FIRST DRAFT v.2 – NOT FOR QUOTATION

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THE LISBON STRATEGY IN A KNOWLEDGE SOCIETY WITHOUT BORDERS: THE BRAZILIAN VIEW

Paper prepared for the IEEI (Instituto de Estudos Estratégicos e Internacionais) project "The Lisbon Strategy and the knowledge society without borders"

THE LISBON STRATEGY IN A KNOWLEDGE SOCIETY WITHOUT BORDERS: THE BRAZILIAN VIEW[1]

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January 2007

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1. ABSTRACT

This paper synthesises the Brazilian strategy towards a knowledge-based society and economy, the perception and the influence of European Union's Lisbon Strategy in the country, its impacts already visible and the possible future ones. The main guidelines of concerned Brazilian policies will be discussed, principally the Industrial and Technological Policy (PITCE[4]), the Program Brazil Three Times (Br3T), the Science Policy and the Educational Policy, all integrated with the PITCE.

Although Brazil has a tradition on cultural and educational relationship with some main countries of the EU, the consolidation of the Union and the current environment where countries are intensifying their efforts to the growth of a knowledge-based economy put new challenges to external relations. These new challenges are added to the traditional ones (agricultural subsidies and barriers etc.).

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[4] PITCE means Política Industrial, Tecnológica e de Comércio Exterior.

2. THE BRAZILIAN STRATEGY FOR THE KNOWLEDGE SOCIETY AND **ECONOMY**

Brazil has an explicit and clear policy regarding science, technology and innovation. We will discuss its main features. In order to do so, a brief historical evolution is necessary.

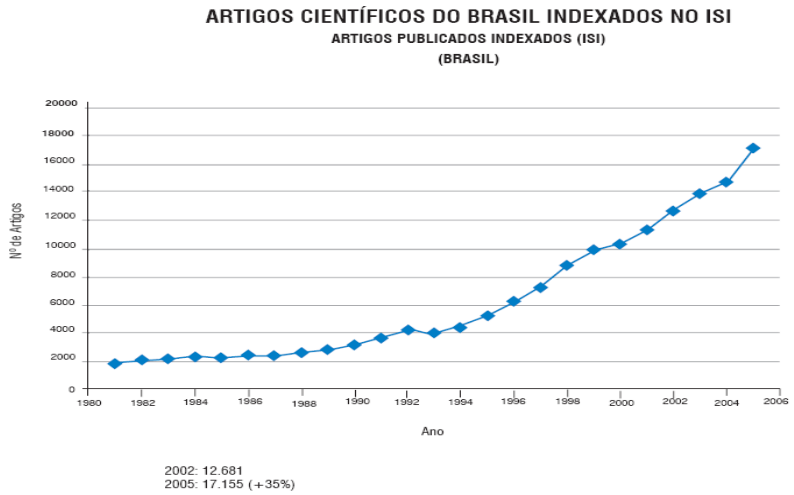
2.1. Preliminaries: Brazilian Development in Industry, Science and Technology

Brazil is currently in an unprecedented situation: macroeconomic stability; reduction of external vulnerability; exports boom; reduction of poverty and inequality; increase in science production; increase in doctoral thesis:

- Low inflation rates during the last 12 years (3,2% in 2006)
- Reduction of external vulnerability
  - Brazil's risk fell down and keep falling (+ 2.000 → 216)
  - Exports and trade superavit boom
    - US$ 60 billions / 2002 → US$ 136 billions / 2006; +US$ 44 billions
- Reduction of social inequality: the lowest level in 30 years
  - 70% of the population had growth in their revenue (2001-2004)
- Reduction of poverty: the lowest level ever since
  - Revenue of the poorest grew more than 10% (2001-4)
  - 5 million people left the situation of extreme poverty
- S&T Development
  - More than 10.000 new doctorates / year
  - Science production is boosting (see graphic 1)

Brazil made an extraordinary and successful effort during last century (XX) to create a modern industrial basis. The country was one of the leaders of economic growth in the whole century and currently has a strong and diversified industry. In the 1970s Brazil intensified investments on the development of a science structure: the creation of post-graduation courses, formation of personnel abroad (PhD studies), creation of specific institutions for research finance etc. This policy was sustained up till now, and Brazil is rapidly increasing its participation in the global production of science.

Graphic 1. Evolution of Brazilian scientific papers indexed by ISI



Source: Ministry of Science and Technology

But the same performance was not observed in technological indicators, as patents. The main explanations to the phenomenon are:

a) The crisis Brazilian economy faced from 1981 to 2003, characterised by high inflation, irregular growth and problems to cope with external debt. Although inflation has decline dramatically from hundreds to less than 5% between 1995 - 2001, external accounts and fiscal austerity were not a priority of the government; inflation tried to returned again in 2002. The new government (Lula) introduced two main goals: fiscal austerity to control inflation and exports boom to cope with external debt. The policy was successful – inflation in 2006 was 3,2%. Exports climbed up from US$ 60 billion in 2002 to US$136 billion in 2006, and keeps growing, what virtually annulated the bottleneck external debt put to Brazilian growth.
b) An industrial basis looking at the internal market; in the old protected environment, it meant a clear accommodation in innovation efforts;
c) The lack of institutions to induce and to support companies' investments in R&D and innovation.

2.2. Brazilian Contemporary Policy towards Innovation and Knowledge-Based Society

It is quite clear that a driven towards a knowledge-based society requires a very well coordinated policy in several levels – macroeconomic, education, infrastructure, scientific etc. But there is a nucleus of the policy: macroeconomic policy by itself does not drive innovation and technology development, although in less developed countries, or, to be more precise, although in Brazil. In that sense, we will focus here on the nucleus of the policy.

Two main interconnected initiatives are key for the Brazilian policy towards a knowledge-based society: the program "Brazil Three Times[5]" (Br3T), and the "Industrial, Technological and Foreign Trade Policy" (PITCE). The first one is conducted by the Strategic Unit of the Presidency of the Republic (NAE – Núcleo de Assuntos Estratégicos); the second one is multi-institutional, under the coordination of the Brazilian Agency for Industrial Development (ABDI).

2.2.1. Brazil Three Times (Br3T)

Brazil Three Times is a broad program for the strategic planning of the country in the long range. Three times is a symbolic quotation involving football (which has two times) and three important dates: 2007 (a new government); 2015 (United Nations Conference on Millennium Objectives); 2022 (commemoration of 200 years of Brazilian independency). The program aims at the definition of national strategic objectives and the creation of institutional conditions for strategic management. It considers some dimension, namely the knowledge one[6]:

"The knowledge dimension involves the current world situation in which knowledge is a differentiation factor of national development levels. This dimension will spread more and more over all human activities and should consider:

- education of quality;
- access to information for all;

[5] Brasil Três Tempos.
[6] Other dimensions are: institutional, economical, socio-cultural, territorial, environmental, and global.

- the rise in the capacity of scientific, technological and innovation knowledge creation;
- the interaction between popular and scientific knowledge"

The program developed prospective studies on key issues like nanotechnology, biotechnology, ICTs (information and communication technologies), super/ultra computing, bio fuels, and climatic changes, based on Delphi analysis and experts reports. These studies have fuelled the elaboration and implementations of the guidelines and specific programs of PITCE.

Brazil Three Times is coordinated by a Council of the main Ministers, and executed by the NAE –Strategic Unit. The main studies, analysis and discussions are contracted under technical supervision of CGEE – The Centre for Management and Strategic Studies[7], linked to the Ministry of Science and Technology.

Section 3.1, page 18, will bring us more details on NAE, Br3T and the explicit influence of the Lisbon Strategy on them.

2.2.2. Brazilian Industrial and Technological Policy (PITCE)

Lula's government launched in November 2003 the document "Guidelines for Industrial, Technological and Foreign Trade Policy"[8], known as PITCE (the acronym in Portuguese). It is the first document of an official policy in the last 25 years - Fernando Henrique Cardoso's government launched some documents in the late 1990s, like "Brazil Classe Mundial" / Brazil World Class but they were a vague consideration on the need to achieve international competitiveness, not a program or a policy. During the brief Collor

[7] Centro de Gestão e Estudos Estratégicos.

[8] Diretrizes de Política Industrial, Tecnológica e de Comércio Exterior. www.desenvolvimento.gov.br or www.abdi.com.br.

government and during the whole Cardoso government (8 years), the official policy was not to have an industrial policy – implicitly, they thought of industrial policy in the "1960s way" – closed market, high subsidies for companies, projects to install a whole industrial sector etc[9]. Cardoso's government speech was to "put an end with the national developmental policy", meaning the abandon of active policies to induce development, mainly industrial development.

Anyway, during the 1990s there was a strong and successful movement towards the improvement of quality in Brazilian companies, inspired in the so-called Japanese methods for quality management. Currently, quality management in Brazilian companies is a common feature and virtually all managers know modern quality techniques and approaches, and the quality of Brazilian products is comparable with those of the main competitors in the US, in the EU or in Japan, South Korea etc.

But Brazilian quality movement was focused on cost reduction. The hegemonic perception of government at the time was that the industry needed a shock of competitiveness to reduce their prices – so, it was necessary to reduce costs. No strategic thinking was conduced towards the need to upgrade industrial structure towards innovation and product differentiation.

PITCE changed the focus. It puts light on the need of increase innovative capabilities and capacities of Brazilian economy, creating programs, instruments and institutions to induce innovation in companies. So, the development strategy of the Brazilian industrial basis is governed by a vision of the future focused on the change of the threshold of industry, by means of innovation and of the differentiation of products and services, by achieving insertion in and recognition by the main world markets.

The policy is sustained by an in-depth analysis of the structure of Brazilian industrial tissue and of the impacts of innovation and product differentiation in Brazilian economy. Although there is a large literature on innovation and development, the analysis are often centred in the most advanced countries of Europe or the US. It is fundamental to understand the relationship innovation – development in less developed countries: a policy must be realistic, suitable for a given situation – a given society, a given economic tissue, a given industrial basis, a given capital structure, a given income distribution, a given regional inequality, a given social inequality, looking at economic and social policy priorities. The major part of these studies was conducted by Ipea – The Institute of Applied Economic Analysis in tight contact with the main Brazilian universities; they were also discussed abroad with some European and North American experts.

The most relevant study showed the gains of a policy focused on innovation and product differentiation for Brazil. It is a quantitative analysis based on the main national databases, concerning the period 1996-2002, and involving 72.000 industrial companies, 5.000.000 workers, more than 95% of value added by Brazilian industry[10].

[9] The same policy was followed (at the time) by most of less developed countries, like Japan, South Korea, India etc. Although there were differences among policies in these countries, the general guidelines were very similar.

[10] There is a book on the research "(DE NEGRI, J.A.; SALERNO, M.S. "Inovações, Padrões Tecnológicos e Desempenho das Firmas Industriais Brasileiras", Brasília, Ipea, 2005), free for download at www.ipea.gov.br.

Firms were classified in three categories according to the competitive strategy[11] really performed and its results:

a) Firms that innovate and differentiate products;
b) Firms specialized in commoditized products but with high productivity;
c) Firms that do not differentiate products and have lower productivity.

The results are impressive:

- Firms that innovate and differentiate product pay average wages 60% greater than firms specialised in commodities and three times greater than firms that do not differentiate and are less productive.
  - *Ceteris paribus*: 11% and 23% higher.
- Firms that innovate and differentiate product showed a higher growth in income compared to others. And firms that innovate (even if without product differentiation) also showed higher growth in income compared to the non innovative ones.
- Firms realizing technological innovation have probability 16% higher to be exporters than non innovative firms.
- Firms that innovate and differentiate product employ more qualified and more stable workforce (stable in the sense that workers remain more time employed in the company).
- Brazilian owned firms invest more than foreign-owned in R&D internal activities as % of the income.

The research showed that an industrial and technological policy based on innovation can help on the rise of wages, on the growth of industry and the economy, on exports, on the employment of more qualified workers.

PITCE Guidelines

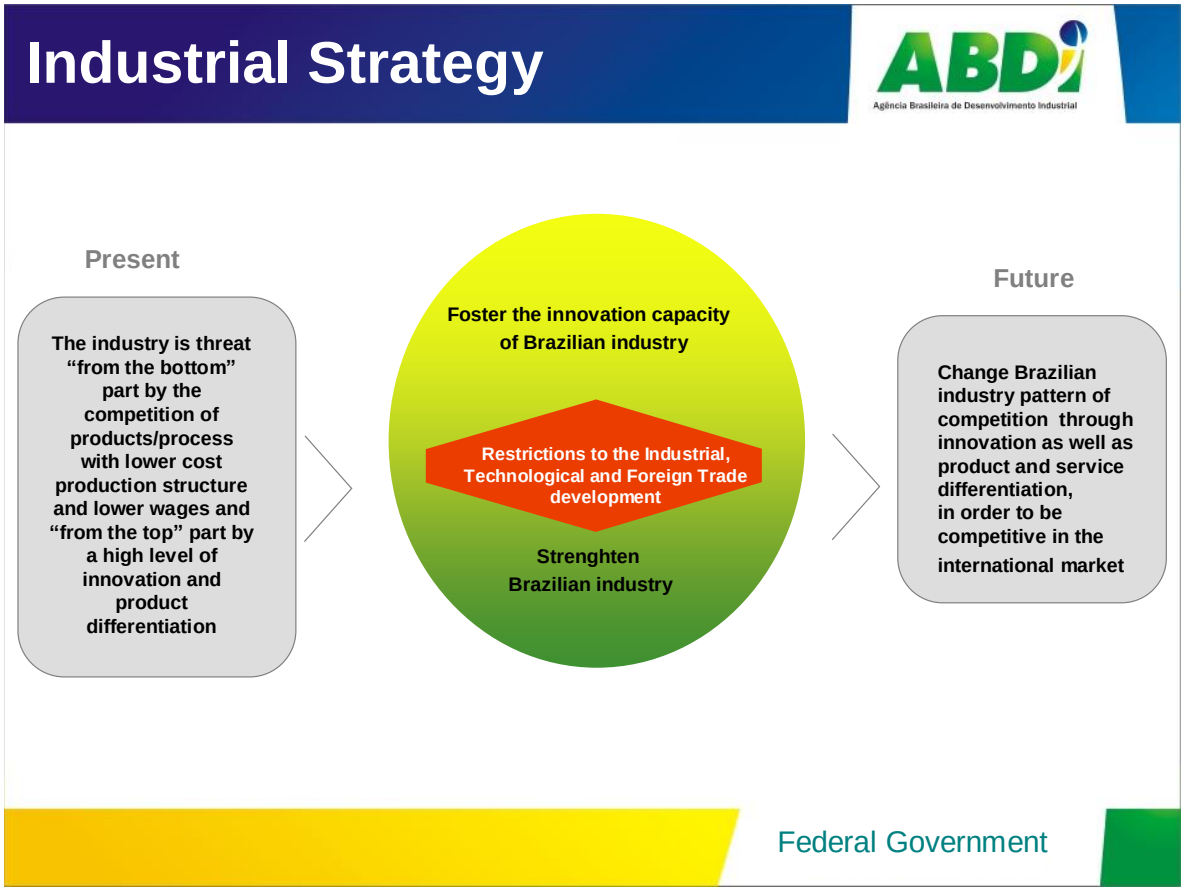
The name PITCE – Industrial, Technological and Foreign Trade Policy has its sense in Brazilian history. It does not mean a traditional protectionist industrial policy as a foreigner could though of but it means instead a policy to induce the development of industry – in that sense it is an industrial policy. It is technological because there is a close link between innovation and technology. But it is not a foreign trade policy – the guidelines, the programs and the institutions around PITCE do not deal with foreign policy, international negotiations and the like. The words "foreign trade" were added to the official name only to make clear that the policy is to improve international competitiveness.

The aim is to foster innovation in industry; to improve innovative capacity on services, products and processes; to enhance the country's technological base in areas that show potential for growth; to create a favourable environment for private and public investments; valuing national and regional resources; to improve the image of Brazil abroad; stimulating projects guided towards mass consumption; to foster employment and income generation; to promote a regional development policy regarding to industrial actions; to coordinate actions with national institutions, states, metropolitan regions and local governments to achieve policy coherence

[11] Innovation is measured according to international standards derived from Oslo and Bogotá handbooks; Brazilian survey is compatible with CIS3 – Community Innovation Survey of the EU, but much more reliable and concerning a much greater universe of firms. The measure of differentiation is a little bit complex, involving several databases. In brief, differentiation is measure by premium price: for a company to be included in this category it must have launched an innovative product in the market and have obtained a price 30% higher than the average price of the market for similar products.

The main guidelines are:

- To reach a new level of competitiveness through innovation and differentiation, increasing efficiency in production and in overall business
  - Stimulating the interaction public institutes – companies
  - Export oriented pattern (international competitiveness)
  - Stimulating the development of company functions like R&D, design, international logistics and distribution, brands
    - not only physical production driven
  - To develop a basis for the future in the productive sector



- To aid industrial modernisation
  - equipments; organisation & management in companies organised in clusters

- To invest in activities that probably will shape the future of production systems: bio & nanotechnology, biomass & renewable energies

- Institutional panorama to be modified
  - fiscal restrictions (debt) / complex-inefficient tax system
  - difficulty of co-ordination
  - the need to redirect public agencies

The policy is articulated in three main axes:

1) *Horizontal guidelines*

- Innovation and technological development - Financial tools, tax facilities, and simplification of the bureaucratic measures for the relationship public Universities – private companies Incentives (innovation law)
- External insertion / exports / internationalisation of Brazilian companies
  - organization of bunches of companies to open distributions centres abroad
- Industrial modernisation
  - Improvement of traditional instruments for machinery substitution; programs for spreading out product and quality certification in small companies; investments in scientific metrology in order to set standards for Brazilian products, like cachaça (Brazilian national spirit), ethanol (in agreement with Nist – USA), and for chemical, biotechnology and nanotechnology metrology.
- Institutional improvement / capacity expansion
  - Innovation & biotechnology laws
  - Creation of the Brazilian Agency for Industrial Development (ABDI) linked to the President of the Republic to coordinate the whole policy (the board is named directly by the president).
  - Creation of formal spaces to discuss PITCE's strategy and management with society, like the National Council for Industrial Development (CNDI), composed by 13 Ministers, 10 CEOs, 3 Trade Unionists. ABDI is the executive secretary of the Council. Among others, the Council launched the Brazilian Initiative for Innovation.
  - To redirect Brazilian Development Bank to finance innovation and capacity expansion instead of financing privatization
  - Elimination of taxes on investments and exports
  - Simplifying the measures for the opening and closure of companies
  - New law for small and medium enterprises, simplifying fiscal procedures.
  - Investments on INPI – The National Institute of Intellectual Property looking at the simplification of procedures and lack of time to register a patent or a trade mark.

2) *Strategic options*

- Semiconductors (application specific – SOCs, Asics)
- Software
- Capital goods
- Pharmaceuticals

3) *Development of special activities*

- Biotechnology
- Nanotechnology
- Biomass & renewable energies / Kyoto protocol based activities12

[12] "Brazil represents a great success story, as the country's National Alcohol Program dates back to 1975, when the Brazilian government first introduced the policy as a measure to reduce its dependence on petrol imports and enable the country to produce renewable and environmentally friendly energy.
From 1985 to 1990, around 90% of all automobiles manufactured in Brazil were powered by ethanol.
To date, more than 6 million ethanol and flexible fuel vehicles have been manufactured in Brazil"
Ford Motor Company, USA, May 10, 2005. (http://media.ford.com/print_doc.cfm?article_id=20825)

We could pick up some efforts for the development of SMEs / Clusters

- Program for industrial extension (organisation & management systems)
  - For clusters of companies
    - Firstly, a diagnosis; only after it, to direct some tools according to needs: finance, design support, research centre, commercialization, export promotion etc.
- For low tech companies: to stimulate product innovation through facilitating machinery substitution – greater access to credit (a research revealed that these companies used to launch new products in association with the acquisition of new machinery)
- For high tech-based small companies: redesign of financial support through special lines for R&D
- To aid product certification process
- To aid the relationship among large and small companies

The policy is based on an articulate ensemble of measures aiming at efficiency improvement; with focus on innovation; looking at the future; integrating governmental actions interacting with private sector, scientific community and trade unions.

One of the aims is to articulate the a productive and growing (in size and quality) scientific basis, the large and diversified industrial basis; engineering skills, biodiversity, design and the Brazilian way of living to improve innovation, competitiveness and economical and social development . Obviously, all the policy respects international agreements (WTO and the like)[13].

PITCE Governance

A characteristic of States as well as large companies is the functional-bureaucratic organisational structure. It means that each organisational unity (section, department, direction, ministry, agency etc.) tends to develop its own approach, its own methods etc. Normally, the result is duplication/superposition of activities, contradictions, difficulty of coordination.

The first challenge is to realign State agencies and private sector towards a unique policy guideline. In that sense, the government made the option to launch a formal document on Industrial and Technological Policy in November 2003. To do so, the Ministerial Chamber of Economic Policy named a task force to propose the guidelines, which deeply discussed the Ministers and approved by the President.

After the PITCE Guidelines became public the task force was unable to manage its implementation – every participant had its own activities in its own organisation (ministries, agencies, institutes etc.). Since there were a clear understanding that coordination was one of the main questions to face, a superior alternative should be built. The option was to create a special agency, not linked to a single ministry, to coordinate in a broad sense: alignment of different agencies; design of inexistent tools; smoothing inter-institutional relations and articulating with the private sector.

ABDI - Brazilian Agency for Industrial Development (Agência Brasileira de Desenvolvimento Industrial) was created by law at the end of 2004 and began operations

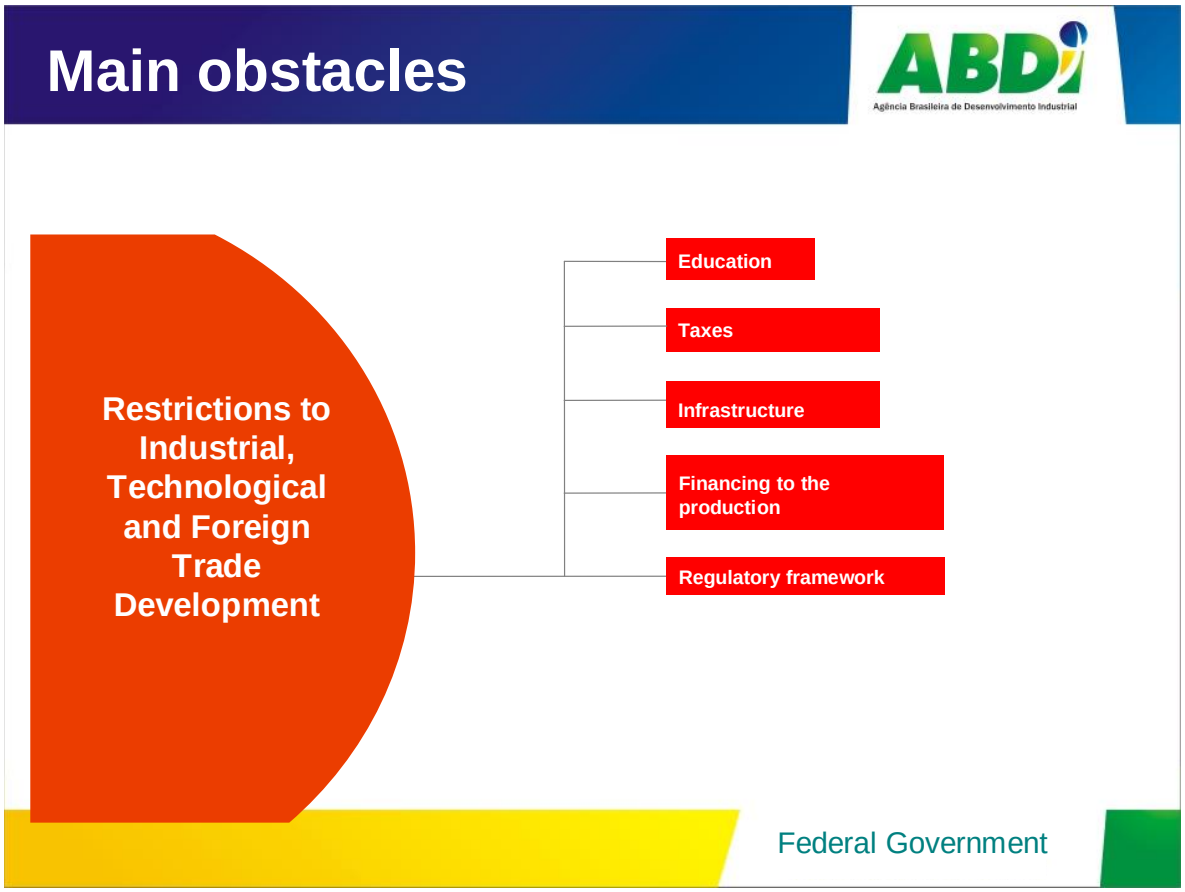
[13] For instance, during a meeting at the Embassy of the European Union to present PITCE in 2004, economic advisors of some countries showed us their analysis of the Policy (PITCE), concluding that there were no problems to foreign companies or related to international agreements.

early 2005. The Agency's purpose is to promote the implementation of the Industrial, Technological and Foreign Trade Policy in close interaction with the public and private sectors. Its board of directors (3) is named directly by the President of the Republic; its Deliberative Council is composed by ministries, agencies, private sector and trade unions.

Three main activities exemplifies the articulation and coordination efforts of the Agency: its role in the National Council of Industrial Development (discussed above); the promotion and coordination of a monthly meeting involving key persons of key ministries and agencies for the evaluation of the implementations of the policy, its problems, difficulties, improvements to be done etc.; the delegation to sum up monthly the status of PITCE for the Brazilian President.

Challenges and Obstacles and How Brazil is Facing Them

During strategic planning process of ABDI five main obstacles were identified:



1) *Education* (see item 2.3 below).

2) *Taxes*. To cope with fiscal restriction, mainly after the so-called Real plan (which controlled inflation due to an indexation of Brazilian currency (Real) to the US dollar but costed a lot and was financed by taxes raise), taxes were elevated in Brazil. Tax system is complex and the federative political system makes it difficult to handle and to modify. But there is a consensus in the society on the need to reform tax system and to reduce taxes. There is a project of law being discussed in the Parliament which would simplify a lot the system by introducing a national value-added tax and

cancelling a lot current taxes. In the meantime, Federal government is reducing their taxes on capital goods, civil construction and popular consumption goods; nevertheless, main taxes are regional (state taxes) and they still persist on capital goods, with some exceptions. The key is the approval of the new tax system law.

3) *Infrastructure*. The bottleneck is logistical. Roads are the main logistical channel but they were abandoned during the last 12 years. Harbours are reaching their limits due to the boom in external trade. Although these logistical bottlenecks are not directly linked to the theme of this paper, they are important to induce or to reduce private investment élan. The federal government launched an urgent (and controversial) plan to the conservation of main roads and is preparing the regulation for private concessions, after have launched the rules for PPP- public-private partnerships. In 2004 investments boomed on railroads after the solution of some regulatory problems introduced during the privatisation process late 1990s – early 2000s.
   There is no energy restriction – the problem in 2001 was solved by investments in line transmissions for strengthening the integration of different production facilities all around the country, looking at South American integration. It is important to note that Brazilian energy is mainly (more than 80%) hydroelectricity based, with a few nuclear powers (2 facilities). Electricity is also generated during sugar and ethanol production process. There is a thermal back up system based on natural gas; there is virtually no thermal electricity coal or oil based. In 2005 the Government proposed and a new law was approved to facilitate private investments in energy.
   ICTs. Brazil has a nationwide and reliable telecommunication system. Taxes were reduced to zero for personal computers leading to a boom in production and consumption. There is also a public program of telecentres aiming at the popularisation of high speed access to internet. The National Council for Industrial Development approved a program – inspired in the South Korean one – to introduce extra-large IP connection (20M) on public schools. Brazil developed a very robust and interactive system of digital TV and made an association with Japan to adopt their system of modulation (which have obtained the best scores in independent tests made by a consortium of Brazilian universities mainly due to the strength of the signal, a crucial feature for Brazilian large cities with high electromagnetical and physical interferences – mountains, buildings, tropical tempests etc.) in association with Brazilian developments.
   Environmental control by companies. Their investments have augmented 83,9% from 1997 to 2002 in the whole country (official data by IBGE)

4) *Finance*. Two main problems arise: interest rates and access. Although climbing down consistently, Brazilian rates are still very high – it is an inheritance of the inflationary period that shaped a banking system focused on the negotiation of public debt and overnight operations instead of investments and credit for consumers / companies. The National Development Bank (BNDES – Banco Nacional de Desenvolvimento Econômico e Social) provides long range credit for investment with lower rates than private banks. Actually, private banks do not offer long term credit; they only made an intermediation of public lines raising the rates.
   The main problem was – and is – institutional. BNDES is a large and solid institution, one of the biggest development banks in the world. But it was designed for financing plants, physical capital (machinery, buildings), and along the years have developed procedures and a strong culture in the matter. However, R&D, innovation, services offer for industrial companies, branding etc. was out of the focus – in fact, these important themes were out of BNDES financing operations. In the 1970s a new agency (Finep) was founded to finance technological projects. In the first

years Finep financed mainly the expansion of the post-graduation system: aiding universities to hire researchers, financing university projects etc. Then it began to finance joint projects university – companies. It is important to remember that until 2005 it was forbidden for private companies to dispute resources for science and technology projects; the only possibility was a joint project with a public research institution – Finep could finance the public partner; the company should finance its own part by itself. The situation changed due to two new laws – the so called innovation law and the so-called "goodness law". They permit public administration to finance science and technology projects in companies, and made easier and simpler for public institutes to make contracts of intellectual property rights with companies in joint projects.

In 2006, provoked by an Ipea proposal, BNDES launched a finance program for innovation in companies as well as special lines for bio fuel development among others connected to PITCE guidelines. But it is still a traditional bank looking at physical assets as guaranties and results. By the other hand, Finep is still university-oriented. It takes some time for changing focus.

One critical lack in the financial system looking at innovation is seed money for technology-based small companies' innovative projects; the whole system of venture capital should be strengthened.

By the end, a general problem appears: the difficulty of credit access for small and medium companies. To gather access to public financing lines it is compulsory not to have a fiscal debt with the state; even if the company contests the debt it can have no access until the final judgement. The issue gets huge proportions since: a) credit is low in Brazil as part of GNP; b) many SMEs had huge problems of survival during the period of high evaluation of the currency (plano Real: R$1,00 = US$1,00), which induced imports and lead to the rise of taxes in the period 1996 - 2002 as well as high interest rates in order to control inflation; many of the companies have financed their current activities by delaying or even not paying fiscal contributions (taxes, social security etc.). And the Real plan has inherited a period of fluctuations in the economy (stop and go growth, fluctuation of interest rates – from negative to the higher in the world; fluctuation of exchange rates etc.) that have weakened companies' financial structure.

So, many companies cannot dispute the more favourable public credit. It is clear that there is a strong argument for not financing companies in debt with the state. But it is also clear that credit must rise for the development of the basis of the industrial tissue – the SMEs.

5) *Regulatory framework*. The main obstacles are under discussion as well as the solutions in course to try to cope with them: rules for finance private projects of S,T&I (science, technology & innovation); tax system; bureaucracy for opening and running a company (a law simplifying dramatically these procedures is in final discussion at the Parliament); the difficulties in public-private relationship in R&D (innovation law facilitates the relationship). But this entire framework is quite new; there is a need to follow their implementation in practice. One critical lack, still untouched, is the framework for science and technology parks.

2.3. The Educational Paradox

Brazil has a dual educational system: quite good public free universities, low quality pre-university public free school. In the short run, there is no bottleneck in the offer of graduate or post-graduate workers; generally speaking companies find whoever they search. So, the main issue is not to improve superior formation but to improve basic formation.

One of the key challenges of Brazilian society is to improve basic education quality. Brazil has universalized the access to basic education (9 years) and has created a strong post-graduation system, responsible by most part of Brazilian scientific production and researchers' formation.

In Brazil, the first 9 years of education (known as fundamental education) are assigned to towns; medium education (high school, 3 years) are assigned to the states of the federation; and university are assigned to Federal government, although some states created its own university system. The Federation rules the system but do not manage schools location, management, and teachers' wages and so on in pre-university system. And there is a large private educational sector. Brazilian elite normally study in top private basic and medium schools and in public universities.

Federal Government launched three main actions in the last three years: the expansion of the Federal system of Universities, which remained paralysed for a long time; the realisation of national evaluation (national test) of the basic education and the divulgation of the best practices; and the creation of a special fund[14] to support quality improvement in basic education – to improve teachers' wages, teachers' continuous education / formation, to improve physical facilities etc. Associated to these efforts, the Government launched a large program of e-learning creating The Open University of Brazil, aiming at teachers recycling as a first task.

Strictly linked to PITCE guidelines The Ministry of Education (MEC) and The National Council of Scientific and Technological Development (CNPq) launched a program for finance doctoral students in microelectronics, nanotech, biotech and engineering; the Ministry of Science and Technology launched a program for facilities modernisation in engineering schools (laboratories etc.); the Ministry of Labour launched a program for the formation of technical workers for software development (programming and analysis).

2.4. First Results

Since the policy was launched late 2003 – in practical terms, in March 2004 – there is still no time and data to an in-depth quantitative evaluation. We can sum up the policy as PITCE and Brazil 3 Times; here, we include all measures taken from agencies and banks of development (BNDES, Finep, CNPq etc.), ministries, regional / local agencies (like Foundations for the Support at Research) etc. Anyway, data already gathered and quantitative analyses lead us to a positive appreciation of the Brazilian path to the knowledge-based society. It is clear that Brazil faces huge problems to follow this path but it is also clear that most of them are macroeconomic ones, and Brazilian economy is getting stronger and stronger: external restriction was virtually ended due to US$ 40 billions yearly superavit in trade balance; poverty and inequality is being reduced consistently; inflation is low and under control etc. Brazilian history shows that for a change occur it is necessary a long path of maturation; Brazil is like a big ship, not suitable for fast manoeuvres but keeping a continuous journey.

By its own characteristics, PITCE has more public visibility than Brazil Three Times program– and more criticisms as well. We would like to put light on some key points: a) the institutional building; b) the perception of private sector – companies, press; c) the commitment of State agencies and key civil servants.

[14] Fundeb – Fundo de Manutenção e Desenvolvimento da Educação Básica.

Institutional building is of utmost importance. Brazilian development institutions were shaped for a kind of development the country does not need anymore. Although important improvements were made since 2004, there is still a long way to go. There is a need to adapt / reshape institutions for the development pattern of the XXI century.

Private sector used to follow the official speech apart from criticizing taxes and claiming for incentives of different types. PITCE was received very well: private leaders criticize the speed of implementation (they would prefer a faster track) but generally speaking they do not criticize the guidelines. Actually, it is quite difficult to distinguish critical considerations on taxes, interest and exchange rates etc. from critics on PITCE – they use to appear together.

In fact, since the launch of PITCE and the increase in the discourse of state agencies, state officials, and governors regarding innovation, private sector followed the path. The National Confederation of Industry (CNI) realised its first conference on innovation; some sectorial entities promoted seminars, conferences, meetings and the like on applied nanotech, biotech and other bearing themes for the future.

The press has also moved in a similar direction. Major newspapers, magazines and TV networks dedicated to Ipea's research on innovation large space and comments. For instance, the findings that firms innovating and differentiating products are more productive, pay higher wages and are more likely to be exporters have rendered a Sunday first page (main news) at "O Estado de São Paulo", one of the main Brazilian newspaper and were published by all the main national newspapers, including the business ones; many regional newspapers have reprinted related news. There were also live interviews at Rede Globo (main Brazilian TV network) and the main radios and magazines.

At the academic level, engineering and – to say - applied hard sciences have received very well the idea of an industrial and technological policy. Some more liberal economists at first were a little bit worried wondering whether the industrial policy could mean a waste of money – that was a widespread perception at the end of military government late seventies. But as the policy is based on innovation and it is not based on the 1970s protectionism, these criticisms turned to be of a different kind: the need to improve the speed of the policy.

Actually, most criticisms mix short term restrictions with long range policy. For instance, some industrial leaders consider that industrial policy is important but more important is tax reductions and the reduction of interest rates. It is obvious that one can not apart macroeconomic conditions and policy from a mesoeconomic policy like industrial and technologic one. But it is a fact that macroeconomic policy by itself does not drive innovation and technology development, although in less developed countries, or, to be more precise, although in Brazil.

3. THE LISBON STRATEGY AND THE BRAZIL: PERCEPTIONS, IMPACTS, EVALUATION

Brazil – Europe Union relationship is anchored on solid historical and cultural ties, based on democratic values which orient common actions for economic development along with social justice and the promotion of world peace.

EU is the main foreigner investor in Brazil; a strong and diversified commercial partnership was developed. EU is the main destination of Brazilian exports whether industrial, agricultural or service goods, and the second main source of Brazilian imports.

Recently the relationship has being strengthened and diversified; the visit to Brazil of the President of the European Commission, Mr. José Manuel Barroso, the first visit of an EC President, has allowed to increase the pattern of relationship.

Current cooperation is being developed in several fields strongly affecting the definition of Brazilian public policies. Cooperation involves themes such as poverty reduction; social inclusion and development; support for external insertion of Brazilian SMEs (ABDI is the Brazilian partner of this project); modernisation of public administration; climatic changes and global environmental governance; education, science and technology. It is helpful to remember that Brazil has a long relationship with European educational institutions, moreover universities. For instance, The Ministry of Education (MEC) and the main Brazilian university, the São Paulo state-owned USP (University of São Paulo) have live agreements with French, Italian, German, British, Portuguese, and Spanish universities, among others; The Polytechnic School of the University of São Paulo has an agreement of double degree with French Ècole Polytechnique (and with the others Engineering "Grands Ècoles" – Ponts et Chaussées, Mines, and the Centrales), with Milan Polytechnic etc.

There is also an enormous potential for cooperation in energy since EU is the major importer and the second major worldwide consumer of energy, depending on external sources to supply around half of their needs. Brazil has a unique position in energy mainly because of renewable energies like ethanol and biodiesel[15].

In this brief presentation we can see that Brazil – EU dialog has ever been based on relevant and contemporary themes. It should be mentioned that, for Brazil, the relationship with the EU is much more than economical, gathering a strong political and strategic relevance. We would like to discuss two issues where the relation with institutions or countries of the US was of utmost importance in Brazilian public policy making towards a knowledge-based society: the definition of an industrial policy based on innovation (PITCE); and the building of the Strategic Unit (NAE)

Firstly, during PITCE elaboration, there were important exchanges with EU. Apart from the inspiration derived from the analysis of documents, programs and institutions, several contacts were conduct with experts and organism; Brazilian government was quite interested in building guidelines and institutions for a long range policy. It is important to quote frequent contacts between Professor Maria João Rodrigues and The Institute for Applied Economic Research (IPEA), the biggest Brazilian Government think tank that firmly supported the elaboration of the policy.

Secondly, UE – Brazil connexions became more effective during the installation and initial activities of the Strategic Unit (NAE) created by President Lula in 2003[16]. As we have seen in section 2.2.1, page 4, NAE mission is to think of, select and structure key themes for the Brazilian future, looking at

> "The offering of qualified information to aid the President strategic decision process"

[15] The original process s of producing biodiesel on ethylic route is Brazilian; ethylic route uses ethanol; methylic route uses methanol obtained from oil refinery, not from biomass.

[16] President Fernando Henrique Cardoso gave an important contribution by creating the Secretary of Strategic Issues (SAE) but it has lost importance in his own government.

The main subjects already under treatment are biotechnology and bio assurance, bio fuels in general and biodiesel in particular (due to the link with regional development), climatic changes, political reform, nanotechnology, ICTs and supercomputing, quality of education. All these documents are free for download at www.nae.gov.br (in Portuguese).

During the program Brazil Three Times (Br3T), still under development, two main connexions were set up: with United Kingdom Strategic Unity (linked to the Prime Minister), and with UE Strategic Commission.

3.1. Cooperation and Exchange of Ideas and Projects

Real cooperation means respect to each one agenda, to the agenda of each country involved. We could say that the most important from the Brazilian point of view is o sustain and improve the – to say – initial push of Brazilian companies towards a innovation and knowledge-driven business strategy. In that sense, cooperation with EU may consider:

a) networking – of companies, R&D activities, supply chain etc. Brazilian companies are investing abroad – for instance, two collective logistical centres in Europe, one in Frankfurt, Germany, the other in Lisbon, Portugal[17]; productive investment abroad is growing as well.
b) knowledge for qualifying small and medium enterprises to move towards a more consistent innovation practice.
c) regional development based on innovation, technological parks.
d) institutional building, on national and international basis.
e) bio energy and environmental issues.
f) improvements in the traditional exchange at university level.
g) methodological knowledge on indicators and evaluation of innovation polices. We are engaged on the building of the Observatory of Innovation and Competitiveness, based on the University of São Paulo with partnership of Ipea and ABDI. The main projects are: to set a bunk of indicators to manage innovation in service activities, as well as indicators of development – there are many criticisms in the current ones; to monitor IPR news and development; to create a site for discussion, learning and diffusion of information; to understand what happens the day after the launch of many national initiatives for innovation: how the speech is linked to real practice.

* * *

Brazil is involved in a transition from the traditional industrial development heavily sustained by state investments in plants, huge subsidies and a high protected environment – the so called national-developmental strategy – to another model, more flexible, more world integrated, reducing social and regional disparities.

In that sense, the objectives proposed by the Lisbon Strategy have inspired and are still inspiring the building of a set of Brazilian public policies. The Lisbon Strategy, aiming at economic and employment growth and in the long range to make Europe's economy the most competitive in the world – a huge challenge – clearly has stimulate Brazil to rethink its development strategy.
Lisbon strategy induced to strengthen the idea that broad learning and innovation strategies connected to knowledge generation and scientific and technological capabilities, are in the root of superior performance of some countries. More than to copy foreigners'

[17] Apart from centres in the US and other countries.

experiences or models, the question is to deeply analyse long term processes in order to understand how they became fundamental for social and economic development.

But European approach also creates some tensions in diplomatic relations. On the one hand, the European efforts to increase their capabilities of knowledge generation and knowledge-value creation inspire the definitions of Brazilian public policies. On the other hand, there is a preoccupation on the set of a new protectionism based on technical standards and technological transfer restrictions. This perception has increased during bilateral negotiations EU – Mercosul and during multilateral negotiations at Doha round (WTO). Europe resists in opening agricultural markets, trying to bargain the opening of services. Fortunately, diplomatic negotiations are likely to recommence in a more mature level.

4. FINAL REMARKS

Brazil has some assets in the run for a knowledge-based society and economy. A diversified and integrated industry, a dynamic service sector, leadership in key areas like renewable energies (hydroelectricity, bio fuels), parallel super computing, oil extraction in deep see etc. A good and booming science that grew six times faster than the world average. More than 10.000 new doctors (PhDs) every year, increasing. A stable economy in a stable region, with stable democratic institutions.

The country launched explicit documents looking at a knowledge-based economy, mainly the Industrial, Technological and Foreign Trade Policy (PITCE) and the program Brazil Three Times (Br3T). A low wage economy will not be able to sustain Brazilian development. Moreover, it will always be a country with lower wages to compete on commoditized products. A competitive strategy based on low wages and not considering technical progress is a bad choice in the long run, making more difficult the construction of a contemporary national development strategy.

Moreover, since markets are more open and more integrated the advance of competitors means that an economy that does not innovate does not reach the same level. In matter of fact, it is pushed down due to its relative loss of competitiveness.

However, the slowness in the definition and in the regulation of programs, tools and initiatives that give practical life to a knowledge-based development, as well as the difficulties in coordination among the several government organisms put a yellow light, an alert signal on the track.

Anyway, difficulties exist to be surpassed, and Brazil is fighting against them. With critical analysis and the alignment to initiatives like the Lisbon Strategy, we do believe that Brazil depends more and more on the increase of its own technological effort to fasten its growth, to be better positioned on knowledge-based markets, to reduce its inequalities and to improve peoples' standard of living.