



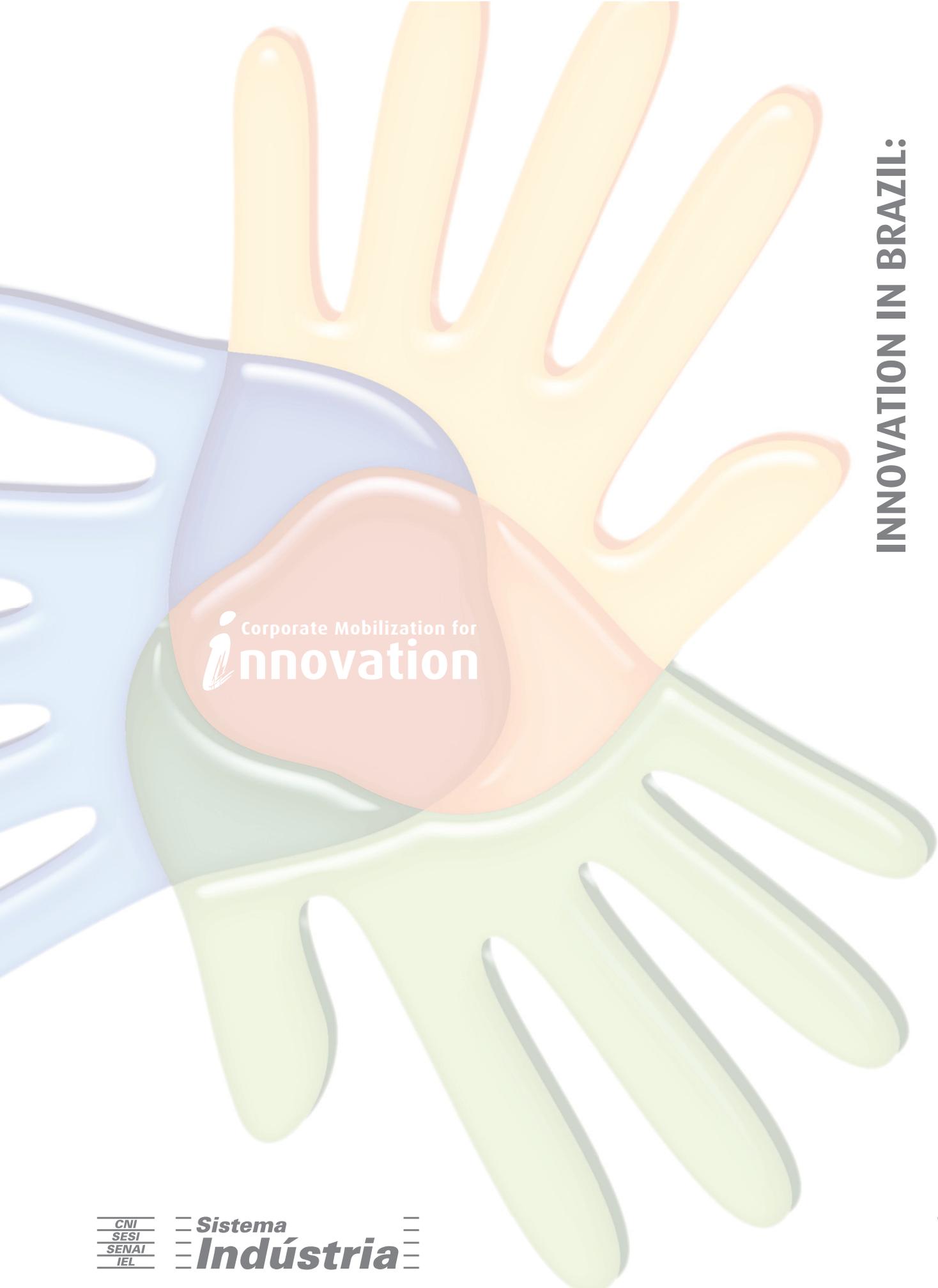
Corporate Mobilization for
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INNOVATION IN BRAZIL:

AN AGENDA TO PROMOTE INNOVATION

BRASÍLIA, 2011



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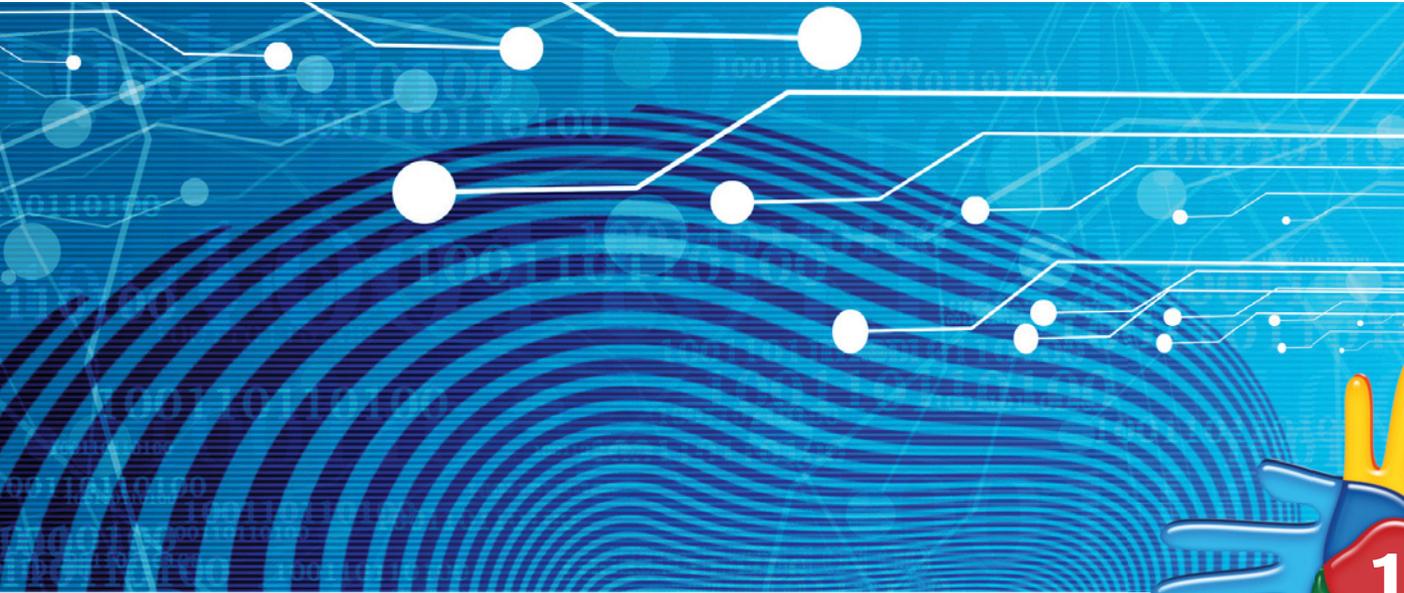
Innovation in Brazil: **An agenda to promote innovation**

The ten-item agenda presented below derives from the actual experience of a significant group of enterprises and from the comparative analysis of innovation policies in other countries. It is not a comprehensive agenda, but we consider it an objective, practical and feasible contribution to create a more favorable environment to innovation in Brazil.

Many of these items have already been presented, at least partially, in business forums as well as for the government, within the scope of Business Mobilization for Innovation – MEI. Nevertheless, this document aims at consolidating an agenda that, we believe, greatly helps to promote Brazilian technological development.

The ten items for this agenda are:

- Infrastructure and Intellectual Property culture;
- Training of skilled human resources;
- Improvement of the legal framework for innovation;
- Foreign Research and Development (R&D) Centers attractiveness;
- Innovation and internationalization of Brazilian enterprises;
- Innovation policy and foreign trade policy;
- Innovation in SMEs;
- R&D structuring projects;
- Sectoral innovation programs;
- Pre-competitive R&D projects.



Improvement of infrastructure and Intellectual Property culture

Brazil adopted, until recently, an intellectual property (IP) regime of control over technology transfer, and differentiated *vis-à-vis* from the regimes adopted by developed countries. This positioning was coherent with the country's stage of development along with its strategy of imports substitution, and not much different from the positioning adopted at early development stages of today's industrialized countries.

This regime needs to be evaluated according to current interests and the country's future development strategy. The current state of affairs in Brazil has significantly changed in recent years. We are now one of the major world economies, and this position will consolidate in the following decades; we stand out amongst emerging countries as one of the best business environments; we are open to foreign investment and welcome intensive knowledge investments, and, it is worth remembering that Brazilian enterprises are going through an internationalization process and will need to protect and license technologies globally.

The IP regulatory framework required today must ensure broad legal certainty towards Foreign Direct Investment (FDI) and to R&D efforts of national enterprises, in Brazil and worldwide; provide legal certainty to IP negotiations between knowledge producers (enterprises, universities and so forth); be compatible with the country's ambitions in being a producer and owner of technology and knowledge and with the negotiable characteristics of knowledge as well as with the advance of innovation models. A pragmatic system, that examines, on a case-by-case basis, the expansion of IP rights being discussed internationally.

However, we also need to give much more emphasis to IP, because, even though the number of patents filed in the Brazilian National Institute of Industrial Property – INPI and in the United States Patent and Trademark Office – USPTO or via the Patent Cooperation Treaty – PCT is increasing above the world average, it is noteworthy that Brazil’s international ranking (24th) is far below the strength of the Brazilian economy in the world (8th). For these reasons, we propose:

I. PRAGMATIC INTELLECTUAL PROPERTY POLICY

- To establish a pragmatic IP policy that ensures broad legal certainty to R&D efforts of national enterprises, in Brazil and worldwide, to FDI and the negotiations amongst knowledge producers.
- To create a permanent IP forum, for national and international issues, with significant business representation.
- To position INPI as the only authority in the enforcement of intellectual property standards in the country, eliminating the additional insertion of foreign bodies in the process of patent examinations.
- To deepen Brazil’s international integration, in order to expand the country’s benefits, for example, through the accession to the Madrid Protocol on trademarks and the Hague Agreement on industrial design.

II. LEGAL AND ECONOMIC CERTAINTY ON IP

- To streamline the grant or declare the admissibility of IP so that companies enjoy incentives and/or licensing associated to these patent rights (drugs, tax incentives for innovation and so on).
- To propose interim measure or law project that updates the income tax legislation in what refers to the tax deductibility of the IP licensing payments and the supply or licensing of technology, know-how or technical assistance.
- To propose interim measure or law project that updates the income tax legislation in what refers to the tax deductibility of the IP licensing payments and the supply or licensing of technology, know-how or technical assistance.
- To recognize the right of the interested parties to freely negotiate the terms and conditions of employment of IP rights, provided to the INPI the option of expressing an opinion on the content of this negotiation only when requested by a party and in matters of a competitive nature.



III. TO ENCOURAGE KNOWLEDGE AND ECONOMIC USE OF BIODIVERSITY

- To repeal the article 2 of the Interim Measure (MP) 2.186/01, with the end of prior authorization to access to genetic resources, avoiding the bureaucratic obstacles and delays on research deadlines.
- To repeal the article 26 of the Interim Measure (MP) 2.186/01, which establishes penalties for accessing genetic patrimony and traditional knowledge without prior authorization.
- Creation of transparent and agile mechanisms for sharing benefits for the exploitation of genetic patrimony and associated traditional knowledge.
- Development of a new regulation regime of access to genetic resources and their derivatives, with a full review of this legal framework, satisfying the goals of encouraging innovation and removing barriers to scientific and technological development posed by current legislation.

IV. TO IMPROVE THE IP LEGAL FRAMEWORK FOR BIOTECHNOLOGY

- To update the Industrial Property Law, allowing broad patent protection for biotechnological products, through the approval of the law project 4.961/05, now in Congress, which enables the patenting of substances or materials derived from living things and that meet the patentability requirements prescribed by law, or, preferably, by editing an interim measure to abolish the Industrial Property Law – law N° 9279/96, section IX of art. 10 and Part III of art. 18.

V. PROTECTION TO CULTIVARS

- To revise Law N° 9.456/97, in order to expand the scope of protection of cultivars, for any plants gender and species that is, cumulatively, distinct, uniform and stable and also expand the reach of the breeder´s right, restraining the unauthorized sale of protected cultivar and, more precisely regulating the exceptions to that right.



VI. OPERATIONAL IMPROVEMENT OF INPI

- To optimize processes and automate INPI in order to achieve full operation in 2012 and establish goals in order to match the best international standards.
- Immediate hiring and effective training of 330 examiners to reduce the backlog of patents in four years.
- Prioritization of the examination of patents in certain technological areas, according to the committee formed by industry, INPI and Scientific and Technological Institutions (ICTs).
- Establishment of technical cooperation agreements – Patent Prosecution Highway (PPH) – with the most important international and South American offices in order to hasten patent grants, without INPI's loss of autonomy.

VII. PATENT INFORMATION SERVICES AND NEW AGENDAS

- To provide training for IP Human Resources in order to create an appropriate environment to innovation and protect Brazilian patrimony and knowledge.
- To establish partnership INPI-Senai-Sebrae to provide services in the field of IP.
- Include the modernization of copyright in the agenda as a stimulus to digital economy.





Emphasis on skilled human resources

training in engineering, “hard-sciences” and technical education

Skilled human resources training is essential in order to strengthen industry’s competitiveness and encourage innovation. We know, this is a broad, long-term and relatively well known agenda. Although, beyond the general issues related to improving quality and expanding training, this document also indicates short-term actions that could mitigate the immediate shortage of skilled human resources.

As emphasized in several diagnoses, although Brazil has significantly improved secondary education, with a considerable increase on the percentage of youth who attend primary school, schooling level remains very low and the percentage of young people who are not in school is still very high: approximately four million children, between 4 and 17 years old are not in school; and 68%, between 18 and 24 years old, do not attend school.

The most serious aspect is that the quality of the education system is very low: only two thirds of young people who are at school complete the 8th grade of primary education, and only 40% graduate from high school; among young people who do graduate, little more than ¼ learned what they should in Portuguese and only 10% of what they should learn in math. In the Program for International Student Assessment – PISA, despite recent improvement, Brazil ranks 53rd among 65 countries, below many Latin American countries.

Secondary education in Brazil ignores the needs of the labor market and the productive involvement of youth and adults. Only 13% of students who attend high school, do so through technical courses (including subsequent), this percentage reaches 40% to 60% in other countries. Higher Education is a result of what happens on secondary education: there are openings, not enough students and inactivity can be observed. The recent expansion also occurred with low quality and with an education profile that is distant from what the market needs. In Brazil, science and engineering accounted for only 10% of enrollments in higher education. The number of graduates in engineering, when compared to the population, is the lowest among all countries of the Organization for Economic Cooperation and Development – OECD.

Direct public investment in basic education rose from 3.2% of GDP in 2005 to 4.2% in 2009, still below the average investment of OECD countries. This distortion related to investing less on basic education has been corrected, but the expenditure per student in higher education is still five times the expenditure on basic education. This reverse situation expresses the insufficiency of higher education and the need for prioritizing basic education. The investment per student in the three stages of basic education is still well below the average investment of OECD countries and needs to be increased. Transform this greater investment into quality is another challenge posed to the educational policy.

The development of skilled human resources, the stimulus to mobility and adequacy of training to new market and knowledge realities have been milestones in innovation policies of more developed countries. The Brazilian reality shows an immense challenge: our most important task is still to expand schooling and build the basis of a high quality education system. However, this challenge comes with the need for providing answers to the general lack of skilled workforce and presenting emergency solutions to the adequacy of youth to the labor market. Therefore, we propose:

I. EMPHASIS ON BASIC EDUCATION

- To increase financial resources for basic education, in order to reach 5% of GDP in 2022.
- To intensify the use of quality assessment and monitor learning.
- To increase the time a student remains at school to a minimum of 6 hours / day and enable the adoption of the nine years of basic education.
- To provide training and value teachers and managers and establish salary policies based on performance, reduce turnover and absenteeism.
- To promote the diversification of secondary education and prepare for labor market.
- To have a national policy for education considering the participation of society, planning and continuity of actions.



II. A NATIONAL QUALIFICATION POLICY

- To formulate plans that are able to align education and training programs to the real needs of the labor market, especially for technical education on secondary education and technological fields in higher education.
- To invest in good information systems in order to assess the impact of learning on the performance of the labor market.
- To provide appropriate information to youth about vocations and employment opportunities, through occupational information systems, professional counseling and mediation of workforce.

III. EMPHASIS ON TECHNICAL AND PROFESSIONAL EDUCATION

- To support the creation of the National Program of Access to Technical Education and Employment – PRONATEC and encourage partnerships between public, private and “S” system (organizations created by the productive sectors (industry, commerce, agriculture, transport and cooperatives) in order to qualify and promote the welfare of their workers.) – aiming at increasing the number of technical courses.
- To increase funding for professional courses based on performance criteria and the demands of the production sector.
- To encourage educational programs and training associated to learning in the workplace, in order to assess the real training needs of the workforce and balance this demand with the students’ preferences.
- To encourage initial professional training and continuing education, especially requalification of unemployed people and courses devoted to youth and adult education – EJA.
- To foster the expansion of National Service of Industrial Learning (SENAI) technical and professional education, through credit lines, with costs that are appropriate to Pronatec.

IV. HIGHER EDUCATION AGENDA

- To formulate a national plan for higher education, establishing quantitative and qualitative goals for the main areas, specialties and types of education, especially for technical education.
- To allocate public resources for higher education based on merit and efficiency, reducing inactivity and increasing the productivity of the system. Stimulate differentiation and flexibility of teaching models, with emphasis on the expansion of short duration courses and e-learning.
- To strengthen actions aimed at improving the quality of higher education.
- To encourage university-enterprise cooperation, disseminating entrepreneurial culture and creativity.



V. AN EMERGENCY ACTION FOR ENGINEERING

- To formulate a federal plan, coordinating the actions of the Ministry of Education (MEC), Ministry of Science and technology (MCT), Ministry of Work and Labor (MTE) and Ministry of Development, Industry and Commerce (MDIC), to stimulate an emergency expansion of engineering education aiming at doubling the training of professionals, through a public call for proposals seeking:
 - to expand the number of places in long and short duration courses;
 - to reduce inactivity and improve productivity in higher education;
 - to improve the quality of engineering courses;
 - to encourage partnerships with international institutions;
 - to stimulate partnerships with companies that require engineers and with the “S” system.

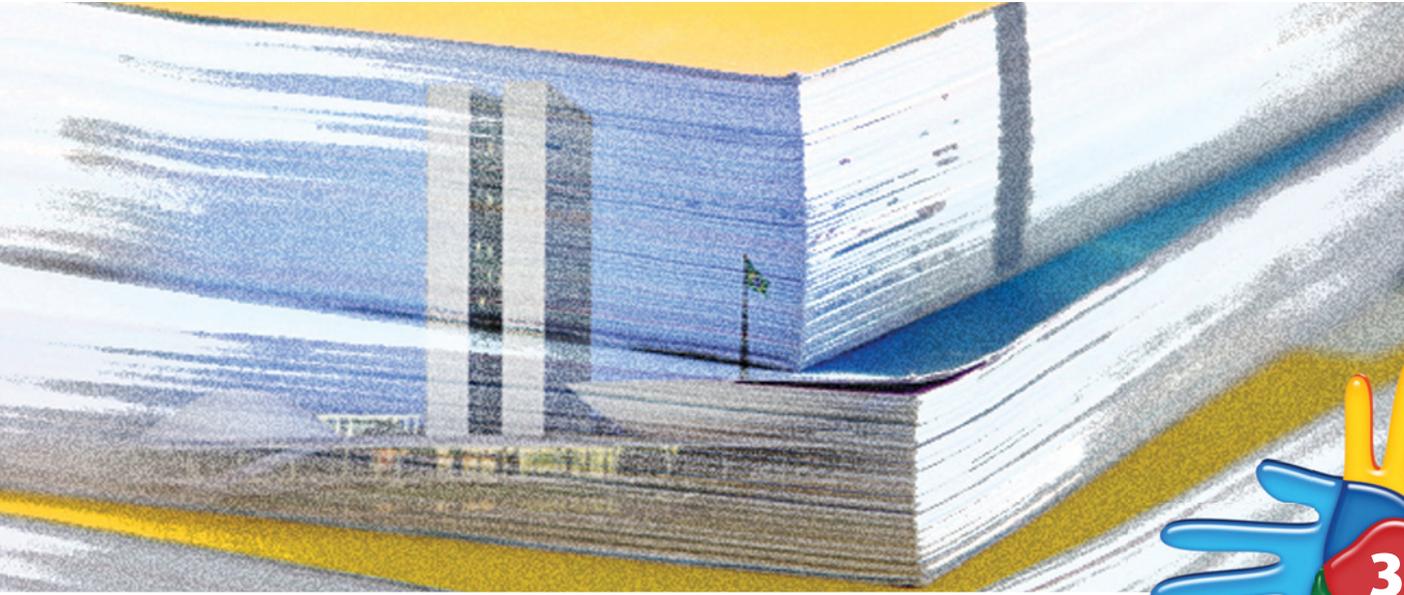
VI. INCREASED MOBILITY FOR SKILLED LABOR

- To flexible legislation concerning work permits for foreigners (Law N° 6.815/80) in order to facilitate the immigration of skilled workforce.
- To stimulate study abroad programs in partnership with enterprises interested in qualifying their professionals' skills or in the process of internationalization.
- To prioritize youth's post-graduate courses abroad on topics that facilitate reverse transfer of technology accessed abroad.
- Support the internationalization of Science and Technology Institutes (ICTs) and universities, in order to attract students and professionals from other countries and expand their contacts abroad.

VII. INNOVATION AND ENTREPRENEURSHIP

- To encourage SEBRAE (Brazilian Service of Support to Small and Medium Enterprises) and the “S” system initiatives towards the support to entrepreneurship and creativity in the companies.
- To extend educational Olympic Games and other games to basic education in order to encourage entrepreneurship and creativity.
- To increase the number of awards and incentive measures directed to entrepreneurship.
- To value and encourage cooperation and team work, on educational levels, through curricula guidelines and dissemination of good practices.





Improvement of the legal framework for innovation

The legal framework for innovation in Brazil has been improving in recent years, especially with the issue of *Lei do Bem* (Law N° 11.196/05 – also known as “Wellness Law”) and Innovation Law (Law N° 10.973/2004); the establishment of rules for government acquisition and the increased dialogue between government and private sector. However a summary diagnosis of the situation shows that improvements are required so as to give a greater legal certainty and effectiveness to incentives and, consequently, stimulate private spendings on R&D.

Lei do Bem is the main tool to support business innovation and has been effective in promoting expenditure on R&D, as the investments are six times the granted tax exemption. Nevertheless, the number of enterprises using incentives is still small due to the fact that it is not well known in the business environment and that it is restricted to enterprises that fit the “real profit” tax regime. For example, in 2009, slightly more than 540 companies used the benefits of *Lei do Bem*.

The following propositions suggest improvements towards a more effective Brazilian Policy for innovation. The first improvement is the direct expansion of incentives, which is explained by the enormous disadvantages of Brazilian enterprises in relation to their international competitors and the systemic factors that adversely affect Brazilian competitiveness.

Other aspects of the law could also be improved, such as giving a less pro-cyclical nature to incentives, allowing, as some countries do, tax credits to be used in the following years after its completion. Or making more effective some incentives conditioned to patents and absorption of skilled human resources; enabling, according with the greater dissemination of open innovation models, the hiring of R&D externally to the enterprises; or even admitting a percentage of spending with non-residents. Finally, it is also suggested to correct a serious distortion in the subsidy so far applied to R&D projects, which do not cover capital expenditures.

I. *LEI DO BEM*: EXPANSION OF INCENTIVES

- To change incentive legislation, allowing the expenditures on technological R&D and technological innovation be effectively double discounted, through the modification of the 19th article of *Lei do Bem*.

II. INCENTIVES FOR LESS PRO-CYCLICAL R&D

- To change legislation (§ 5th of 19th article of *Lei do Bem*) to indicate that the amount exceeding the real profit and calculation basis of social contribution on net income (CSLL) may be used in the following years, observing the same procedure regarding accumulated financial losses in previous periods (limit use of 30% of profit earned each year).

III. EXPAND THE NUMBER OF ENCOURAGED COMPANIES

- To extend the benefits predicted in *Lei do Bem* for R & D to enterprises that operate under the tax regime of “presumed profit”, as well as the enterprises that use the Simplified Taxation System, modifying the rules of Corporation Income Tax (IRPJ) and Law of Simplified Taxation System (*Lei do Simples*), generating, with the counterpart of accessory obligation for benefitted enterprises, a documentary procedure regarding expenses on R&D.

IV. ALLOW THE HIRING OF EXTERNAL R&D

- To eliminate any restrictions to hire other companies to conduct external R & D, even if they are not taxed by real profit, making it clear that tax benefits from *Lei do Bem* may only be used by contractors through a new writing of article 18 of this law.



V. HIGHER EFFICIENCY OF INCENTIVES FOR R&D ASSOCIATED TO PATENTS

- To make the 20% additional of incentive granted by *Lei do Bem* effective for enterprises whose R & D projects result in patents, replacing the concession of patent by a single declaration of admissibility issued by the Brazilian National Institute of Industrial Property (INPI), in accordance with the Patents Cooperation Treaty; admit expenditure to be corrected according to *Selic* rate and make it clear that the protection of patent rights may be made in any country and not only in Brazil.

VI. HIGHER EFFICACY ON R & D INCENTIVES REGARDING HIRING MASTERS AND PHDS

- To make effective the incentive for R & D activities implied in the subsidy predicted by *Lei do Bem*, in order to hire masters and doctors, transforming it into a tax incentive through the right to double discount the expenditures on professionals with these skills, exclusively dedicated to the enterprise technological development, without prejudice of the already predicted Income Tax Legislation for a period of three years, considered from the day the researcher is hired.

VII. HIGHER EFFICACY TO INCENTIVES FOR SKILLED HUMAN RESOURCES

- To provide more efficacy to incentives predicted by *Lei do Bem*, admitting, in addition to outsourcing, the possibility of internal transfer of masters and PhD experts, who prove carrying out researches through the professional registration, overcoming the restrictions of incentives only for hired staff, and allowing the hired researcher to work in other sectors of the company, eliminating the necessity of exclusive dedication to R & D.

VIII. TO ADMIT INCENTIVES FOR R & D EXPENDITURES WITH NON-RESIDENTS AS LONG AS PROPORTIONAL TO THE EFFORTS MADE IN BRAZIL

- To admit a certain percentage (10%) of expenditures on research and development to be conducted on non-residents in order to enable the acquisition of goods or services abroad (supplies, specialized consultancy, overseas staff training, etc.); or also enable enterprises in the internationalization process to be stimulated to innovate, as long as this incentive is proportional to the company's technological capability in Brazil.



IX. ADMIT THAT ECONOMIC SUBSIDIES FOR R & D ALSO COVER CAPITAL EXPENDITURES

- To create a type of capital contribution to R & D activities in the private sector, specifically authorized by special law, modifying the federal legislation in several aspects (Law N° 4.320/64, Law N° 12.309/10, Law N° 11.540/07 and Law N° 10.973/04), so as to allow financial assistance to capital expenditures associated to R & D projects, as many countries do.

X. ENABLE THE TECHNOLOGY FUND (FUNTEC) OF THE BRAZILIAN DEVELOPMENT BANK (BNDES) TO DIRECTLY SUPPORT COMPANIES R & D PROJECTS THROUGH SUBSIDY AND CAPITAL CONTRIBUTION

- To enable Funtec/BNDES to directly support enterprises through economic subsidy or capital contribution, removing the restrictions currently existent on operating this Fund.





Foreign Research and **Development (R&D) Centers attraction**

Brazil may and should attract a greater number of transnational enterprises research and development centers. Recent successful cases indicate this is possible as long as Brazil is competitive in some activities and the prospects of its economy and internal competencies show to these companies that being in Brazil is relevant to their global strategy.

Brazil is interested in attracting R & D Centers. They generate good jobs in the country, strengthen Brazil's position in the world economy and disseminate the practice of innovation throughout the private sector. These activities generate synergy with the academic research carried out in Brazil and strengthen the cooperation links with Brazilian enterprises innovative activities. As a result, they strengthen the country's competitiveness, stimulate adding value and help to modify the production structure of the country through the introduction of more intensive activities in technology.

The amount of investment in R & D performed outside the country of origin has grown in a pace about three times the total investment in R & D, even though it has been concentrated on the triad countries and, more recently, in China. Policies associated with attracting these centers range from specific tax incentives to professional training and offering of research infrastructure of world class.

Some international studies show that these centers have very positive results on the local research ecosystem and contribute to reverse the undesirable "brain-drain".

The recent experience of companies that deployed or are considering deploying R & D centers in Brazil shows that some initiatives could contribute to a more active policy of attracting this kind of activities, namely:

I. GREATER ARTICULATION AND COORDINATION OF GOVERNMENT ACTIONS

- Company-government relation:
 - To transform the newly created “Innovation Room”, which gathers various government agencies to assist companies interested in establishing centers of R & D in Brazil, into a more operational and pro-active business; define a focal point for the “Innovation Room” that takes over the responsibility for initiatives and has the capacity to summon and coordinate other government bodies and agencies;
 - To define the “Innovation Room” as the only contact with entrepreneurs and investors interested in conducting R & D and innovation in Brazil;
 - To stimulate the capture of global projects by development agencies, through the support to investors or subsidiaries established in the country;
 - To produce and disseminate contents aimed at attracting investments through portals, booklets, brochures etc., with information about the Brazilian economy, R & D environment and human resources training, incentive regimes and priorities for science, technology and innovation public policies.
- Government-government relation: increase the coordination and common understanding of roles, practices and actions aimed at R & D in each sphere of government, and work together to attract R & D activities of foreign enterprises.

II. CONVERGENCE OF PUBLIC POLICIES AIMED AT RESEARCH, DEVELOPMENT AND INNOVATION

- Need of convergence of national policies directed to industry, services, innovation and R & D, notably the funding mechanisms currently existent, namely: BNDES, Finep, Capes, FAPs , etc.
- Greater scope and celerity on defining double taxation agreements with major international economic centers in order to facilitate foreign direct investment (FDI) in general, and investments in R & D, in particular.
- Definition and overseas promotion of areas defined as high priority in the context of Science, Technology & Innovation and industry policies, especially the segments the country wants to stimulate in terms of knowledge and technological development in order to allow investments of enterprises identified with these priorities.



III. INTELLECTUAL PROPERTY (IP)

- Definition of a pragmatic framework for intellectual property, which indicates the Brazilian position as effectively committed to the intellectual property rights and to the legal certainty necessary for cooperation agreements between all innovation system actors.
- Need to adapt the intellectual property system to the R & D investment model in each enterprise, analyzing, on a case by case basis, the demands for flexibility and for marketing model of intellectual capital.

IV. HUMAN RESOURCES

- Need for specific large-scale training policies for highly skilled professionals in engineering and science, and mechanisms of foreign exchange and retention of talents that discourage the competition among these professionals.
- Need for mechanisms that adjust the national costs of hiring skilled staff to international standards and make Brazil more competitive in global terms (exoneration of duties, effective subsidy to hire skilled personnel etc.).
- Create support mechanisms to attract highly skilled foreign researchers and professionals, both by enterprises and research institutions.
- Development and regular dissemination of comparatives with other countries in terms of foreign direct investment (FDI), investment in R & D and costs, qualifications and availability of skilled human resources.





Support for enterprises internationalization and R&D abroad

The internationalization of Brazilian enterprises is a promising aspect of the Brazilian economy's recent changes. It enhances these enterprises competitiveness, due to the diversification of their markets and to the possibility of exploiting synergies associated with these new businesses.

The internationalization process almost always begins through exports, which create the basis for more complex modalities, such as Foreign Direct Investment. The increase in Brazilian FDI, associated to geographic diversification, represents the initial step to create Brazil's first transnational enterprises. Its main motivation has been to maintain or improve the enterprise's position internationally.

Brazilian and other countries experiences show that internationalization boosts innovation through the contact with new customers and suppliers, for it facilitates access to new technologies or strategic products and imposes more aggressive behaviors in terms of technology. The acquisition of other enterprises has also shortened the learning path associated to certain technologies. These cases also reveal that enterprises that have previously dealt with innovation have a greater ability to capture the benefits of internationalization and the firms which invest abroad are more productive and innovative.

However, there are many difficulties associated with this process. The policy supporting internationalization is limited and counterbalanced by a series of internal obstacles. These barriers include lack of mechanisms for risk mitigation, lack of investment protection agreements and tax problems, since the Brazilian taxation model is typical of a capital-importing country. There are also not enough specific support mechanisms for R & D to enterprises working abroad, even to enable the reverse transfer of technologies accessed overseas.

An examination of recent experience and of other countries policies suggest that some initiatives could contribute to a policy that would favor this process and bring gains to the innovation process in the country, namely:

I. COMPREHENSIVE POLICIES FOR DIFFERENT STAGES

- Policies that support internationalization need to manage the enterprises distinct needs, depending on their stage in this process.

II. RECONSTITUTION OF THE INTERNATIONALIZATION WORKING GROUP (WG) IN THE CHAMBER OF FOREIGN COMMERCE (CAMEX) AND DIALOGUE WITH BUSINESS MOBILIZATION FOR INNOVATION (MEI)

- To reconstitute the internationalization working group, established in Camex, in 2009, but discontinued at the end of the last government. Gathering representatives of different government agencies the WG facilitated the construction of an integrated policy to support the FDI of Brazilian enterprises (taxation, financial support, international agreements, business promotion, trade policy, etc.).
- To establish a dialogue mechanism between WG and MEI concerning only innovation and internationalization.

III. BRAZIL'S APPROPRIATE TRIBUTARY TREATMENT TOWARDS THE FDI OF BRAZILIAN ENTERPRISES

- Double Taxation Agreements (DTA):
 - Brazil has signed 30 DTAs, but this number is lower than the existing figures in most emerging countries, being necessary to expand the scope of these agreements, specially with countries that are relevant for the Brazilian FDI;
 - It is also necessary to adapt the Brazilian tax practices to international doctrines, setting limits on unilateral interpretation of the established agreements, especially about the meaning of withholding tax – crucial issue to define where the incomes will be taxed.
- Losses compensation:
 - To consolidate the results (profits and losses) obtained overseas, for tax purposes, with the results of the control company in Brazil, compensating the tax paid abroad. Currently, the company should consider in its result the profit earned by its subsidiaries / affiliates abroad, compensating the tax



paid abroad through the tax due in Brazil. But the losses obtained abroad cannot be deducted from the profit earned in Brazil, being only compensated through eventual profits obtained in the country of origin in future years. As investments take time to generate positive results, this tax practices burden companies in the early internationalization stages.

- To recognize the benefits granted abroad:
 - To admit, under the double taxation agreements and the Brazilian legislation, that granted tax benefits in investment receptor countries be recognized in Brazil in order to stimulate enterprises' internationalization. It means the opposite of current practice which voids these incentives by full taxation of profits.
- To eliminate uncertainty in the interpretations of Secretariat of Federal Revenue of Brazil (SRF):
 - To adjust the legislation and Brazilian tax practice, eliminating gaps and increasing legal certainty, especially in what concerns the SRF interpretation to certain modalities of operation, as for example, through trading companies, which may extraordinary burden the international operations and remove competitiveness from the companies internationalization process.
- To reduce taxes on imports of services:
 - To reduce taxes on imports of services, which in some cases reach 46% of the service provided by foreigners, in comparison to 17% of services provided by national firms, since internationalization requires hiring services abroad, that are not available in the domestic market, such as market research, legal support, bureaucratic procedures, etc; besides the services associated with "internalization" of innovation processes and new technologies the company had access while in a foreign country.
- Premium deductibility on overseas acquisitions:
 - To define a tax policy that contributes to reduce the internationalization cost, as for example, permit the premium deductibility on overseas company acquisition, with modifications of the 7th art. of Law N^o 9718 and of the 74th of Interim Measure n^o 2158 in order to equate the overseas acquisitions to the ones made in the domestic market, as other countries do.

IV. ADEQUACY OF FUNDING LINES AND GUARANTEES

- To create credit and guarantee instruments and specific credit insurance to different modalities of internationalization, suitable for all sizes of enterprises, as in other countries, strengthening the BNDES unit initiatives for fund-raising and funding operations to enterprises located abroad.



V. AVAILABILITY OF FDI RISK MITIGATION INSTRUMENTS

- To negotiate investment protection agreements (APPIs) with countries which receive Brazilian investments in order to guarantee the rights of investors against political and expropriation risks.
- To implement a low-cost system for hiring coverage guarantees against risk of restrictions on transfer of profits and dividends, capital repatriation and investment expropriation.

VI. MECHANISMS TO SUPPORT THE INTERNATIONALIZATION PROCESS

- To reinforce the actions of government agencies, such as Brazilian Trade and Investment Promotion Agency (APEX) and Ministry of Foreign Affairs (MRE), on support and technical assistance to companies in early stages of internationalization and on the identification of new technologies, the most demanding markets and the most advanced users (information on market conditions, local regulation, risks, procedures for executives and staff migration, etc.).

VII. INTEGRATION OF SUPPORT FOR INNOVATION AND INTERNATIONALIZATION POLICIES

- To admit that up to 10% of expenditure on research and development (R & D) encouraged by *Lei do Bem* be carried out with non-residents, facilitating technology development and generation and acquisition of intellectual property (IP).
- To support the establishment of clusters and internal competence centers in the enterprises or in partnership with ICTs, capable of carrying out the reverse transfer of technologies accessed abroad.
- To support the internationalization of ICTs and universities in a way to attract overseas students and professionals and broaden their connections out of the country.
- To stimulate a greater cooperation and partnerships between Brazilian and foreign research centers, integrated with the internationalization projects of Brazilian companies.





Strengthening the articulation between innovation policy **and foreign trade policy**

A large number of countries, notably in Asia, give great emphasis to the relationship between technology and foreign trade policies. In addition to the success of these countries, this is very consistent with what is known about Brazil, where, actually, the most innovative enterprises are those with greater efficiency of scale, which import and export more goods with higher added value.

For Brazil, the need for this articulation is almost total, due to our foreign trade profile, that shows high deficits in technology intensive manufacturing, and which in 2010 presented a deficit even in sectors with low to medium technology. In fact, the deficit is higher the higher the technological intensity of these goods is.

There is no doubt that the foreign trade policy has progressed due to its better coordination, procedure simplification, trade promotion, new financing methods and guarantees, special tax regimes for predominantly exporting enterprises, and improved trade defense. But despite these improvements, the agenda of foreign trade has a huge challenge ahead, which is to sustain the growth of manufactured exports and ensure diversification in a context of strong currency appreciation.

There is a complex set of issues to be faced, beginning with the institutional design and the lack of coordination of actions. This is a known agenda in foreign trade, due to the division of work between the coordinating bodies, funding agencies, promotion agencies and the trade negotiations area. But this dilemma is much greater with regard to the relationship between technology policy and trade policy. Although there have been some specific actions in the past (PAEX, Progex, Softex), there are no specific programs or responsibility defined on how to act in this area. Trade policy is a horizontal policy of low selectivity and focused on a schedule of credit, guarantees, promotion and trade negotiations. The technology policy, in turn, virtually ignores the need for a foreign trade agenda.

The agenda proposed here is essentially of greater articulation among policies, and greater attention from technology policy to foreign trade:

I. COORDINATION OF POLICIES

- To overcome the complete existing disarticulation between technology policy and foreign trade policy, including a review of the responsibilities of government agencies, and with an update of the institutional design that supports these policies.
- To expand the intersections between S&T and innovation and foreign areas beyond MCT participation on Camex executive committee, with the creation of a Camex WG on technology and innovation.
- To create within the institutional framework of S&T an explicit interface with foreign trade, through the restructuring of the Secretariat of Technological Development and FINEP.

II. TO CREATE SPECIFIC PROGRAMS FOCUSED ON THE FOREIGN TRADE AND TECHNOLOGICAL DEVELOPMENT AGENDA

- To make sectoral choices and/or prefer segments and technology-intensive enterprises, matching horizontal policy instruments with strategic sectoral actions which identify relevant opportunities for Brazil in the global market.
- To map strategic opportunities relevant to Brazil in the global market, linking technology policies and trade policies for these sectors.
- To broaden the tax benefits granted for innovation, when the focus of the projects are the foreign market, and provide subsidized credit facilities for these types of exports.
- To design a specific program for the selection of technology-based projects aimed at foreign markets, involving production chains or group of enterprises.



- To use ordering actions for Technology Demonstration Platforms projects, already mentioned in this agenda, for the development of internal skills of production chains aimed at the international market.

III. TO SUPPORT FOR THE ACQUISITION OF STRATEGIC ASSETS ABROAD AND THE INTERNATIONALIZATION OF BRAZILIAN ENTERPRISES

- To support, as already described in this agenda, the internationalization of Brazilian enterprises, specially the strategic acquisition of assets abroad, which can shorten the path of technological learning for enterprises.
- To encourage greater cooperation and partnerships among enterprises, Brazilian and foreign research centers integrated to technology-based exports projects or to the acquisition of technologies focused on exports projects, or with a significant contribution to the balance of payments.

IV. TO SUPPORT TECHNOLOGY INFRASTRUCTURE FOR SUPPORTING EXPORTS

- To set specific policies which can create good externalities to the export sector to improve the technical efficiency of products and processes, the quality of final goods, to face technical barriers and induce innovation.
- Strengthen the *Progex program* with a business support basis based on a technical and technological service providers' network established at Senai and technological institutes.





Support for innovation and R&D for SMEs

A significant part of expenditure on R&D in Brazil is made by medium and large enterprises, and the weight of small and medium enterprises (SMEs) is still low all over the national expenditure on innovation and technological development. In many other countries this situation is different and SMEs are an important part of the innovation ecosystem, the SMEs synergistically enhance the action of large enterprises.

In these countries, the development of technology-based SMEs is a key element of national strategies for strengthening their productive structures. To do so, the policies cover from the much favored tax treatment to innovative SMEs, to the promotion of mobility of researchers and the creation of new businesses, and the setting up of a financial system designed to support these enterprises, with strong emphasis on seed capital and venture capital methods.

The Brazilian innovation agenda must also include a more appropriate treatment to technology-based SMEs. But it also needs to pay attention to all SMEs, due to a specific problem in Brazil, which is the excessive productivity gap that exists between large and small businesses, and that poses a difficulty to boost the competitiveness of a significant number of production chains.

Wider technology diffusion actions, introduction of more appropriate innovation management practices and even creation of new business models should be in the innovation agenda of SMEs in Brazil. The results of this agenda should aim at reducing SMEs' mortality rates and raise the average productivity of the production system as a whole, making it more competitive.

I. TO REDUCE THE PRODUCTIVITY GAP BETWEEN SMES AND LARGE ENTERPRISES

- The main objective of policies focused on supporting innovation for SMEs in Brazil should be to reduce the productivity gap between these enterprises and the large Brazilian enterprises. This agenda implies the recognition that much of the actions needed is more directed to dissemination of technology and good management practices rather than technological development.
- To give emphasis on government support to the actions of diffusion of technology, training and improving the innovation management in SMEs, dissemination of concepts and best practices.
- To provide capillarity to the supporting actions for SMEs, similar to Sebrae's actions on training innovation agents, backed by a network of partners in industry federations and Senai.

II. PRODUCTION CHAINS

- To establish programs and competitiveness goals by production chain, focusing on raising the SMEs productivity (suppliers), with the support of large businesses and industry innovation programs.
- To support the strengthening of industry associations' technological institutes, focusing on incremental innovations and technology diffusion.
- To use the order of Technology Demonstration Platforms projects for the development of enterprises' clusters, focusing on SMEs already installed and new technology-based SMEs.

III. LOCAL PRODUCTIVE ARRANGEMENTS – LPA

- To support local production arrangements as a way of acting largely on improving innovation in SMEs.
- To focus on innovation programs for LPAs in developing business plans, improving innovation management and technologies diffusion, with support from development agencies for such mechanisms of action.



IV. TECHNOLOGY INFRASTRUCTURE

- To strengthen the technical and technological services aimed at SMEs with support from Sebrae, Senai and development agencies, with emphasis on strengthening tests and calibrations' metrological networks.
- Expand partnerships among INPI, industry federations, industry associations, Sebrae and Senai to support capacity building of SMEs in managing their intellectual property policies.

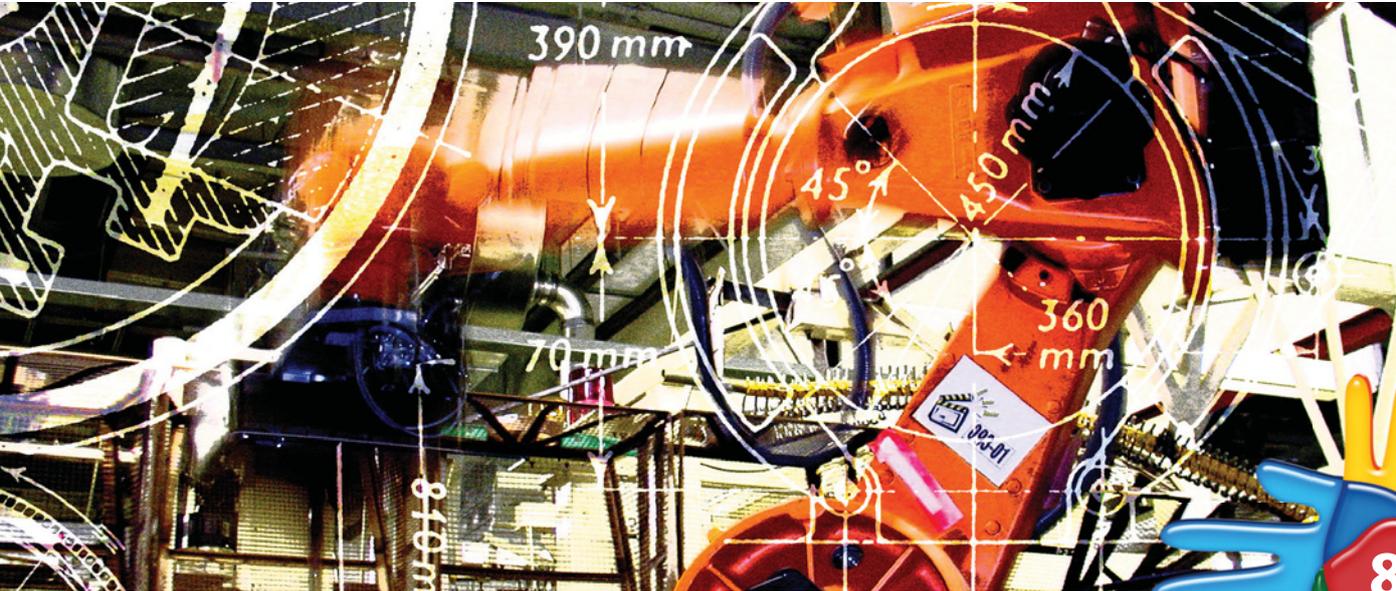
V. TAX BENEFITS

- To extend the benefit provided in the “*Lei do Bem*” (Law nº 11196/2005) for R&D activities to enterprises that also work with the presumed profit regime and enterprises that choose the Simplified Taxation System (“*Simples Nacional*”), changing the IRPJ legislation and the “*Simples*” Law, creating, with the consideration of the creation of accessory obligation to the beneficiary enterprises, a way of registering expenses on R&D, as already explained in this agenda.

VI. SMALL AND MEDIUM TECHNOLOGY-BASED ENTERPRISES

- To support the development of a financial system to support technology-based SMEs, through the establishment of a venture capital industry, integrating and strengthening the actions of BNDES and FINEP (BNDESpar, Inovar and Prime).
- To introduce more flexible and automatic mechanisms to BNDES and FINEP lines geared to technology-based SMEs, along the BNDES Card's rules.
- To expand and strengthen the actions for mobility of researchers supported by the Innovation Law, through credit lines and seed capital support, similar to Inovar and Criatec.





Support for structuring projects and R&D on a large scale

The completion of structuring projects and large-scale cooperative R&D in strategic sectors is a mechanism used in many countries for industry technological development, by creating a series of external factors and promoting the competitiveness of production chains as a whole.

Despite the wide range of instruments created to promote R&D activities in Brazil, there is an inherent difficulty in financing large projects with non-refundable resources due to several causes: the strongly academic institutional culture of the funding agencies; the fear managers have of the judgment of their actions from control bodies and society; the understanding that large projects should not be a priority, thus reserving public funds for SMEs that have more difficult access to capital and tax benefits. Moreover, in the case of large resource inflows, little tradition of monitoring and *ex-post* evaluating projects also presents a hurdle, in overcoming the fear to promote them.

The existing instrument in Brazil allows support for large projects, but in general, these projects end up being made only by a complex and slow institutional engineering, in which several agencies share the project costs to reduce their individual exposure. The most recent evaluations conducted by the government, about the profile of the private effort in R&D carried out in Brazil, show that this effort is focused on leading firms or the ones capable of becoming leaders: the medium or large enterprises account for 90% of expenses on R&D in the private sector.

These enterprises represent the most dynamic technology core of the Brazilian economy and have a great capacity for linking the various industrial sectors, with the potential to leverage small and medium enterprises' suppliers of the production chain, but, curiously, receive little aid from the agencies more directly aimed at promoting the country's technological development.

To overcome these difficulties, we propose the following agenda:

I. TO IMPLEMENT MONITORING AND EVALUATION SYSTEMS FOR PROJECTS

- To adopt monitoring of the implementation and evaluation of major projects' results, which makes benefits for this type of resources application transparent to society and control agencies.

II. TO CREATE MECHANISMS FOR SELECTING STRATEGIC PROJECTS

- To implement appropriate mechanisms, based on open and transparent negotiations, to support strategic projects of great impact, which overcome the practice of spraying resources and proliferating small projects, as well as to mobilize production chains, universities and technological institutes, based on clear economic goals, preferably aimed at the foreign market, to be applied in strategic areas of industrial and innovation policies, with appropriate allocation of resources.

III. TO SUPPORT PRE-COMPETITIVE R&D PROJECTS

- To support pre-competitive R&D projects, like pilot plants and demonstration plants, as detailed in this agenda, through risk sharing and intellectual property, along the lines of international best practices.

IV. TO ENCOURAGE CAPITAL EXPENDITURES AND NOT JUST COSTING

- To use grant resources to projects from the private sector to support also capital expenditures and not just costing, as detailed in this agenda, in order to facilitate the technological infrastructure of large projects, along the lines of international best practices.



V. LEGAL-INSTITUTIONAL ARRANGEMENTS AND APPROPRIATE SCHEDULES

- To avoid complex financial engineering for large projects, with excessive and unnecessary sharing of responsibility and funding across many agencies or by creating more agile mechanisms for cooperation among agencies, with the definition of a core institution responsible for monitoring, evaluating and disbursing resources, and through an unified accountability.
- To adopt management professional systems of large projects, with appropriate governance and eventual selection of private managers or a prime contractor, by identifying the skills needed to perform these functions and a negotiated process between the participants.
- To implement systematic creation of consortia or creation of Special Purpose Entity (SPEs) for the institutional organization of complex medium and long term projects, with a definition of responsibilities and rights of the parties, but with its own governance and appropriate management capacity.

VI. TO IMPLEMENT A SYSTEMATIC ORDERING OF TECHNOLOGY DEMONSTRATION PLATFORM PROJECTS

- A project to build a prototype that incorporates several technologies is still under development.
- Based on the challenges posed by a long-term agenda common to the industry and given the comparative advantages installed.
- Engagement – and development – of a cluster: export company, already established SMEs, new technology-based SMEs, enterprises from other industries with complementary skills and ICTs.
- To use a government procurement mechanism, referred in the Innovation Law and regulated by a specific law.





Sectoral Innovation

Programs

In spite of recent advances, the innovation agenda in Brazil was and remains essentially a macro and horizontal agenda, with goals to increase expenses on R&D, but with little pragmatic sectoral approaches capable to give concreteness to this agenda.

Many of the strategic programs of the industrial policy focus on large knowledge areas (biotechnology, nanotechnology, etc.), which are important to create technical and scientific capabilities in the country, but since they did not focus on the market, they ended up having little economic impact. It is symptomatic that the evaluation made for the industrial policy emphasizes advances in more horizontal areas such as tax and financing, but reveals a little advance of the so-called structuring programs, industry focused.

It's not that there are no good examples in the country, as shown by the oil and gas actions, articulated from Petrobras demands, under the Prominp (Mobilization Program of the National Oil and Natural Gas Industry). Its success is due to the combination of several factors, such as good management, strong demand, range of actions (work force training, procurement policies, credit lines) and the technological leadership of the exports company.

There are also good sectoral studies on innovation and technological prospecting work in many government agencies, although these works are still in need of a more pragmatic approach in order to focus on entrepreneurial opportunities. It is undeniable, however, that the success of the innovation agenda depends on the ability to incorporate a sectoral treatment to it. This is because the dynamics of innovation, competition and regulation are different for each sector, and the technical and technological conditions for success are also different.

In addition, this sectoral action would allow industry to define concrete goals to be reached and more easily evaluated and monitored action plans. The agenda would benefit from concreteness, in more effectively specifiable actions and, therefore, less generic. Therefore, we propose:

I. INNOVATION SECTOR PLANS SHARED WITH LARGE EXPORT ENTERPRISES

- To work with the business chain from large enterprises which hierarchically organize these chains, as they define the products and product engineering (assemblers, prime contractor, etc.), structuring sectoral innovation programs with goals and objectives agreed between the government and the private sector, and defined over time, through the articulation of suppliers and ICTs affiliates, along the lines of Prominp in the oil and gas chain.

II. PRE-COMPETITIVE R&D SHARED AMONG SEVERAL ENTERPRISES

- To act more generally along with an economic sector, creating externalities by pre-competitive R&D actions shared among multiple enterprises or acting together with other aspects that influence the innovation sector (human resources, cooperation, regulation, etc.), equally negotiated with the sector, and with goals and objectives scaling up over time.

III. SECTORAL DIFFUSION AND INCREMENTAL INNOVATION

- Specific actions of incremental innovation, technology diffusion or solving bottlenecks, such as human resources qualification that meet the competitiveness requirement in the short term and that are relevant to reducing the heterogeneity of Brazilian industry, and contribute in narrowing the differences in sector's productivity.

IV. LONG-TERM STRATEGY ACTIONS

- Long-term strategy actions aimed at a better international insertion of Brazil or the substitution of imports, arranged from large projects and orders placed with leading enterprises and their supply chain.





Support for pre-competitive **R&D projects**

The scaling up of the initial steps to more advanced stages of developing a product or process is essential for a technology to reach the market. These are high (technical and economic) risk research and development activities and key to the competitiveness of the Brazilian industry, especially in process industry.

Despite the wide range of instruments to support R&D in Brazil, there is not a clear non-refundable public funding mechanism for scaling up activities or pre-competitive R&D.

A commendable BNDES-FINEP initiative for new biomass processing technologies based on sugar cane is the closest model to this practice, due to its business focus, the project selection criteria and the mix of instruments that it mobilizes. Even so, their difference is notable in relation to other countries models: the subsidy values are much lower than those internationally applied and are directed to costing expenses only. In addition, you must have more than one agency and multiple instruments with reasonable administrative and legal complexity in order to achieve the same result.

In many countries, the promotion of these activities is an important part of technology policies. It is common for government agencies to support all or part of the establishment of pilot plants or proofs of concept (plants used to develop and validate new methods and/ or new technologies), demonstration plants (small scale units, with about 10% the ability of a commercial plant), or even subsidize part of a first commercial scale plant.

In areas of national interest and high technological risk, this support has been crucial to accelerate technology development. This is especially relevant when several technological routes compete with each other, like the development of renewable energy or green chemistry, and where the public interest is to reduce risk and accelerate the implementation of market solutions.

Public support varies from country to country, but a good benchmarking is model followed by the U.S. and Europe for bioenergy, in which, on average, outweigh the following public fund percentages: Basic R&D – 100% promotion, technological development – 80%; proof of concept (pilot plant) – 50% to 60%; demonstration plant – 50%; first commercial plant – 10% to 40% public support.

In order to overcome these difficulties, it is necessary first to agree that pre-competitive R&D activities are eligible for public support. Second, define appropriate legal and institutional arrangements and, finally, to support projects with values much higher than those usually promoted by the agencies and also subsidize capital expenditures, not just costing.

I. ESTABLISH WHICH PRE-COMPETITIVE R&D IS ELIGIBLE FOR PUBLIC SUPPORT

- To incorporate to the operational policies of agencies the understanding that pre-competitive R&D activities are eligible for public support (pilot plants or proofs of concept, demonstration plants and the first commercial scale plant).

II. TO ESTABLISH VALUES AND PARAMETERS TO SUPPORT PRE-COMPETITIVE R&D APPROPRIATE TO THE TECHNOLOGY RISK

- To promote variable support to each scaling phase of projects, aiming to achieve international standards: Basic R&D – 100% promotion, technological development – 80%; proof of concept or pilot plant – 50%; demonstration plant – 50%; first commercial plant – 10% public support.
- To provide resources consistent with the real dimensions of the projects, selecting priorities and avoiding the spray of resources in many initiatives to promote small percentage of funding.

III. TO ENCOURAGE CAPITAL EXPENDITURES, AND NOT JUST COSTING

- To admit the use of grant resources to projects in the private sector for capital expenditures, and not just costing, as detailed in this agenda.



IV. TO EMPLOY APPROPRIATE LEGAL AND INSTITUTIONAL ARRANGEMENTS

- To avoid complex financial engineering, with excessive and unnecessary sharing of responsibility and funding from many agencies, as already detailed in this agenda.
- To implement consortia or SPEs creation systems for institutional organization of pilot plants and demonstration plants, as detailed in this agenda.

V. TO EMPLOY APPROPRIATE LEGAL AND INSTITUTIONAL ARRANGEMENTS

- To avoid complex financial engineering, with excessive and unnecessary sharing of responsibility and funding from many agencies, as already detailed in this agenda.
- To implement consortia or SPEs creation systems for the institutional organization of pilot plants and demonstration plants, as already detailed in this agenda, consistent with the operation of this type of research infrastructure.

VI. DIRECT SUPPORT FOR ENTERPRISES, ON A PREFERENTIAL BASIS

- Direct support for enterprises, with funding in the form of subsidy, in order to shorten the placement of these technologies in the market.
- To adopt variable modalities for sharing intellectual property, based on the percentage of public funds involved and size of private enterprises and partner research institutions.



