is sought out at the highest, most advanced levels; the status and progression of the countries' national innovation system is compared to the best possible international standards. In conjunction with these comparisons, Arbix noted, all of these countries engage in "designing a system that measures, monitors and evaluates [the national innovation system] in order to help companies, industrial sectors and national economies identify their own growth patterns and obstacles to their improvement." The importance of policy monitoring and performance appraising is increasingly recognized as an integral part of successful innovation policies. It is justified not only by the fact that the results of these evaluations help identify weaknesses in current policies and serve as guides for future initiatives, but because they also function to legitimize and justify investments in innovation, and more generally, the structure of the national innovation system.

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The Finish case serves as a particularly relevant example of how these evaluative practices are fundamental to the development of sound innovation-oriented policies. A country whose culture values careful reflection, Finland's "highly evolved" system of deliberation was initiated back in the 1980s. The purpose of this process of review, Arbix stated, was to "measure the policy impacts on the [country's] social and economic equilibrium." Government agencies financing research used this process as a management instrument precisely to justify innovation-related investments. According to reports produced by the [Technical Research Centre \(VTT\)](#), Finland's system of appraisal was a key factor in sustaining increasing levels of R&D investment over the past decades. During the recession of the early 1990s, the country was able to maintain these investments despite budgetary constraints because this monitoring process made public financing of R&D transparent and accountable. The results of these deliberations served to solidify a political and social consensus around the fact that stimulating innovation was one of the most crucial aspects of creating a national system of science and technology—ultimately leading to the formation of an economy dedicated to and sustained by advanced knowledge.

In all of the countries studied, there is vigorous debate concerning the role of universities. As Arbix highlighted, universities are actively encouraged to adapt to the changing dynamics of the global economy and the shifting forms and functions of the innovation process. To the academic community, this is not seen as a sign of their declining significance or irrelevance; instead, it is viewed as "an evolution of their part in this process." The principal focus among policymakers, researchers and business people is to promote increased cooperation with firms and enhance the "socio-economic relevance of academic research agendas." To support greater

university-business partnerships, competitive funding systems are being developed for both universities and companies. Additionally, academic institutions are seeking to attract more foreign students and researchers. As is the case with each country's national innovation system, Arbix explained, universities also base their standards of comparison and evaluation on global standards of best practices.

Another important similarity among the seven nations' innovation system was the integral function of the state. Through its institutions, policy instruments and planners, the state was a key player in the "elaboration, implementation and sustainability of innovation policies." Arbix enumerated how the state performs these functions. Most significantly, the state helps enable, articulate and structure cooperation with the private sector. Even in countries such as the United States and the United Kingdom where there is a strong orientation towards free market principles and decentralized federal structures (generally considered less conducive to state involvement), governments are actively involved in

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“BRAZIL IS STILL IN THE INITIAL STAGES OF “ACKNOWLEDGING INNOVATION AS A KEY ISSUE TOWARDS DIVERSIFYING ITS PRODUCTIVE STRUCTURE; BOTH PUBLIC AND PRIVATE SECTORS HAVE DIFFICULTIES IN ESTABLISHING PRIORITIES FOR INVESTMENTS.”

the development of “pro-active policies to stimulate innovation and assist the restructuring of enterprises” to align with the shifting patterns of globalization. In these countries, Arbix asserted, the public sector is responsible for amplifying and strengthening public and private sector relations; boosting inter-firm cooperation; intensifying dialogue about the dynamics of regional and local development (clusters, APLs); promoting small- and medium-sized businesses, especially technology-based companies³; and planning, rationalizing, and coordinating coherent innovation policies.

The diversity and breadth of state functions in all these countries exemplifies how many of these

approaches to innovation reinforce one another. The maturity of each country’s political system facilitated the establishment of a policy consensus concerning the future projection of the country, which allowed for greater policy stability and continuity, and this, in turn, enabled policymakers and business leaders to create enduring, predictable, and long-term strategies that solidified each country’s position as a competitive world leader.

EVALUATING BRAZIL

Although Brazil has also experienced institutional, legal and political change that has led to its current focus on innovation, there are significant obstacles that impede the country from reaching a level on par with the systems present in the United States, Canada, Ireland, France, United Kingdom, Finland and Japan. The results of the Mobit study served as references for the series of proposals developed by the group to mobilize Brazilian innovation. The proposals, synthesized from the best practices adopted in the seven countries, are recommended on the basis that they are consistent with the “objectives, priorities, possibilities and constraints of the Brazilian context.”

In comparison to the innovation systems of these seven countries studied, there exist some notable differences in the case of Brazil. Arbix outlined a set of structural and political differences, as well as divergences in approaches to research, development and innovation. There have been considerable efforts on the part of the Brazilian government to

3. As reported by the Industrial Survey of Technological Innovation 2005 (PINTEC), of all the R&D investment carried out by the private sector, small- and medium-sized businesses accounted for 33 percent, and the remaining 67 percent was performed by large corporations.

4. According to an OECD report produced by Carlos Henrique de Brito Cruz, “The sectoral funds have become the most important instrument for delivering direct government support for innovation. There are currently 16 such funds in operation, including the Telecommunications Fund (FUNTTEL), which is administered by the Ministry of Telecommunications. Most sectoral funds are primarily financed by levies on enterprise turnover in the network industries that were privatized in the 1990s, including energy and telecommunications. The introduction of these sector-specific levies was justified as a means of preserving innovation intensity after privatization, given that the former State-owned enterprises that had hitherto dominated the network industries were active R&D investors.” For full citation, see footnote 10.

institute a greater focus on innovation, particularly with the development of sectoral funds⁴, the *Lei de Inovação*⁵, and the *Lei do Bem*⁶, the creation of CNDI⁷ and ABDI⁸. Despite institutional deficiencies and imperfections of existing laws and policies, Brazil's matured and modernized legal and institutional tools have made it possible for the country to design and execute innovation-oriented development strategies. However, serious governance challenges remain. According to Arbix, “the weakness of state power, the inefficiencies of public institutions, and a complex bureaucracy that obstructs concrete actions are problematic issues that make the task of coordinating initiatives for building an innovation-based economy more difficult.”

While Brazil has recognized the importance of a knowledge-based economy in theory, industrial policy is still confused with a policy to reduce the so-called Brazil cost⁹. Arbix maintained that Brazil is still in the initial stages of “acknowledging innovation as a key issue towards diversifying its productive structure; both public and private sectors have difficulties in establishing priorities for investments and resource allocation.” Exports are seen as the way to improve business competitiveness, yet Arbix concluded that the “number of competitive and exporting companies remains small” and the goal

of internationalization, still nascent. Also, as highlighted in a recent OECD report, Brazilian companies generally engage in process, rather than product innovations. This means that the primary areas of innovation relate to the acquisition of machinery and equipment, which are derived from technologies developed abroad, not in Brazil. Brazilian entrepreneurs view innovation as high-tech development—a strategy restricted to large corporations. Nonetheless, the framework and vision set forth in the PITCE, although in some ways still undefined and contentious, has been embraced by both government and business. Implementation of its policies, however, remains slow. Brazil's development challenge is to set the country on track, focusing on the power of innovation, seeking to compete in the most globalized markets and in the field of the highest value-added products, services and processes.

On the political dimension, Arbix highlighted various challenges confronting the Brazilian government. The fragmented nature of its national innovation system makes it difficult for the government to coordinate actions among the various, disparate agencies and organizations tasked with implementing the country's innovation policies. Take for example the state of São Paulo. The state is not only responsible for

5. *Lei da Inovação*—Implemented in late 2004, its key components include: incentives for building and strengthening partnerships between universities, research centers and firms; incentives to increase university and research center participation in the innovation process; and incentives to promote innovation within companies.

6. *Lei do Bem*:—Law number 11,196 enacted November 21, 2005. This law created a series of fiscal incentives to promote corporate innovation-oriented physical and human capital investment in Brazil.

7. *Conselho Nacional de Desenvolvimento Industrial* (CNDI—The National Council of Industrial Development): Formed by government officials and private sector representatives, the Council's mission is to submit proposals to the President for national policies specifically targeted to promote industrial development in Brazil.

8. Brazilian Agency for Industrial Development (ABDI): An agency created to promote the enactment of industrial development policies in harmony with foreign trade and science and technology policy.

9. The term “Brazil cost” refers to the economic inefficiencies that exist in Brazil's legislation and regulatory framework that affect the country's global competitiveness. These include a tax system that penalizes the export sector; labor legislation and conditions dictated by the government rather than negotiated between laborers and employers; poor infrastructure; high cost of capital; and inadequate educational and health services (limiting the development of human capital). For more information follow this [link](#) to the Brazil Cost Project, sponsored by the Brazilian National Confederation of Industry and the Center for International Private Enterprise.

more than 50 percent of the scientific production and resident patent filings in the country, but it is second only to Brazil in terms of R&D investments in Latin America—ahead of Mexico and Argentina¹⁰. The relative autonomy of states in Brazil's decentralized federation—which allows state governments to play an important role in financing R&D and designing science and technology policies—can also complicate federal innovation policy coordination efforts.

Concerning Brazil's approach to research, development and innovation, Arbix made three distinct observations. First, Brazil does not always benchmark its performance with the highest available international standards. Second, while there is a drive to boost university-business cooperation, these efforts are met with resistance and, in general, hampered by inadequate institutions. Third, funding mechanisms for research in Brazil are growing at an impressive pace, with competitive financing for firms and universities becoming the norm, yet insufficient resources and attention are dedicated to attracting foreign researchers and students. Measuring the progression of Brazil's innovation system against the new innovative strategies adopted by the United States, Canada, Ireland, France, United Kingdom, Finland and Japan, it is evident that Brazil must embrace a more offensive approach towards innovation—making it the organizing principle around which all public and private sector efforts converge.

STRATEGIC RECOMMENDATIONS

Arbix concluded by presenting the Mobit final recommendations. To mobilize innovation in Brazil, he proposed to establish a series of forums “to improve dialogue and permanent debate with business leaders in order to develop a National Innovation Initiative.” Creating both a network of international Brazilian researchers responsible for

“THE CHALLENGE OF INNOVATION IN BRAZIL IS NOT DUE TO A LACK OF RESOURCES OR ENTREPRENEURIAL CAPACITY, BUT RATHER IN MAKING ALL DISPARATE GOVERNMENT, UNIVERSITY AND BUSINESS EFFORTS CONVERGE TO PRODUCE REAL PRODUCTS AND SERVICES.”

gathering data, analyzing trends, and performing forecasting studies, and a campaign to publicize current laws and available institutional tools that support innovation would further expand and entrench the country's efforts.

The expansive goal of creating a more coherent Industrial, Technological and International Trade Policy, implemented in its entirety, requires greater articulation between ministries, agencies and the private sector in order to strengthen the command of PITCE and the efficiency of Brazil's industrial policies. The challenge of innovation in Brazil is not due to a lack of resources or entrepreneurial capacity, but rather in making all of the disparate government, university and business efforts combine to produce tangible products, services and processes. Research conducted by IPEA supports this; Arbix

10. Carlos H. de Brito Cruz and Luiz de Mello, “Boosting Innovation Performance in Brazil,” Economics Department Working Paper No. 532, OECD (2006), 6 and 20.

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noted, when resources and capital reach firms, they are “successfully put to use.”

One of the most critical areas in which Brazil can improve its innovation strategy is in the articulation of its policies and institutional arrangements responsible for their coordination. Inspired by the French experience with *Pôles de Compétitivité* (Competitiveness Hubs) and by the Finnish formation of the Strategic Centres for Science, Technology and Innovation, Arbix called for the creation of hubs, networks and arrangements for innovation that connect groups of firms. The aim of this proposal is to “develop productive arrangements or services of excellence¹¹.” The design of these arrangements should be flexible, extending to local, regional, sector-based or project-based schemes; government institutions would be responsible for supporting the articulation and provision of competitive financing, with the creation of supporting juridical entities; and local authorities (city councils, secretaries, regional entities) should be actively involved in the process. Moreover, the country should chose ten thematic areas (i.e. development of composites for the aeronautics industry, biotechnology for ethanol, nanotechnology for the petro-chemical sector) on which to focus and concentrate resources. By formulating these “meso projects¹²” with strong state coordination that utilize institutional knowledge of activities, needs and operational capacities of the players in these chosen areas, Brazil can more effectively stimulate innovation within companies.

Of the instruments available to the Brazilian government, Arbix cited four that may be most effective

“UNIVERSITIES ARE BEING PUSHED BY VARIOUS SECTORS TO INCREASE COOPERATION WITH BUSINESS AND ‘ENHANCE THE SOCIO-ECONOMIC RELEVANCE OF THEIR RESEARCH AGENDAS TO ADAPT TO THE SHIFTING FORMS AND FUNCTIONS OF THE INNOVATION PROCESS.’”

in spurring innovation. First, building and promoting a National Fund, whose purpose would be to sponsor innovation and establish a system of support for private enterprises, especially in the “pre-project” phase. Second, utilizing this system of pre-project support to help nascent firms perform self-assessments and identify weaknesses and opportunities. Third, using the National Fund to stimulate investment in new products and enterprises through the creation of venture capital funds. Fourth, designing a plan to apply the government’s purchasing power to generate innovation.

The final recommendation Arbix presented regarded the management and evaluation of the national innovation system. He stressed the need to

11. These “productive arrangements and services of excellence” would be similar to the Progex program of the Ministry of Science and Technology. Progex supports companies by ensuring their products meet the technological standards of external markets. The process that Progex follows for specific products is divided into two steps: the first, involves a Progex visit to the production site in order to evaluate the product needs vis-à-vis the external market and the company’s ability to meet international standards; the second, involves product testing and the implementation of solutions for the diagnosed problems.

12. Meso projects refer to intermediate projects (regional, local or sectoral-based) targeted towards medium- and/or high-technology intensive companies and research centers (public or private). Meso projects differ from national governmental initiatives: whereas government policies have broad, far-reaching implications for nearly all sectors of a country’s economy, meso projects are smaller in scope and generally target specific industries.



From left to right, Ricardo Sennes, David Kupfer, Mario Salerno and Glauco Arbix

“build a permanent system for monitoring and evaluating competitiveness and innovation policies based on international standards of excellence.” In order to improve innovation management this appraisal process must be defined and employed according to the PITCE guidelines. Also, to properly debate the formulation of the national innovation system, he concluded that a federal meeting must be convened to bring together the principal observatories, agencies and research centers that focus on innovation.

REFLECTIONS ON THE STUDY

The group of researchers, economists, and public officials who participated in the discussion, debated the findings of the study presented by Arbix and analyzed its implications for Brazil’s national innovation system. The participants included Evando Mirra, director of ABDI; Carlos Henrique de Brito Cruz, scientific director of the São Paulo State Research Foundation (FAPESP); David Kupfer, professor at the IEA and Coordinator of the Industry and Competitiveness Group at the Federal University of Rio de Janeiro; and Mario Salerno, Professor at USP’s Polytechnic School and Executive Coordinator of the Competition and Competitiveness Observatory.

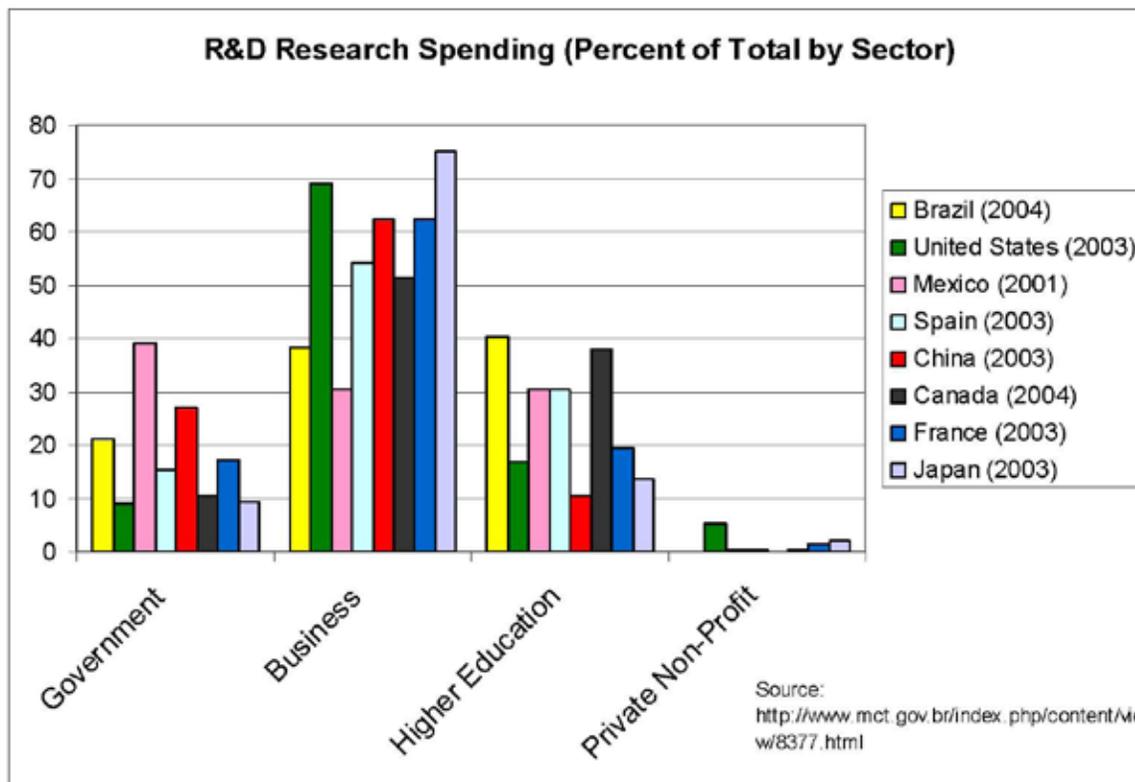
Mirra articulated the strategic vision of Brazil’s innovation policy as seen through one of the govern-

ment’s key agencies responsible for industrial policies, ABDI. He noted that the ultimate goal is for Brazilian goods and services to gain access to and increase market share in global markets. The present global scenario is such that Brazil is at once being pressured “from above” by highly competitive and innovative producers and also “from below” by various producers competing with lower costs (primarily of inputs, such as labor). He observed that in comparison

with other emerging economies, Brazil has a strong scientific base that operates “along every phase of the innovation process,” not just in few select industries. Moreover, the Brazilian economy has a base of sound and promising fundamentals: with a significant trade surplus and a large stock of international reserves; relatively low (although rising), stable and predictable levels of inflation; expanding capital and credit markets; lower unemployment, higher formal-sector jobs and real wage increases that have reduced inequality; and a buoyant private sector with sufficient resources to invest, the “Brazilian economy is in a position to create new cycles of long-term economic growth.”

Brito Cruz commended the remarkable study produced by the Mobit team and provided a series of discussion points. He observed that the study could have done more to explain the obstacles and points of resistance that each of the seven countries were

“PER YEAR, BRAZIL GRADUATES MORE THAN FOUR TIMES THE NUMBER OF PhDs IN THE AREA OF COMPUTER SCIENCE THAN DOES INDIA.”



forced to overcome. Commenting on the changing role of universities in the innovation process, he noted that much opposition still exists—many regard public-private partnerships as incompatible. While there is a growing international consensus concerning the symbiotic relationship between the provision of public goods and profit-driven business interests, this attitude seems notably absent in Brazil. Brito Cruz argued that the lack of innovation in Brazil's private sector is not so much a product of insufficient information, rather, it is more likely linked to the dearth of scientists working in private enterprises.

On the issue of government coordination, he disagreed with the assessment that political and institutional fragmentation—something that every country experiences—lowers Brazil's innovative capacity and argued instead that the absence of coherent and legitimate coordination among the diverse actors is

responsible. Furthermore, although the distinction between investment and innovation brought up in the study is valid, more emphasis should be directed to the fact that Brazil needs to increase its overall level of investment. At around 1 percent of GDP since 2002, total public and private spending on innovation has remained stubbornly low, especially in comparison to the OECD average of about 2.2 percent. To be considered an important actor in this arena, Brito Cruz stressed, Brazil must have a more pronounced investment base (closer to the OECD average). Moreover, new mechanisms need to be created in order to boost investment—lowering the costs and economic risks associated with R&D investment, as well as expanding the availability of external financing, both of which are critical ways to improve this deficit. Brito Cruz also questioned why Brazil is not a visible player in the international field of innovation. The question he

posed was, “When companies are choosing locations to establish centers of research,” why is Brazil not on their short-list of countries? Arguing that Brazil deserves greater international attention, Brito Cruz cited a little-known statistic: “Per year, Brazil graduates more than four times the number of PhDs in the area of computer science than does India, yet internationally, India is the only emerging market recognized for its excellence in computer science.”

One of the principal researchers who participated in the deliberation of the PITCE in 2003, Salerno offered a response to Brito Cruz: Brazil has no iconic company. “We do not have a company that has mastered a key technology,” he elaborated. Moreover, Brazil does not successfully publicize its efforts and accomplishments. The country has no campaign comparable to that of the Indian government, which goes to great lengths to champion the strength of its software industry. For instance, at the March 2008 Washington International Renewable Energy Conference (hosted by the United States Government), the Brazilian government had no recognizable presence, despite the fact that the nation is considered a world leader in renewable fuels.

Kupfer expanded on a point raised by Arbix, stating that the concept of innovation certainly goes beyond science and technology; he defined it as knowledge applied to productive activities—in a sense, innovation resembles the concept of creativity, applied in a way that generates value to society. He added that the countries assessed in the Mobit study understand this concept, envisioning innovation as a way to boost each country’s productivity, increase its market share, open up new markets, and generate more revenue and jobs. Kupfer explained that innovation in Brazil, in many ways, is comprised of disparate strands of innovation, creating a network of unconnected, tangled knots.

The challenge, therefore, is to manage these different points of innovation—which exist in various sectors of the country’s economy. Nevertheless, as



Carlos Henrique de Brito Cruz

result of persistent development challenges in Brazil, the issue of innovation must still contend for space on the national agenda with other, “more pressing matters concerning our underdevelopment.” In order to contextualize the present status of innovation in the Brazilian economy he referenced statistics developed by the *Pesquisa de Inovação Tecnológica* (PINTEC—Technological Innovation Research) of IBGE, showing that 65 percent of companies did not employ innovation. Of the remaining companies, 31 percent constitute what is known as “imitator firms,” meaning the innovation they performed was a process or service only new to the company, not the market. This signifies that of the more than 70 thousand firms surveyed in PINTEC, only 4 percent, or about 2,800 firms, have capitalized on R&D investments by creating new products or services. Because Brazilian innovators suffer from such isolation and disconnect within the domestic sphere, there is no critical mass to spur true innovation and, perhaps more importantly, no consumer market for innovative products in Brazil. According to Kupfer, this critical mass will only take shape at a future development stage, after Brazil has overcome its underdevelopment problems and has restructured its market to support innovative design and reach the levels of competence and capacity necessary to compete in the global market.

BRAZIL INSTITUTE

Created in June 2006 as part of the Wilson Center's Latin American Program, the BRAZIL INSTITUTE strives to foster informed dialogue on key issues important to Brazilians and to the Brazilian-U.S. relationship. We work to promote detailed analysis of Brazil's public policy and advance Washington's understanding of contemporary Brazilian developments, mindful of the long history that binds the two most populous democracies in the Americas.

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