



Research Proposal

The Emergence of New Successful Export Activities in Latin America

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ACRONYMS

ABIT	Associação Brasileira da Indústria Têxtil e de Confeção / Textile and Garment Brazilian Industry Association.
ABRABI	Associação Brasileira de Empresas de Biotecnologia/ Brazilian Association of Biotechnology Enterprises
ATM	Automatic Teller Machine
DNA	Deoxyribonucleic acid
EMBRAER	Empresa Brasileira de Aeronáutica / Brazilian Aviation Enterprise
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária/ Brazilian Agricultural Research Corporation
FENIT	Feira Nacional da Indústria Têxtil / Woven Industry National Fair
FINEP	Financiadora de Estudos e Projetos / Projects and Studies Supporter
HS	Harmonized Commodity Description and Coding System
MSE	Micro and Small Enterprises
NGO	Non-Governmental Organization
R&D	Research and Development
SECEX	Secretaria de Comércio Exterior / Foreign Trade Office
SIM	Salão Internacional da Moda / International Fashion Saloon
SUFRAMA	Superintendência da Zona Franca de Manaus / Manaus Free Trade Zone Superintendence
UFRGS	Universidade Federal do Rio Grande do Sul / Rio Grande do Sul State Federal University
UNICAMP	Universidade de Campinas / Campinas University
UNIVALI	Universidade do Vale do Itajaí / Itajaí Valley University
UNIVILLE	Universidade da Região de Joinville / Joinville Region University

1. Introduction

This proposal is in response to a Call for Papers, issued by the Inter-American Development Bank, which investigate the emergence of new successful export activities in Latin America. The essential objective of this body of research is to increase our knowledge of the vectors that influence the process of discovery of new export-oriented activities and their diffusion in the economy.

Within this context, the current proposal seeks to explain Brazil's export situation and to perform an in-depth analysis of three chosen sectors – **Biotechnology, Automatic teller machines (ATM) and Fashion (clothing industry)**. These particular sectors were identified following a careful selection methodology. **An effort was made to avoid working with competitive cost oriented sectors, sectors highly dependent on natural resources, or sectors that operate with low levels of technology. Certain sectors were given priority over others due to their unique characteristics and high aggregate value. In addition, the selection process was aimed at providing a sampling of differentiated cases where specific forms of knowledge could be generated, thereby enriching the final results of the research project.**

In the case of Brazil, the selection process has proven to be extremely complex, for the country currently contains a great number of possibilities for new export-oriented activities. We mention this complexity due to Brazil's relatively elevated level of national economic sophistication and the country's large number of exported products¹.

Brazilian exports exceed 100 billion dollars, total, and have become increasingly diversified in recent years. Brazil currently exports everything from traditional agricultural commodities to technologically sophisticated products which congregate extreme aggregate value. However, Brazil's participation in foreign commercial relations continues to be relatively unimpressive, representing only 1% of total global trade. Brazil's global participation is particularly lackluster when compared to the size of its national economy.

A series of factors that have historically limited the country's capacity to benefit from growth in international trade relations. These include among other important elements: (i) serious political instability – the death of Getúlio Vargas, the abdication of Jânio Quadros and the subsequent coup and rise of the military regime; (ii) the implementation of a development model based heavily upon import substitution; (iii) the persistence of market reserves policies, especially within the technology sector; (iv) at least two decades of serious inflation; (v) and a moratorium on foreign debt payments².

In the early 1990's, a second series of factors began to make itself felt and these were more favorably inclined towards the "internationalization" of the domestic economy. Brazil succeeded in stabilizing its currency and consolidating its democratic institutions. Trade policy reform has stimulated productivity growth and helped integrate Brazil into the global economy. As a result, during this more recent period the country witnessed the emergence, growth and some measure of consolidation of new, dynamic, and highly sophisticated export sectors. It is true that these sectors

¹ In the following sections, we will present a detailed analysis of this subject.

² This analysis is not intended to be exhaustive. Rather, we present it in order to connect some of the relevant elements in the country's economic and political contexts.

are still a small percentage of Brazil's total exports, but they are important instruments for the construction of a cycle of future sustainable growth.

This project has as its focus the investigation of the emergence, growth, and eventual consolidation of three promising sectors. Our investigations seek to provide a valuable complement to the systematic evaluation of public interventions, creating a more complete understating of the process of discovery and diffusion.

We feel that we are in a unique position to competently perform the proposed research project, due to the combination of attributes and professional experience our team of researchers possesses. Our team has:

- (i) Experience in academic research in the areas of economy and administration. The Research Center on Firm Internationalization (NuPin) of the COPPEAD Institute has been studying the export management of firms for 28 years. Themes studied were connected to the decision-making process in exports, the motivation to export, the perception of barriers preventing exports, quality control in exports, marketing and communications strategy abroad, the education and training of executives for exportation, the impact of subsidies on exports, the choice of channels for exports, and other entrepreneurial decisions associated with export activity. Furthermore, the Brazilian experience with trading companies and export consortia gained the special attention of the researchers. In 1989, the Center broadened its scope by beginning to study not only exports as an international business activity, but also other "outward" internationalization activities such as the opening of offices, the installation of plants, joint ventures and strategic alliances. They also began to deal with "inward" internationalization, that is, with the establishment of alliances and franchisees and the technology transfer among multinational and Brazilian companies.
- (ii) Experience in field work and offering direct technical assistance to companies and governments in exportation promotion. A number of our researchers are active in a trade-led export growth program currently being implemented in the Brazilian Northeast. This program analyzes export sectors in the region and works to increase exports with those sectors which demonstrate the most potential. The selected sectors are entitled to direct technical assistance provided by the program. In our opinion, it is apparent that there is a marked synergy between the work performed by this program and the research activities detailed in the current proposal.

This proposal has been divided into seven sections, in addition to this introduction. The second section, "Methodology", details the proposed work and the methodology to be applied during the research. This section also presents the research methodology which was used in the development of this proposal. The next section, "Overview of Brazilian export performance", presents a brief analysis of Brazilian exports. "Sector Selection" explains the process by which our researchers evaluated Brazilian exports and chose the three sectors to be analyzed in the current research projects. Section 5, "Initial Study of the Sectors" presents a condensed analysis of two of the sectors chosen (Automatic Teller Machines (ATM) and Fashion (clothing and apparel)) It also offers up a more in-depth analysis of the remaining sector, Biotechnology. Section 6 "Technical Team", gives details regarding the professional curriculums of each of the researchers involved in the execution of the project. Section 7, " Budget", lays out the research project's costs. We conclude our presentation with a series of "Appendixes".

2. Methodology

The objective of this research project is to study the elements that affect the discovery of new-export-oriented activities and their diffusion within the economy. This objective will be achieved through case studies of products or sectors which, twenty years ago, were either not present or were an insignificant element in Brazil's economy but which are today considered to be important export products/sectors. Given this goal, it is of interest to understand how the discovery process took place within each of the selected cases and, in particular:

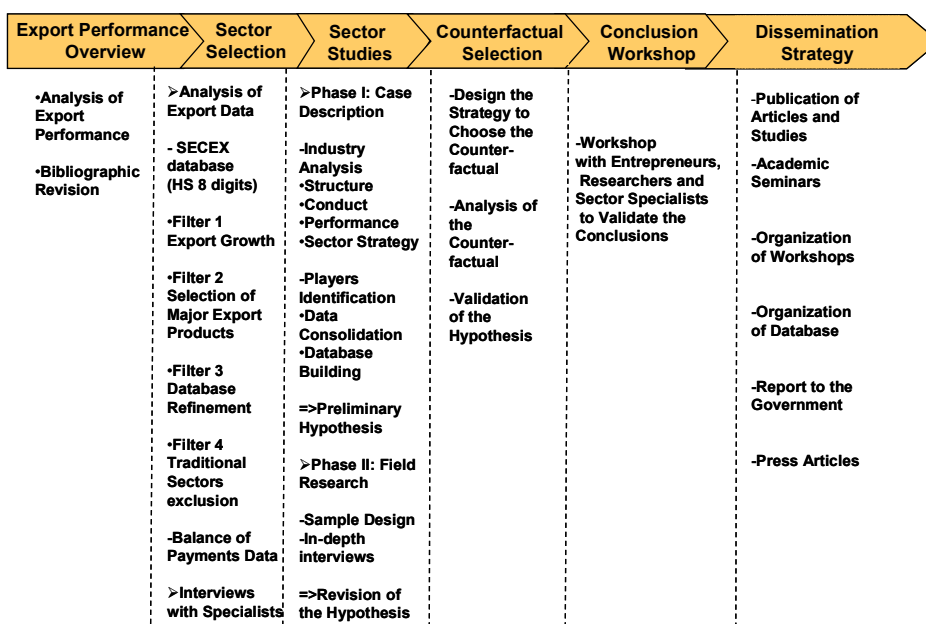
- 1) The characteristics of the first mover and the challenges they face;
- 2) The characteristics of imitating firms and the diffusion process, in particular the channels and magnitude of spillovers;
- 3) The role of trade liberalization, FDI, export subsidies, government support, and other similar elements in encouraging or inhibiting discovery and diffusion.

A crucial step in understanding our research process is to look at how we chose the cases to be analyzed. This section will present a detailed description of the methodology used in selecting the sectors, as well as the proposed strategy for case study and analysis. The methodology we have used here is comprised of six stages, the first two having already been carried out for in the elaboration of this proposal:

- Phase 1: A general analysis of Brazilian exports
- Phase 2: Selection of sectors (or activities)
- Phase 3: Study of the selected sectors
- Phase 4: Selection of counterfactual cases
- Phase 5: Conclusion workshop
- Phase 6: Strategy for the dissemination of the study

The proposed research methodology is based on three main sources of data collection: (i) primary research of a qualitative nature among sector companies and public or private institutions; (ii) official and trade associations databases; and (iii) secondary sources such as articles from journals and newspapers.

Figure 1 – Research methodology



2.1. Analysis of Brazilian exports

The following general analysis of the performance of Brazilian exports was constructed using the SECEX (*Foreign Trade Office*) database and through bibliographical research regarding the subject. In addition to the history of the sectors in question, their representation within the total of Brazilian exports and any changes in their composition were analyzed based on differential rates of sector growth.

A brief bibliographical mapping of the issue was conducted in order to identify any analyses regarding the impact of trade liberalization, exchange rate policy, productivity growth, the emergence of new business areas, the technological composition of export products and the absolute and relative performance of Brazil within the global market.

2.2. Sector Selection

The selection of the sectors to be analyzed is performed in two phases. First, production and exportation data is collected and analyzed for each sector. Following this step and armed with a list of potential sectors, a group of specialists is interviewed in order to discuss and identify products or sectors that could serve as relevant case studies.

2.2.1 Analysis of exportation data

The best option for identifying products that were not produced in Brazil 20 years ago, but which are today are considered major exports is to analyze domestic production information and cross reference that with available exportation data. However, because data on industrial production is not itemized in such a way as to allow the identification of new products, our selection process must primarily rely upon an analysis of exportation data.

Information on the export of merchandise and commodities is provided by the SECEX (*Foreign Trade Office*), while data on the export of services is reported by the Brazilian Central Bank.

2.2.1.1 SECEX (Foreign Trade Office) database

Information on the export of Brazilian goods is made available to the public on the internet through the Foreign Trade Office (SECEX). Data is released on a monthly basis and is separated by producing state, country of destination and type of product, classified using an 8 digit code in accordance with the Harmonized Commodity Description and Coding System (HS). Records were only converted into digital form in 1989, making it possible to construct a database for products exported from the country between 1989 and 2005. The result is a usable database comprised of 9,605 product types tracked over a 17-year period.

The source of official data also contains the name of export companies, addresses, and the amounts exported by each one. Unfortunately, the complete database is not available to the public. When information on companies is made available, exported products are not reported, making it impossible to construct a longitudinal sequence which contains both the values exported and the companies exporting. As a result, our analysis was limited to an analysis of products.

According to Klinger & Lederman (2004), the level of separation to be used in the analysis is not an obvious choice. Greater separation allows for a more specific study of products through which discoveries can be confirmed and uncertainties cleared up. On the other hand, given an 8 digit classification, differences in products may not be relevant in terms of production and difficulty of discovery.

Because Brazil's industrial base is quite diversified, we therefore decided to analyze the products at their highest level of separation, believing that any discoveries in the productive base would occur mainly within sectors which were already consolidated and which would be hidden in a four or six-digit analysis.

The eight-digit data base contains 9,605 products, the majority of which belong to sectors that enjoy considerable consolidation in the country. It was therefore necessary to apply a number of filters in order to select more interesting products. The Excel spreadsheet sent with this proposal presents a complete database, with the filters applied, and the results of each stage of analysis.

Filter 1 – Selection of products with an average growth greater than the total of the sequence.

The proposal request states that research should focus on cases which “have recently emerged and experienced strong growth, going from basically zero to becoming a ‘major’ export”. Therefore, the first filter applied to the exportation base is the average growth of the sequence for each of the 9,605 products. Based on the results of this initial filter, products with low levels of growth were then eliminated. Due to the presence of a large number of zeros throughout the sequence, the angular coefficient of the sequence's variation was used as a growth indicator, standardized by an average value of 17 years. Based on this number, all products were eliminated that had an average growth which was less than the total growth of the sequence (7%).

Filter 2 – Elimination of products with exports totaling less than US\$ 5 million in 2005.

Another reference made in the proposal was that the cases selected currently be considered a major export product. While it does not specify what, exactly, a "major" export is, the filter is intended to eliminate products whose export value in 2005 was less than US\$ 5 million. The selection of this particular amount is arbitrary, however. We feel that it is a conservative estimate for a relevant

product on Brazil's export list, considering that it represents only 0.005% of the total exported by Brazil in 2005.

Filter 3 – Corrections due to lack of data

The third filter attempts to correct for lack of information in the database. Due to a change in the classification of goods and merchandise from 1995 to 1996 and the obvious failings of the conversion system, there is a very real possibility that the sudden growths in the sequence in 1996 could represent a reclassification of a product rather than the discovery of a new one. Therefore, products whose sequence went from zero before 1995 to more than US\$ 5 million in 1996 were excluded from our selection.

Filter 4 – Exclusion of traditional sectors.

One of the requirements for reference is the identification of products whose domestic production was insignificant 20 years ago. As there is no widely disseminated database for domestic production, we performed individual analyses of a number of important sectors on the export list. Sectors such as the metal, chemical, paper, and meat industries were investigated in order to identify their relevance within the domestic economy during the 1970's and 1980's (eliminating them as non-discoveries). As part of this investigation: (i) reports and sectorial studies were consulted; and (ii) interviews were held with representatives of trade associations and with specialists in the respective sectors.

After this final filter, a list of sector finalists was elaborated which we then discussed with sector specialists.

2.2.2.2 Data on the export of services

Data on the export of services is available from the Brazilian Central Bank. The historical sequence begins in 1947 and contains 25 categories. Unfortunately, the data available does not allow for a detailed analysis of exported services,. However it does point to certain categories that deserve a more detailed examination.

The service categories identified as potential selections were added to a list of merchandise chosen by specialists in foreign trade.

2.2.2 Consultations with specialists

With the final list of merchandise and goods (including a selection of services from the Brazilian Central Bank) the next stage in the selection process began: consultation with specialists. This stage was extremely important as – given the long list of finalists produced by the filtering process described above, an often very technical description of the products involved and each sector's internal specifications – the process of selecting the most interesting cases was quite difficult.³

A series of macroeconomic analysts, sectorial specialists and experts in foreign trade were consulted. First, requests were made for information regarding the most important recently

³ As mentioned in the Introduction, the members of our research team have already completed the identification process of exporting sectors. According to our experience – and despite the wealth of existing information in the country –specialist consultation has been proven to be most valuable and cost effective research tool. During research previously undertaken by our team, indications from specialists have provided new and important contributions to the list of interesting cases, assisting in the identification of a number of cases that were not revealed by the numbers.

emerging sectors, without presenting our list of finalist sectors. Following this, consultants were asked to give their opinions regarding the short list of finalists resulting from the selection process described above. Using this sequence of questions, the interviews served to compile a complementary list of potential cases including sectors that were not previously selected using the HS classification system. These cases generally turned up because their classification code did not clearly indicate the product in question or because they had been divided into different classification segments.

Through consultation with various specialists, our list of goods, merchandise, and services was thus narrowed down once again. It then went through a rigorous qualitative analysis: (i) avoiding cost-competitive oriented sectors, sectors highly dependent on natural resources, or sectors operating with low levels of technology; and (ii) highlighting sectors with high levels of differentiation and considerable aggregated value. In addition, the selection process aimed at providing a sampling of differentiated cases where specific forms of knowledge could be generated, thereby enriching the final result of the research project.

2.3. Study of the selected sectors

Following the research above (already completed) the information most relevant to the study (such as the characteristics of the first mover, the challenges faced, the characteristics of the imitating firms, how the process of the diffusion of knowledge took place and the role of the government) will be obtained through primary research with companies and public institutions. Due to the type of information we wish to collect, our research will be essentially qualitative in character. The most important aspect of the project will be in-depth interviews conducted with the companies active in the relevant sectors (in terms of sales and market presence) and the compilation of a sample with the greatest possible diversity in company profiles.

To guarantee the accuracy and veracity of the analysis, the research will be based on and backed by official data. This should be sufficient to identify the number of companies, the main relevant events for the sector and to confirm information provided in interviews. The principal databases utilized are described in the attachments.

The methodology which will be followed in analyzing the selected sectors can be divided into three distinct phases.

2.3.1. Phase I

Industry analysis.

The industry analysis presented below is designed to provide an overall picture of the industry through an investigation of its principal elements, here using the SCP, Structure, Conduct, and Performance, model.

1. Structure of the Industry:

- Value chain: Value chain design; Distribution of the added value; Bargaining power over the chain; Market failure; Case specific: Where it has operated? What competitive advantages exist?

- Demand: Product matrix (existing and potential); Global Market analysis (global trends in demand); Consumer analysis; Channel analysis (Channel segmentation by region; List of key market buyers by region; Key buying factors by channel segment; Price by product and channel segment; Key constraints and trends of channel segments).

- Supply: Map of the production chain (inputs, processes, technology, key constraints, key trends); Key producers throughout the chain; historical analysis of supply; key competitors and market share by regional market; key constraints and trends of suppliers.

- Enabling environment: Lessons learned from development projects in other countries and in Brazil; Regulations in the target countries and in Brazil; international trade regulation; taxes and subsidies in the target market and in Brazil; effect of macroeconomic factors on product trade (in the target countries and in Brazil); policies for encouraging exportation.

2. Conduct and Performance of the Players

- Key strategy by players in Brazil: large-scale and MSEs
- Success strategies of players in other countries
- Strategy of competitors in the market focus (pricing and promotion; product and package design; production and trading over the value chain; technology; access to finance)
- Competitiveness of Brazilian suppliers

3. Summary of the Sector Strategy

- Key success factors of in sector operations
- Key challenges, threats and opportunities for the sector

Analysis of the companies

This phase seeks to identify the sector players, including the first-mover, imitating firms, research institutions, supporting government institutions, lenders and specialized business support services. The aim is to compile a list of the sector's main firms and of support institutions and companies.

First, key states and subsequently cities that export the product were identified using SECEX data. Following this, the companies operating and exporting in the regions will be detailed, thereby identifying the export companies.

To this list will be added the names of companies registered in industry associations (if applicable), which were identified in the industry analysis and cited in other databases. After compiling the company list and contact information, a brief questionnaire will be sent to the companies' commercial departments in order to gather basic information on each firm's profile. This will include the following information: the year the company was founded, the range of its earnings, the year it began exporting, a list of goods sold, the number of employees, its location and the source of its capital. The researchers will seek to establish a partnership with industry associations so that these can participate in the selection process. This, in turn, helps ensure that the greatest possible number of companies will respond to the questionnaire.

The list of support institutions will be compiled based on references from sector companies and specialists as well from bibliographical sources. Both the database and the list of support institutions will be expanded following company interviews if names are suggested that were not previously identified.

This report on the players and their key characteristics (such as the year operations began and when the first overseas sale was made) helps us to formulate theories regarding who was the first mover in the sector and which were the imitating companies. Additionally, the database will help to establish the initial survey sample.

In this phase, we will respond to the following questions regarding the first mover, the diffusion process and government participation⁴:

First mover: Which was the first firm to export a non-negligible amount of the goods in question? Was it a foreign or domestic actor? Was it an existing firm or an individual entrepreneur?

Diffusion: Describe the process & by which other firms gradually joined the pioneer in exporting the new product. Describe the firm dynamics: how many firms had entered the market 5, 10, and 15 years after the discovery? What are the characteristics of the imitating firms (foreign/domestic, firms/individual entrepreneurs, coming from other industries upstream/downstream or using similar technology, or unrelated industries, etc.)? Did these firms discover new markets for the product, or did they supply the same markets as the first mover? What happened to the first mover's share of exports?

Public response: Characterize the degree of public involvement in the discovery and diffusion process, if any. Were there other external, non-state actors who aided the process of discovery and diffusion, such as NGOs, industry & trade associations, academic institutions, etc.?

2.3.2. Phase II – Field Research

In this phase, field research will be conducted with a sample of the sector's support companies and institutions. The sample of companies will be selected from the database built in the previous phase. The issue of geographical location will be carefully analyzed to provide understanding as to how the companies' locations do or do not influence the process of knowledge diffusion, as indicated by Audretsch & Feldman (1996), Marshall (1920) and Krugman (1991).

The main company factors investigated will be the following: sector history (entrance of companies in the market), reasons why owners began their business, key developments, the process of discovering new products and processes, channels for transmitting knowledge, interaction between sector agents, collaboration between private and public agents, market deficiencies, the decision-making processes and the system of incentives. In addition, interviews will establish the existence of copycats and their impact on research activity, diffusion of knowledge and formal company sales. Given the type of information sought, in-depth interviews will be conducted with executives from each company.

Regarding government support, the following issues will be investigated: how relevant organs view the sector's development, types of government support, available public financing and the government's stance on adapting regulation and infrastructure.

Following the first round of interviews, information will be systematized and theories assessed. If necessary, another round of interviews will be conducted to confirm or discard conclusions. In this second round, companies and institutions identified as important competitors (official or otherwise) in the first set of interviews may be included in the sample.

In this phase, the following questions will be posed:

First mover: What led this firm to begin its activities: where did the idea come from, and what was the motivation for selecting this particular country/product? What is the history of this entrepreneur/firm (were they involved in a related industry domestically or abroad, had they

⁴ Some of the questions listed here were only partially addressed, allowing the survey conductors to build a hypothetical model. These questions and the model were elaborated, corrected and/or validated in Phase II of the survey, described below.

previously experimented in other new activities but failed, etc.?) What were the greatest hurdles to overcome? What were the greatest uncertainties at the planning stage, and what were the biggest surprises during the early days of the discovery? What was the degree of learning and productivity improvement? How did the first mover penetrate the foreign market, or did they begin with the domestic market? What were the coordination difficulties, and how were they overcome? What, from the point of view of the first mover, were the positive spillovers, if any, that they generated for subsequent entrants? Did they anticipate these spillovers in advance, and if so, did that influence their investment decision? How has diffusion affected the first mover: has it eaten away their market share, enhanced productivity through agglomeration economies, or something else? What are the other relevant aspects of the first mover's story?

Diffusion: Was export growth related to the rate of diffusion? What limited the first mover from expanding faster and capturing more of the benefits of their discovery: were there financial or managerial constraints, did imitators drive up factor costs, did imitators compete directly with the first mover in the market, or was there something else? What was the process by which the knowledge diffused? What was the degree of uncertainty in the planning process of the imitators- were there important spill-ins from the first mover? Did significant uncertainty remain in the planning process? What was the learning curve like during the early years of operation? Was the same degree of investment in foreign market cultivation necessary?

Public response: What, if anything, did the Government do to stimulate the discovery (e.g. tax incentives, special economic zones, etc.) and/or accelerate diffusion?

2.4. Counterfactual Cases

It is hoped that in the course of the research a series of key factors will emerge concerning the sector's development. In this phase, the theories about the importance and validity of each factor must be confirmed. This can be done by querying the different companies about the importance of each factor. Nevertheless, the analysis of a counterfactual case will be necessary in order to confirm the importance of the factors identified as relevant.

The analysis of the counterfactual case seeks to show what would have occurred in the sector under analysis if the key factor had not existed. However, since such a counterfactual hypothesis cannot be directly observed, it analyzes the performance obtained by other firms or similar sectors which did not undergo the same process, comparing them with the case in question. The evaluation of a policy, intervention or development is thus subject to the identification of a comparison group. In the case of company analyses, the choice of comparison group is especially difficult due to the particularly distinct characteristics of each company.

Given the numerous difficulties involved in building a comparison group which can provide reliable validation of a proposed result, as well as the substantial additional effort required to investigate comparison companies, our study will apply a less rigorous counterfactual hypothesis, studying a similar but less successful case in order to verify the consistency of the histories gathered in during our research.

Definition of the counterfactual can only occur after research has identified the main hypothesis on the causes of the sector's development. With the causal model established, it will be possible to define which counterfactual options are most applicable. Two strategies may be employed to select the counterfactual: (i) select companies from the same sector in another geographical region in Brazil (or in another country) and which have presented an inferior performance, or (ii) select another sector within Brazil that has been influenced by the factor identified as crucial to the development of the case under analysis.

Selection of the counterfactual case will depend on three factors: (i) the existence of similar, unsuccessful, cases in Brazil, (ii) specific sector features, and (iii) the type of factor identified as crucial to the sector's development. For example, in the case of biotechnology, one would not likely expect to find a counterfactual in Brazil since the sector does not have well defined boundaries. In the case of fashion, if the incentives considered to be a key to the sector's development were limited to a specific region, one could compare the performance of the companies analyzed in the case with companies from other regions in Brazil whose performance was inferior.

2.5. Conclusion workshop

The conclusions of the research as well as the counterfactual analysis will be presented in a workshop. Sector players such as entrepreneurs, R&D institution representatives, public agency employees and specialists will be invited to attend the workshop and discuss our conclusions. This event will be organized in order to guarantee that there is an agreement regarding the discovery and diffusion process identified. In addition, participants will be stimulated to brain-storm about policies which can be implemented in order to sustain the sector development.

2.6. Dissemination strategy

The transfer of the knowledge acquired and of technologies developed by means of the project will be assured by the utilization of several mechanisms. Concerning contributions generated for scientific knowledge, the transfer will be made as follows:

- Publication of Articles and Studies in General, Directed to the Academic Community

This will be one of the forms utilized to disseminate the knowledge generated by the project among its different audiences. In the future, efforts will be made to consolidate the experiments developed during the research for publication in book format.⁵

- Academic Seminars

The dissemination of results will also be achieved by academic seminars in universities conducting research which presents synergies with the subjects investigated by our project.

- Organization of Workshops

The organization of workshops will allow researchers to get together to exchange experiences. Researchers from all over the country as well as from universities and research centers abroad will be invited. In addition to academic workshops, efforts will be made to hold workshops in partnership with industry associations from the sectors studied so as to mobilize the public and private sectors.

- Organization of a Database for the Use of Researchers

Finally, a database to be developed will be made available to researchers and specialists interested in studying the sectors selected by this research project.

- Report to the Government

Based on project results a specific report will be prepared for the government, with indications of suggestions for public policies for the support of the internationalization of Brazilian companies.

⁵ This dissemination initiative will depend on the following: approval by IADB and the securing of resources for publishing.

3. Overview of Brazilian export performance

Brazil's dimensions, both in terms of size and population, situate the country as a regional leader and one of the main economic powers of Latin America. However, these dimensions don't reflect in its presence in international trade. Brazil's presence on the global market is small—the country is responsible for only about 0.9% of the world's international commerce⁶—but it is growing.

Up to the early nineties, Brazil was a closed economy. The liberalization policy introduced in the beginning of '90's drastically reduced Brazilian import tariffs and exposed the economy to international competition. Brazilian firms accustomed to a highly protected market were obliged to adapt their processes and reduce their costs in order to remain competitive. New investments were made and firms increased their productivity.

The liberalization of the trade regime, combined with a tight monetary policy and a fixed exchange rate adopted in 1994 to lower inflation, has had severe impacts on Brazil's trade balance. Only after 1999, when successive international shocks and pressure upon the country's international reserves led Brazil to abandon its fixed exchange rate for a flexible one, did the situation started to change. In the wake of this devaluation, more Brazilian firms began looking at external markets and creating international strategies. In 2002, the year that brought leftist President Luiz Inácio "Lula" da Silva to power, a new monetary crisis depreciated the exchange rate by 53% over a 12 month period, giving even more stimulus to Brazilian exports. In 2003, Brazil achieved its first trade surplus since 1992 and export records have been successively broken ever since.

The economic scenario of the 1990s – high interest rates, an overvalued exchanged rate, increased competitiveness and privatization – affected each economic sector in a different form. The impact of these factors on each sector depended upon the prevailing capital-production relationship, the elasticity of exports and imports, the greater or lesser relevance of capital opportunity costs per inversion project and the competitive advantages acquired by companies in each of the various sectors. In the cases in which these factors combined to generate long term perspectives, companies become more profitable, the industry becomes more competitive and the export potential greater.⁷ Thus, some sectors have become success cases and have obtained elevated growth rates in the international market: the soybean complex, beef, chicken, steel, aircraft, automobiles and auto parts are good examples of such sectors.

A preliminary analysis of goods and merchandise data points to the growth of the export base. In 1989, Brazil exported 4,897 types of products (HS 8 digits⁸), while in 2005 this number had increased to 7,242, representing a growth of 2.5% per annum and thereby suggesting the existence of numerous discoveries.

The refining of Brazilian export data and its careful analysis shows that the country has exports a significantly diversified range of products. The country sells agricultural products (soybeans, fruit,

⁶World Trade Organization, base year 2004

⁷ Miranda, 2001

⁸ Brazil's adoption of the HS system meant a reduction in the number of classified products from 13,179 to 9,386. As a result, counting of the number of the products exported in 1989 based on the NBM classification results in a greater number of products exported that year: 7,392.

sugar, coffee), chemical products, pharmaceutical products, aircraft, automobiles, electro-domestic devices, and etc (see Table 1). There are almost 10,000 different products exported by more than 15,000 companies. In addition to this, service sector exports have presented significant growth in such areas as financial services, architecture and construction, communication and publicity, tourism, and etc (see Table 2).

Table 1 – Brazil Export Ranking

Commodities	Exports in 2004 (US\$ billion)	% of total Brazilian exports
1 Vehicles and auto parts	10,583	11.0
2 Soybeans	10,039	10.4
3 Iron and steel	7,062	7.3
4 Ores	5,177	5.4
5 Oil	4,295	4.4
6 Aircraft	3,268	3.4
7 Chemicals	3,169	3.3
8 Machinery and equipment	3,107	3.2
9 Pulp and paper	2,908	3.0
10 Poultry	2,705	2.8
11 Sugar	2,639	2.7
12 Wood	2,451	2.5
13 Beef	2,409	2.5
14 Coffee	2,024	2.0
15 Footwear	1,898	2.0
16 Aluminum	1,778	1.8
17 Telephone equipment	1,564	1.6
18 Plastics	1,514	1.6
19 Textiles	1,445	1.5
20 Tobacco	1,380	1.4
21 Leather	1,290	1.3
22 Electrical Equipment	1,137	1.2
23 Orange Juice	1,057	1.0
24 Pumps And Compressors	1,026	1.0
25 Furniture	1,002	1.0
26 Pork	744	0.8
27 Stone	647	0.7
28 Corn	597	0.6
29 Alcohol	461	0.5
30 Gold	412	0.4
31 Cotton	406	0.4
32 Shrimps	391	0.4
33 Refrigerators	362	0.4
34 Ceramics	342	0.3
35 Pharmaceuticals	270	0.3
36 Glass	266	0.3
37 IT Equipment	237	0.2
38 Fertilizers	223	0.2
39 Fruit	220	0.2
40 Motorcycles	208	0.2
41 Nuts	207	0.2
42 Wheat	207	0.2
43 Cocoa	193	0.2
44 Perfume Products	189	0.2
45 Copper	187	0.2
46 Rubber	177	0.2
47 Tools	171	0.2
48 Candy	166	0.2
49 Precious Stones and Jewelry	165	0.2
50 Chocolate	121	0.1

Source: Analysis: Foreign Commerce Yearbook, 2005 – 2006

Table 2 – Services Revenue

Discription	US\$ million 2005	Annual average	Standard growth
Services Revenue	16,095	620	10%
Professional, technical and business services (mail)	3	0	22%
Professional, technical and business services (liberal professional)	455	10	21%
International travels (government travels)	28	1	21%
International travels (credit card)	2,101	99	19%
Professional, technical and business services (project execution)	8	0	18%
Professional, technical and business services (engineering and architectural)	3,372	154	17%
Computing and information technology	88	3	17%
Government	1,194	56	16%
Professional, technical and business services (professional athlete fee)	158	8	15%
Equipment rental	78	5	15%
People to people, cultural and recreation - Audiovisual	16	1	15%
Cultural and Sporting Events	40	2	14%
Professional, technical and business services (publicity)	116	9	14%
Communication	239	13	13%
Professional, technical and business services (participation in trade fairs and exhibitions)	17	1	13%
International travels (health)	18	1	13%
Professional, technical and business services (Instalation/maintenance of offices and real estate)	1,906	108	12%
Royalties and licenses	102	7	12%
Construction	8	2	11%
International travels (educational, cultural and sport reasons)	7	0	9%
Financial services	507	23	9%
Trade related	606	25	8%
International travels (tourism)	1,668	38	4%
Insurance	134	5	3%
Transports	3,186	47	3%
International travels (business)	40	0	0%

Source: Brazilian Central Bank

Brazil has positioned itself among the world leaders in some sectors which carry a significant weight in the range of national exports. For example, it produces almost 50% of the global short-ranged jet market, due to the operations of EMBRAER; it is the world leader in the sugar industry and its largest coffee and orange juice producer; it is the principal exporter of iron ore, tobacco, soybean, and beef; and it is among the leading exporters of shrimp.⁹

Nevertheless, qualitative improvements in the range of exports are still necessary. Despite the fact that the historical series of exports shows a clear tendency of growth and the substitution of primary products by manufactured ones, Brazilian performance has been inferior when compared to the global average. Only 40.9% of Brazilian exports grew at a rate equal to or higher than that of global exports and of these, only 20.9% were products of medium-high and high technology.¹⁰ The strong dependence on low and medium-low technology products implies that an important factor in the competitiveness of Brazilian products is their low price. As a result, the country's exports can be

⁹ Analysis: Foreign Commerce Yearbook, 2005 – 2006”, from *Análise Editorial*

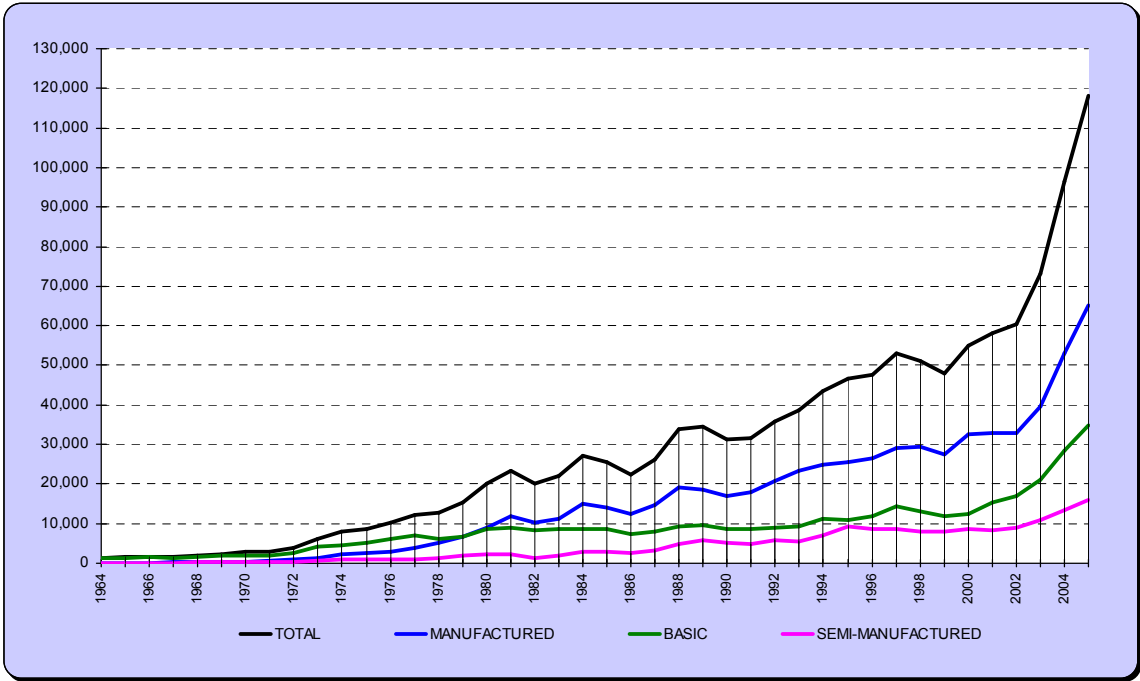
¹⁰ Miranda (2001)

easily impacted by currency variations and by the entrance of new competitors with a cheaper cost structure into the market. These factors can be demonstrated in the decline of Brazilian participation in the US and European markets, which has fallen almost 10 points in the last three years. This slack is almost certainly being taken up by countries such as China and India, whose exports to the United States and the European Union have grown more than Brazilian exports in the same period. Finally, the analysis of Brazilian export performance shows a scenario of strong concentration, with around 75% of total national exports being concentrated in little more than 250 companies.¹¹

This scenario reveals the need to identify strategies for the diversification of the range of Brazilian exports in a search of products with greater differential and technological intensity, which is precisely the motivation of our proposal.

Another important aspect directly related to the performance of national export companies is the low level of the internationalization of these companies. A large number of them still operate solely in Brazil, sending their products abroad directly from their in-country production base.

Figure 2 - Brazil Export Performance 1964 – 2005 (US\$ million FOB)



Source: Ministry of Development, Industry and Commerce

¹¹ Analysis: Foreign Commerce Yearbook, 2005 – 2006”, from *Análise Editorial*

4. Selection of Cases

We have done our selection process (being that this was within the scope stipulated for the proposal) using the methodology presented in Section 2 of this proposal. Our analyses are presented in the following sub-sections. At the end of the base analysis, information is consolidated into a single list of potential sectors, which was then put through a process of specific analysis, culminating in the choice of the three sectors that are the subject of this study (this process is detailed in the final subsection of this text).

4.1. Analysis of goods and merchandise database

The selection process began with the treatment of the main database used in this research (SECEX goods and merchandise). A desegregation level of eight digits was used, creating a list of 9,605 products.

The initial analysis of this database showed that the majority of the products analyzed belong to traditional sectors of the national economy. With the purpose of refining the analysis, four filter levels were applied, whose results are given below¹².

Filter 1 – Selection of products with average growth higher than the series' total

The first filter applied to the export base was the average growth of the series for each of the 9,605 products. The angular coefficient of the series' variation, standardized by the average value of the seventeen years of this series, was used (with the resulting value being 7%). After the implementation of Filter 1, 4,595 products were eliminated and 5,010 potential products remained.

Filter 2 – Elimination of products with less than US \$5 million exports in 2005

The second filter eliminates products with a low representation in the final series. The remaining products demonstrate a significant presence in the total of Brazilian exports. The limit value used was US \$5 million. Through the application of Filter 2, 4,037 products were eliminated, leaving 974 potential products.

Filter 3 – Correction for data error

The third filter corrects potential errors in the database generated with a change in classification that occurred in 1996. Products were excluded whose initial series started in 1996 and which have values above US \$5 million. Through the application of this filter 74 products were eliminated, leaving 900 potential products.

Filter 4 – Exclusion of traditional sectors

Brazil has a broad base for the production of goods and merchandise. This was created mainly during the import substitution period of the 1950s-'70s. As a result of this, in the middle of the 1980s, numerous sectors that currently have a significant export presence already existed in Brazil (e.g. petrochemicals, steel, paper and pulp, rubber, footwear, leather, automobiles and etc.).

¹² We would like to point out once again that the Excel file with the full database, and with the filters used and with the results of each stage, is annexed below.

Many traditional sectors went through important structural changes in the last twenty years, provoked by the economic opening, by the privatization process, the pressure of competition from imports and the fusion and acquisition process. Consequently, the level of productivity has increased significantly and new products have been incorporated into the production base. However, in a general form, the changes that have occurred in these sectors have been concentrated in the introduction of new processes instead of the introduction of new or innovative products.

Based on this, it was decided to exclude from analysis the products that compose the so-called traditional sectors of the national economy. It is believed that the product innovations introduced in these cases are the result of a natural process of growth and of greater investment in industrial plants. Therefore, these are not interesting cases for the study of the unfolding of the learning process and the discovery of new products¹³.

Consulting the economic literature related to the theme and after having interviewed sector and export specialists, the following list with the most relevant traditional sectors was constructed¹⁴: sugar (HS 17), aircraft (HS 88), aluminum (HS 76), poultry, beef and beef byproducts (HS 02), coffee (HS 09), footwear (HS 64), leather (HS 41, 42, 43), iron and steel (HS 72, 73), tobacco (HS 24), wood (HS 44), mining (HS 26), oil (HS 27), chemical products (HS 28, 29, 38), textiles (HS 58, 59, 60, 61, 62, 63)¹⁵, vehicles and automobile parts (HS 86, 87), milk and dairy products (HS 04) and cocoa and derivatives (HS 18). Applying Filter 4, 321 products were excluded from the list, leaving 579 potential products. It should be noted that the machinery and equipment sector alone represents almost 50% of this total.

4.2. Analysis of balance of services database

As mentioned above, data from the Brazilian balance of services was also analyzed. Service data is broken down into 25 categories which do not allow a detailed analysis of the productive activities to be carried out, but rather highlights some sectors that deserve a more detailed analysis. It can be noted that the principal technical services sold by Brazil are engineering and architectural in nature. This, however, has been a strongly consolidated sector in Brazil since the 1970s and it is therefore not applicable to the current study. Another category that has shown considerable growth is that of professional fees. However, since no distinction is made between the professionals from different sectors, we cannot use this variable in our analysis. Finally, two other categories were shown to be interesting: “computing and information technology” and “publicity”, with an average growth of 17% and 14% respectively. This demonstrates the growth of two sectors that have begun to stand out in the country: the software and the publicity campaign sectors.

¹³ The risk associated with the application of Filter 4 is undeniable, since it can eliminate interesting products from the final base. Nonetheless, due to the broad range of products produced in Brazil, it is believed that the products eliminated will not have a relevant impact on the selection process used in this study.

¹⁴ As well as the databases used, the literature review, interviews with specialists and the pioneering publication “Analysis: Foreign Commerce Yearbook, 2005 – 2006”, from *Análise Editorial* contributed in a significant form to this study.

¹⁵ In relation to this sector, there are interesting exceptions, such as fashion products, which compete in a differentiated international market.

4.3. Consolidation of the selection process

Based on the final list of goods and merchandise (with 579 potential products), plus the service sectors of “computing and information technology” and “publicity”, detailed qualitative analysis was begun: (i) avoiding sectors that compete for cost, are strongly dependent on natural resources, or which have a low technological level; and (ii) emphasizing sectors with a high level of differentiation and high added value. In addition, the choice process aimed to obtain a sample of differentiated cases, where specific learning can be generated, enriching the final content of the research project. In this way, the following sectors were selected for our project¹⁶:

Automatic Teller Machines (ATM): This case represents the sector of machines and equipment and studies a special segment where Brazil developed a differential by embedding a service (software) in machine assembling. It is thus a case which aggregates the study of the machine and software industries. The financial service industry is strong in Brazil. It is an example of how an economy adversity (the inflationary process) has forced firms to develop new instruments of control, becoming a reference within its area. Financial software began to be developed in Brazil during the inflation period and is today exported to other countries.

Fashion (garment): An industry which demonstrates a high degree of differentiation and creativity and which represents a case where Brazil has been able to penetrate into an activity which demonstrates extremely high-aggregate value and selectivity. By looking at the increase in professionalism of the sector, we can explore the role Brazilian creativity (internationally recognized in the fields of T.V., music and advertising production) plays in generating a differential within the traditional industry of clothing and accessory production.

Biotechnology: a high technology sector that has created important differentials for Brazilian products and whose development can impact on various economic sectors. This makes the case even more relevant, since the diffusion process involves not just the biotechnology process, but also the companies which use this product. Its study is extremely relevant for the design of public policies, due to the primordial role R&D and the state played in its conception.

Given the researches' focus on understanding the process of discovery and learning, it was decided to choose less traditional sectors which could reveal quite distinctive trajectories. Since the motivation for understanding how countries diversify their export base is to identify alternative trajectories for economic growth, we chose sectors that actually induced a change in the standard of development. It is our intent here to study sectors in which Brazil has created a competitive differential.

Understanding how these sectors have developed in the country will help us, in turn, to understand how a developing country such as Brazil can penetrate more dynamic markets where less tangible factors such as knowledge and brand are fundamental. The change in development levels goes through a change in the productive base less focused on agricultural and industrial commodities to one focused on products with differentials.

¹⁶ Other sectors could be presented as interesting alternatives for study: medical and surgical instruments; electronic game software; cell phone applications; cell phones (even though Brazil is essentially an assembly platform); rocks; soybean; shrimp; grapes (even though the latter four do not have a significant level of innovation and technology).

The growth in the sectors selected is very recent in Brazil, and there is little information about their trajectories. This makes the contribution of this work even greater and increases the challenges we face in our analysis. For this reason, it was decided to restrict the proposed study to three cases, thus avoiding the dilution of our understanding of these priority cases.

A brief presentation of each of the selected cases is given below and one – biotechnology – is presented in great detail.

5. Initial Sector Study

5.1. Automatic Teller Machine

Automated banking systems are made up of hardware and software which implement the automation of bank branches and their alternatives: call centers; home banking; and internet banking. A part of this product, software carries significant weight as a purchasing factor, given that the hardware currently used is based on a network of microcomputers, which have already become industrial commodities. The only exception is the equipment specially developed for banking applications, the most important of which is the automatic teller machine (ATM), chosen as a case study for our research.

Indications of Brazil's share of this market are substantiated by export data. Brazil started exporting ATMs and their associated components in 1996 and by 2005 this sector accounted for more than USD 30 million of Brazil total exports.

The reason for our choice stems from the participation of Brazilian companies in this market, which is generally dominated by foreign companies. The figures presented by Melo et al (2000) indicate that the production of ATMs between 1995 and 1996 was dominated by three American, one German and one Japanese company. However, two Brazilian companies followed closely in the market-share ranking: in 1998, Procomp and Itautec each had a 4% share of the global market. This product clearly did not exist in Brazil twenty years ago and it draws our attention because it represents a case in which Brazil has managed to compete within a manufacturing segment highly dominated by foreign companies.

Brazil's entry into this market was possible thanks to the offer of differentiated software solutions. After witnessing an inflationary period that lasted two decades, Brazilian banks were obliged to innovate and create mechanisms to control money and defend purchasing power. This is why Brazil was one of the first countries to automate its banking system. The production of ATMs in Brazil began in this scenario. The foreign companies that offered banking solutions did not possess products able to meet the needs of Brazilian banks, nor were they interested in developing exclusive products for the Brazilian market. On the other hand, the fact that only a small portion of Brazilian financial institutions were controlled by foreign capital made it so that no pressure was exerted to adopt internationally accepted solutions. Thus, the need to develop specific solutions for the Brazilian market and the legal restrictions to foreign investment in the country's banking activities led to the creation of an industry comprised of a small number of domestic companies, led by Itautec Philco, Procomp and Sid.¹⁷

¹⁷ Melo et al (2000)

Today, Brazilian companies are have set a reference point in terms of the production of these products and firms like Itaútec have concentrated their production on ATMs, diminishing the importance of computer production in their commercial activities, a segment in which they possessed no differential.

These companies are also starting to produce other machines geared toward commercial automation, such as fiscal printers, point-of-purchase terminals and cash registers. Recent figures have revealed considerable export performance for these products. Another noteworthy product that contributes significant revenues to these companies' coffers is the voting machine. This product has made Brazil a worldwide reference mark, as it has made it possible to computerize entire election processes. Therefore, Brazil currently exports technology for elections to many different countries.

5.2. Fashion (Clothing Industry)

The clothing industry includes a large variety of economic activities, which range from the creation of more-or-less customized garment designs (fashion design) to mass clothing production. In itself, the term "fashion", which refers to the trends/personal tastes of a given society or group, is more intimately connected with the creation process than production.¹⁸ Thus, fashion may be viewed as a cultural expression: a language in which fabric, cut, color, design and accessories are signs identifying social groups, values and ways of being. This industry, in modern consumer societies, constitutes a complex and highly important phenomenon in terms of social psychology and economics.

The current scenario for the Brazilian clothing industry is one of growth in the domestic market as well as selected foreign markets. Every year, Brazil is both home and host to more and more events, seminars and specialization programs in this field. There are increasingly more people interested in the tremendous potential of this economic sector which is professionalizing itself in great strides.

The clothing industry has existed in Brazil since the beginning of the 20th century. At the beginning, however, the industry merely reproduced foreign designs sold in sophisticated fashion boutiques, such as Mundo Elegante and Mappin Stores in São Paulo. No domestic "fashion production" therefore existed. It was during the World War II, when fabric and goods imports became scarce, that the country started investing in its own textile and garment industry. At that time, the capital of São Paulo was already on its way to becoming a textile center. In the postwar 1950's, European-style domination gave way to Americanized fashion and in 1958, the first FENIT – *Feira Nacional da Indústria Têxtil* (Brazilian Textile Industry Fair), which presented the world's latest fashion trends, was held. Even then, however, the country still didn't produce Brazilian fashion.

The first truly Brazilian style began to emerge after Lívio Rangan, the advertising mastermind who revolutionized fashion marketing in Brazil, created a new fashion advertising market, which led in turn to the birth of a special press segment showcasing Brazilian fashion in magazines like *Cláudia* and *Manequim* (Editora Abril). With Rangan, the FENIT, in addition to drawing big names in international haute couture to Brazil, began investing in genuinely Brazilian fashion. In the '80's, designers like Dener, Francisco José, Guilherme Guimarães, Clodovil and many others were widely acclaimed in the world of Brazilian haute couture, creating the Brazilian Look and the domestic prêt-à-porter industry. However, it was only in the mid '90's, when the FENIT reduced its institutional character and began to focus more on marketing, becoming a platform from which to

¹⁸ <http://pt.wikipedia.org/wiki/moda>

launch new products seeking greater profitability, that Brazilian fashion gained worldwide recognition. The '90's witnessed many breakthroughs in Brazilian fashion with the creation in 1996 of Morumbi Fashion, currently the Official Brazilian Fashion Calendar and São Paulo Fashion Week. This event lifted Brazilian fashion to a higher status, firmly placing the country within this millionaire segment's business itinerary. Brazilian brands and designers have since demonstrated their importance on the international fashion scene. Names like Alexandre Herchcovitch, Ricardo Almeida, Fause Hatem, Lino Villaventura and many others are gaining public acclaim.¹⁹

The changing of Morumbi Fashion's name to the São Paulo Fashion Week stemmed from a desire to internationalize the event, which currently attracts buyers from the largest retail chains in the world, including Saks, Barney's, Lafayette and Printemps. The event consolidated São Paulo as the principal launching ground for the latest fashions and trends in Latin America. According to the Foreign Trade Ministry's website, The New York Times declared 2000 to be Brazilian Fashion Year.

At the beginning of 2000, the *Salão Internacional da Moda* – SIM (International Fashion Salon) was created in order to strengthen fashion *Made in Brazil* and to invest in exports. According to data from the *Associação Brasileira da Indústria Têxtil e de Confecção* – ABIT (Textile and Clothing Industry Association), the entity responsible for intermediating between the interests and demands of the segment and the government, the sector sold USD 22 billion in 2001 and its exports totaled some USD 1.3 billion.

It is possible that in addition to its creativity, other factors may have contributed to the current internal and external projection of Brazilian designers: (i) the *discovery* of Brazilian models, like Gisele Bündchen, Caroline Ribeiro and Fernanda Tavares, which evidently attracted foreign attention to Brazil; (ii) the establishment of a fashion calendar in the country to standardize previously isolated initiatives; (iii) the appreciation of fashion as a business; (iv) the evolution of the textile sector; (v) and the unquestionable quality of Brazilian raw materials.²⁰

According to the ABIT, the textile sector alone sold USD 2 billion in 2000. In the national ranking, it is the country's second largest industry and the fourth producer worldwide. The ABIT also states that in 2001, the sector generated approximately 20 thousand jobs. The textile and clothing industry accounts for almost 5% of the country's gross domestic product (GDP) and employs 1.6 million people. Brazil ranks third in the production of knits and seventh in threads and designed articles. Its position in international trade is still timid, however, representing little over 0.2% of the global total of exports and imports.

Apparently, then, versatility and diversity in the use of crafts and technological materials, the composition of the fabrics and the "Brazilian way" of designing fashion make more of a difference than the crafts and technological materials themselves. In this respect, the strength of Brazil's cultural heritage has served as a source of inspiration.

¹⁹ www.revistadoseventos.com.br/

²⁰ www.mre.gov.br/CDBRASIL/ITAMARATY/WEB/port/artecult/moda/apresent/apresent.htm -

5.3. Biotechnology²¹

Biotechnology is defined as the use of live organisms (or their cells or molecules) to rationally produce substances in order to generate commercially-feasible products. This field is intensely associated with the field of research and development, given that its objective is to apply, on a large scale, any scientific and technological breakthroughs resulting from research in the biological sciences, or to transfer them to the industry.

Brazil's potential in this field is associated with its tremendous biodiversity. The country is a large natural reserve, where 22% of the plant species known to Man are found in their natural state. Moreover, along with other countries, Brazil shares some 70% of all known animal, plant and microorganism species, with immense geographical niches still untouched by science and yet to be explored in a modern, sustainable and profitable manner.

Despite this vast biodiversity, development in this field is still recent. The perception of Brazil's competitive advantage in Modern Biotechnology emerged in the '80's with a cycle of pioneering scientists, business owners and public-sector figures. Strong governmental support was provided to focus the attention of a fraction of the 20,000 biological scientists and engineers from public laboratories and the industry on biotechnology. The first industries to use intermediate biotechnology in the agricultural and health sectors were established during this period.

On a global level, growth in the field of biotechnology started accelerating in the 1970's, with the development of genetic engineering (direct alteration of genetic material) or recombinant deoxyribonucleic acid (DNA) technology. A few examples of the substances or products that have been produced through modern biotechnology or genetic engineering include human insulin, human growth hormones, virus-resistant plants, insect-tolerant plants and herbicide-resistant plants. Another important use of biotechnology involves the production of bacteria used for the biodegradation of oil spills and toxic waste.

Biotechnology is present in many industrial segments such as the pharmaceutical, agricultural, cattle-raising, food, chemical and fuel segments. It may therefore be divided up into certain sub-areas: agrobusiness, industrial, health, and the environment. Due to the economic importance of agriculture in Brazil, applications for biotechnology in this country have been geared towards agrobusiness and have proven promising in the short term. This may also be explained by the pioneering spirit of the *Empresa Brasileira de Pesquisa Agropecuária* – EMBRAPA (Brazilian Agricultural and Cattle-Raising Research Company) in the sector. Founded in 1973, this public institution is currently recognized as the most important center of reference in tropical agriculture in the world. This institution's hitherto unheard of level of investment in in-country research have been the driving force behind the development of Brazilian biotechnology.

As of the second half of the '90's, both the Brazilian private sector and foreign investors started investing more heavily in the field of biotechnology. Companies such as Allelyx, Canavialis, Indicus, Genoa, Agrocera Rossi and Cocamar have, along with Embrapa, established themselves as centers of technological research and innovation, contributing toward increasing the productivity of various Brazilian economic activities, and the emergence of other strong sectors in the country. Today, one would be hard-pressed to find any Brazilian agricultural or cattle-raising product that hasn't benefited in some way from advances in this field. Brazil is a world leader in terms of soy,

²¹ This section was written based on information gathered with Brazilian Association of Biotechnology (ABRABI).

cotton, sugar, beef, pork and poultry exports, a position which may be attributed to this movement. Listed below are a few of the principal actors in the sector:

- **Universities:** UNICAMP; UFRGS; Universidade do Vale do Itajaí – UNIVALI; UNIVILLE.
- **Private non-profit institutions:** Instituto Capanema; Fundação BIOMINAS.
- **Public agencies and research and development foundations:** *Superintendência da Zona Franca de Manaus* – SUFRAMA (Office of the Superintendent of the Manaus Free Trade Zone); Embrapa; Laboratório Nacional de Computação Científica; Fundação Biocruz; Pólo Bio-Rio; Fundação BioMinas; and Agência de Inovação da UNICAMP, FINEP.
- **Biotechnology companies focused on agrobusiness:** CanaVialis; Alellyx.
- **Biotechnology companies focused on the health care field:** Biotoools do Brasil; Biom Technology; Extracta Moléculas Naturais; Genzyme.
- **Biotechnology companies focused on industrial applications:** BioClean do Brasil; and Novozymes.
- **Bioinformatics companies:** Scylla.
- **Suppliers of research input:** FK-Biotecnologia S.A; Biocen do Brasil; Uniscience.
- **Law firms that specialize in industrial property and patents:** Castro, Barros, Sobral, and Gomes Attorneys at Law; and Dannemann, Siemsen, Bigler & Ipanema Moreira.
- **Venture capital investment funds:** Votorantim Novos Negócios.

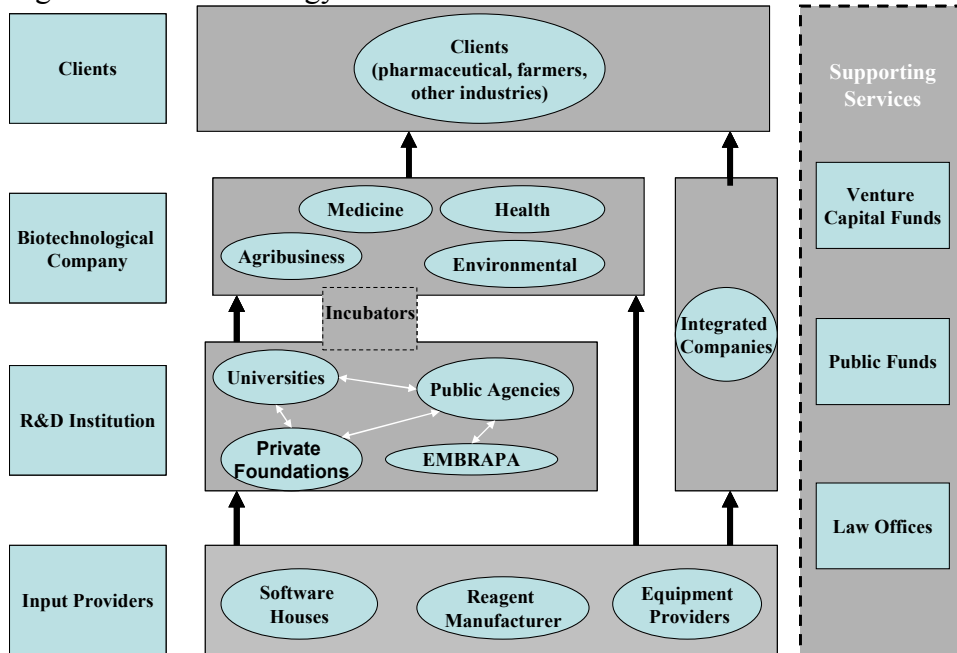
The exporting of biotechnology products is recent in Brazil and the results are still quite uncertain. There have, however, been systematic advances in this field which have enabled the creation of more efficient technological processes and new products. An example of this is the field of plant genetic sequencing, which makes it possible to create pest-resistant organisms. Brazil has already concluded the sequencing of the *Xylella Fastidiosa* (sugarcane bacteria), the *Xanthomonas* (eucalyptus bacteria) and the virus *Citrus Sudden* (the cause of the sudden death of citrus trees). Innovative micropropagation processes, paternity tests, molecular tests and advances in biofuel are just a few of the other success stories in this field.

In order to understand this sector's development, the following research phases will be implemented:

1) Industry analysis

In the first phase, the Brazilian industry's organization will be analyzed (value chain, demand, offer and enabling environment), the behavior and performance of its players (key strategies, key success factors, competitiveness of the Brazilian suppliers). The design of the biotechnology value chain will help us to understand the players in the sector and to map the relationships between actors (see Figure 3 for a preliminary version. Arrows represent possible relationships within the sector).

Figure 3 – Biotechnology value chain



In this case, current players as well as potential players must be studied, because there is a considerable amount of ground to be covered between the discovery of a new product and its sale. Regulatory issues are crucial in this case, which depends greatly upon patent and industrial property legislation. In this respect, the effects of two recent Brazilian laws, the Biosafety Law and the Innovation Law, should be carefully assessed, although this assessment will be based primarily on projections instead of concrete facts, given the short time it has been in effect.

2) Identification of the companies.

The primary source for identifying the companies in this field will be the Brazilian Association of Biotechnology Companies, which holds information about 32 of the sector's companies and research institutions. The ABRABI will be an important source of contact between the companies and researchers of this project, and essential toward forming a database with the companies' profiles and obtaining interviews.

This, however, is certainly not the complete list. Banks and venture capital funds are another important source of information about other companies in the market and firms that are entering the market, as it is part of their daily routine to identify and receive proposals from firms in this and other sectors seeking financing. In this sector, the first round of interviews will clearly be an important phase in order to obtain the names of other players from the interviewed companies.

A key issue in this sector, given its high research component, is the identification of public and private research institutions. ABRABI estimates indicate that there are approximately 20,000 scientists in Brazil working in this field alone, which reveals the existence of numerous research institutions in the sector. Here, the task is to identify which of these are bigger players and leaders in research and which have generated discoveries that were transformed into commercially-viable solutions.

Other actors such as law firms and input suppliers will also be interviewed in order to understand their role in the sector's growth. In this case, there is no need to extend the assessment to include many institutions.


3) Field research

There is a strong hypothesis that this sector's first-mover was EMBRAPA, because when it initiated its research in the field of agrobusiness and generated improvements in plants and animals, which are now crucial to agricultural production, it showed the country that research into biotechnology can generate profits. The process of diffusing know-how must have started with this company; thus indicating it as the first to be assessed and interviewed in our research. Though our assessments and interviews with EMBRAPA, we hope to achieve an understanding of how its discoveries were diffused within the corporate world, as well as its own and external sources of financing, partnerships it has established and any important internal changes in the institution in the last two decades, among other points.

The heads of those research institutes considered references in the field will then be interviewed in order to ascertain the source of their financing, the existence of partnerships with other institutes, incentives toward choosing certain lines of research, the processes which takes place between a discovery and its transformation into a business, as well as the difficulties encountered in developing the sector.

Companies that currently market products in the field of biotechnology will then be interviewed. In this sector, location is an essential factor. Thus, our priority will be those companies located near research centers but we will also include those companies that operate alone (if any). We thus hope to identify any differences in the standard discovery and growth processes. Another distinction must be made between those companies that have already marketed products and those that are still in the research and development process. The network of partnerships in the latter case must be carefully assessed. Special attention should be given to the role of foreign capital in the establishment of the companies and how research is put to commercial use.

After these surveys have been conducted, our preliminary theories will be reexamined. Validation of conclusions will depend on two more phases of assessment: comparison with a counterfactual case and a discussion organized in collaboration with members of ABRABI and specialists in the field. The definition of the counterfactual case may only occur following a more detailed study of the sector. We believe that no counterfactual may be found in Brazil, given that the sector's borders are not clearly defined, however, this opinion may be revised at a later date.



6. Technical Team

The research team is composed of a group of multi-skilled professionals with solid experience in researching international trade and enterprise development topics. The team includes:

Angela da Rocha

Project director Angela da Rocha has been working as Professor of Marketing and International Business since 1976 at the COPPEAD Graduate School of Business of The Federal University of Rio de Janeiro. Angela founded COPPEAD's The Research Center on Firm Internationalization (NuPin) with the Export Management Line of Research which she developed from the results obtained in her master's thesis, entitled, "Exports Marketing: an evaluation of Brazilian export incentive policy and its contribution to medium and small-sized firms". Her main areas of study are the internationalization of firms and marketing strategies. She has developed and oriented research on the decision-making process in exports, the motivation to export, the perception of barriers preventing exports, foreign marketing and communications strategy, the impact of subsidies on exports and many other entrepreneurial decisions associated with export activity. She has also published thirty articles in international and Brazilian journals and is the author of six books and an organizer of another four. Additionally, she has written fifty chapters published in books in Brazil and abroad. Angela is a I-A researcher, the highest level set by the Brazilian National Council for Research and is also a member of the Editorial Board of the Journal of International Management. Angela holds a Ph.D. degree from IESE (the *Instituto de Estudios Superiores de la Empresa, Universidad de Navarra*, Spain), a master's degree from the COPPEAD Graduate School of Business and a bachelor's degree in Economics from The Federal University of Rio de Janeiro.

Helson Braga

Helson Braga is a Professor of International Economy, Industrial Policy and Fiscal Policy in Federal University of Rio de Janeiro. He has published more than seventy articles in international and Brazilian journals in topics such as export promotion, foreign trade, industrial performance, foreign direct investment, export financing and export processing zones. Mr. Braga is also the president of the Brazilian Association of Export Processing Zones since 1999. Mr. Braga holds a Post-Doctoral Degree from University of Chicago (major on Industrial Organization) and a Ph.D. and a master's degree from Getulio Vargas Foundation.

Alexandre Sahade Darzé


Alexandre Sahade Darzé is currently the Chief of Party for the USAID/Brazil Trade-Led Growth Program, promoting export strategies for the small and medium enterprises located in the Northeast (the poorest) region of Brazil. The program has three components: (i) implementing sustainable trade opportunities for the clusters of the region; (ii) creating an enabling environment for trade (based on interventions such as financing and regulatory changes); and (iii) enhancing the use of techniques by other institutions operating in SME development in Brazil.

Mr. Darzé served as Coordinator for the Microfinance Institutional Development Program of the Brazilian National Development Bank (BNDES) in a project financed by the Inter-American Development Bank (IADB). In this capacity, he advised the BNDES on bank microfinance strategy, managed support for a portfolio of MFI clients receiving BNDES support and conducted market research and training for the bank. Mr. Darzé has deep experience with qualitative research. He is a trainer for MicroSave-Africa Market Research Participatory Rapid Diagnostic methodology for microfinance and has adapted and applied this methodology in order to research national, regional and local microfinance markets around Brazil and internationally. He holds an MBA from

COPPEAD, University of Rio de Janeiro (one of Brazil's top business schools) with a focus on finance and he speaks fluent Portuguese and English.

Joana Monteiro

Joana Monteiro is an economist with experience in export promotion strategies, value chain analysis, field research and data analysis. Since October 2004, Joana has been the monitoring and evaluation manager in CRESCCE, a two-year project in Brazil managed by Development Alternatives, Inc. (DAI) and financed by USAID in order to enhance trade-led growth of small and medium enterprises. Within this project, Joana has participated in the sector selection process, which chose three groups of small firms to be supported by activities designed to increase their presence in international market. She also interviewed traders and mapped the procedures needed to export products from Brazil. Additionally, Joana carried out the baseline research, conducting in-depth interviews with some 30 firms and organized another 25 focus group discussions. Joana has a master's degree in economics from the Catholic University of Rio de Janeiro (PUC-RJ) and a bachelor degree in economics from the Federal University of Rio de Janeiro (UFRJ). Her master's thesis won first place in the national competition of theses in economics on the subject "The Challenges to Economic Growth in Brazil".



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<http://www.abap.org.br>
<http://pt.wikipedia.org/wiki/moda>
[http://www.mre.gov.br/CDBRASIL/ITAMARATY/ WEB/port/artecult/moda/ present/](http://www.mre.gov.br/CDBRASIL/ITAMARATY/WEB/port/artecult/moda/present/)
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<http://www.agricultura.gov.br/>



Annex 1 – Curricula vitae

NuPIIn – Research Center on Firms Internationalization (NuPIIn – Núcleo de Pesquisas em Internacionalização de Empresas)

The Research Center on Firms Internationalization (NuPIIn) of the COPPEAD Institute will act as the project's headquarters, that is, the institution in charge of its coordination.

The research center has its origins in 1977, when the first COPPEAD's line of research – Export Management Line of Research – was developed from the results obtained in the master's thesis of Prof. Angela da Rocha entitled, "Exports Marketing: an evaluation of Brazilian exports incentives policies and its contribution to the medium and small-sized firms" which she defended in 1976.

At that time, having as coordinator the visiting professor Dr. Carl Christensen of California State University, the first studies on the topic were carried out, forming the First Group of Research on Exports Management, which would turn up to be the departure for the existence of the Research Center on Exports Management. Approximately 400 Brazilian firms were then visited, documented and all data collected was filed.

Between 1977 and 1988, four Exports Research Groups were formed, counting on the participation of six professors and a total of 24 master's students belonging to different classes, and generating a large number of theses, articles, presentations at national and foreign conferences, company cases etc.

During that period, themes emphasized were connected to the decision-making process in exports, the motivation to export, the perception of barriers preventing exports, quality control in exports, marketing and communications strategy abroad, the education and training of executives for exports, the impact of subsidies on exports, the choice of channels for exports, and other entrepreneurial decisions associated with export activity. Furthermore, the Brazilian experience with trading companies and export consortia deserved special attention from the researchers. At the time, a study was done for IPEA, an institute associated to the Ministry of Planning, which consisted in evaluating the Brazilian trading companies system and comparing it with the Japanese model.

The Field of International Business would come to succeed the Research Center on Exports Management in 1989, since the activities of the Center had undergone a large broadening in scope: studies no longer included only exports as an international business activity, but they began to encompass other "outward" internationalization activities such as the opening of offices, the installation of plants, joint ventures and strategic alliances. They also began to deal with "inward" internationalization, that is, the establishment of alliances and franchisees and the technology transfer among multinational and Brazilian companies.

Furthermore, cultural issues began to receive more and more emphasis, leading to the inviting of Prof. Dr. Everardo Rocha, an anthropologist, to comprise the team of researchers in the area of International Business. Through the incorporation of new methodologies and distinct theoretic background, the combination of managerial vision and anthropological vision provided greater density to the studies performed.

The research during the period from 1990 to 1995 consisted, then, of four major blocks:

- “Outward” internationalization (exports, opening up of offices, plants and subsidiaries abroad);
- “Inward” internationalization (joint ventures with foreign companies operating in Brazil, arrival of international franchisors/franchisees, technology transfer and acquisitions of Brazilian companies by multinationals);
- Cultural impacts and firms management (cultural differences in managerial and business processes, managerial practices transfer in distinct cultural contexts);
- Impacts of the opening up of the market on the firms competitiveness (made-in – images of products according to their countries of origin, consumer’s ethnocentrism, consumption anthropology).

The recognition by the international scientific community for the work developed by the team can be confirmed by the following facts and events:

- The invitation to Prof. Dr. Angela da Rocha to become a member of the CIMaR – Consortium for International Marketing Research – an organization of high-level researchers from various countries, which dedicates to the studies of firms internationalization. Prof. Dr. Angela da Rocha is the only Brazilian (and Latin American) researcher to participate in the consortium.
- International and national awards received from researchers associated to the research group, such as two awards from the Business Association of Latin American Studies (BALAS) in 1988, by Profs. Drs. Angela da Rocha and Carl Christensen (1988 e 1990) and award received in 1993 by Prof. Dr. Frederico de Carvalho at the *1st Symposium on Marketing and Economic Development*, held at the INCAE (Costa Rica) for his work on Trading Companies.
- Inclusion of the work “*The export experience of a developing country: a review of empirical studies of export behavior and performance of Brazilian firms*,” in the 1995 volume of *Advances in International Marketing*.
- Works carried out by the Area of International Business were referred to in “*International marketing: an annotated bibliography*”, of Michigan State University, a mandatory source of reference in the field.

Finally, in 1997, with the support of PRONEX, the Research Center on Firms Internationalization is constituted (one of Pronex’s centers of Excellence). Pronex’s support was shown to be decisive for the consolidation of the Center and for setting its research in motion. Among the achievements of the five-year period (1998-2003) in which the Center received Pronex’s support, the following aspects stand out:

- The holding of four workshops on Firms Internationalization, over two days, as of the second year. The works were published in annals. This event has been consolidated and lends support to researchers in the area.
- The publication of three books by Editora Mauad, with works by NuPin. The titles published are as follows: (1) *The Internationalization of Brazilian Firms*: studies on international management (Rio, Mauad, 2002); (2) *The new frontiers: the Brazilian firms internationalization* (Rio, Mauad, 2003); (3) *The challenges of external markets: theory and practice in firm’s internationalization* (Rio, Mauad, 2004).
- The defense of 25 Doctoral and Master’ dissertations during Pronex’s support period.
- The presentation of works at International and National Conferences.
- Reception of several awards at conferences, such as the award for the best paper by doctoral students at the Business Association of Latin American Studies – BALAS, and three awards for best paper and honorable mention at the ANPAD Conference

– Associação Nacional dos Programas de Pós-Graduação em Administração (National Association of Post-Graduate Programs in Business Administration).

- The award “2003 Highly Commended Award” to Prof. Dr. Angela da Rocha by the *International Journal of Retail & Distribution Management*, for her article published in that international periodical.

In 2003 international scientific partnerships were established with the *Universidade Técnica de Lisboa* (Lisbon Technical University) of Portugal and the University of Uppsala in Sweden. This latter partnership proved to be especially rewarding, since the Uppsala School is the leading school in the world for research on firms internationalization. At the 4th Workshop on Firms Internationalization, which was held in November 2003, NuPIIn relied on the participation of three researchers from Uppsala. Additionally, in 2003, Profs. Angela da Rocha and Carlos Herais were called to give lectures to researchers and doctoral students of the two schools in Portugal and Sweden.

In 2004, NuPIIn was again supported by PRONEX/FAPERJ, having received the approval of its second research project. The studies results related to the second project are not yet available, since the research is still being performed.

Angela da Rocha

Project Director

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PROFESSIONAL EXPERIENCE

COPPEAD Graduate School of Business of The Federal University of Rio de Janeiro (1976 – present)

Professor of Marketing and International Business. Dean (2004-2006); Director, PhD Program (1989 to 1996).

President, Business Association of Latin American Studies, 1999-2000; Vice-President Membership, Executive Committee, Business Association of Latin American Studies, 1998; Secretary, Executive Committee, Business Association of Latin American Studies, 1997.

Teaching areas are Marketing Strategy, Comparative Marketing, International Marketing, Strategic Market Planning.

Schering-Plough Corporation (1975-1976)

Product Manager responsible for the Coppertone product line.

PUBLICATIONS

BARRETTO, A. S. P. ; ROCHA, A. M. C. . Patterns of internationalization of Brazilian firms and the decision to establish subsidiaries abroad. *Advances In International Marketing*, New York, v. 11, p. 79-131, 2001.

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influencing the decision process.. In: Michael Czinkota. (Org.). Export management: the public
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DISTINCTIONS

Researcher I-A (highest level) of the National Council for Research (CNPq - Conselho Nacional de Pesquisas, Brazil), since 1995.

Emerald Literati Club – Highly Commended Award for article published in the *International Journal of Retail and Distribution Management*, 2003.

ANPAD (The National Association of Graduate Programs in Business) – Research Award in International Business, 2001; and Special Mention in International Business, 2001.

BALAS (Business Association of Latin American Studies) Research Award, 1988 and 1990.

Principal researcher in the PRONEX (Program of Support to Centers of Excellence) project “The Internationalization of Brazilian Firms”, from 1997 to the present. Total grant: approximately US\$ 700,000, from 1997 to the present.

Consultant to the National Council for Research (CNPq - Conselho Nacional de Pesquisas, Brazil), from 1987 to the present; Consultant to CAPES, the National Agency for Development of faculty, from 1987 to the present; Consultant to the Rio de Janeiro State Government Council for Research, 1990 to the present.

Member of the Editorial Board of the Journal of International Management, 2002 to the present; Editor, Latin American Business Review, 2001-2003; Member of the Editorial Board of the Revista Brasileira de Comércio Exterior (Brazilian Journal of Foreign Trade), from 1986 to 1989. Member of the Editorial Board for the Coppead Graduate School of Business, 1989 to the present.

Member of the Education Committee of the American Chamber of Commerce for Brazil, 1987.

Senior Scholar Research Award, the Fulbright Commission, Program for Research in the United States, 1984.

Received fellowship grants from CAPES, a government agency of the Ministry of Education, for the M.Sc. and Ph.D. degrees. Received a number of other grants from CNPq, the federal government agency for research.

SKILLS AND ACTIVITIES

Fluent English, Spanish and Portuguese. Read and understand French.

EDUCATION

Ph.D., IESE - Instituto de Estudios Superiores de la Empresa, Universidad de Navarra, Barcelona, Spain, 1983. Major field was Marketing with emphasis on Marketing Strategy.

M.Sc., Coppead Graduate School of Business, The Federal University of Rio de Janeiro, 1976.

B.Sc., Economics, School of Economics, The Federal University of Rio de Janeiro, 1972.

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PROFESSIONAL EXPERIENCE

Economist – Ministry of Finance (1970/79), Center for Studies in Foreign Trade Foundation (1984/91).

Consultant - World Bank (1987/88 – “Analysis of Comparative Advantages and Productivity Changes in Brazilian Industry”), and Getulio Vargas Foundation.

Executive Secretary of the National Council of Export Processing Zones - ABRAZPE (1991/93 and 1997/98).

President of the Brazilian Association of Export Processing Zones – ABRAZPE (1994/96 and 1999 to present)

PRINCIPAL PUBLICATIONS

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Rio: Editora da Fundação Getúlio Vargas (1980) (Ph.D. Dissertation).

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"The Role of Brazilian State in the Process of Economic Development", **Conjuntura Econômica**, vol.35, nº 4 (abr/1981).

"Effective Protection from Tariffs and Transport Costs", **Estudos Econômicos**, vol. 12, nº 3 (1982).

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"Measurement of Technical Efficiency in Brazilian Industry: 1980", **Revista Brasileira de Economia**, vol. 40, nº 1 (jan/mar/1986).

"Export Promotion and Growth Strategy: Lessons from Taiwanese Experience", **Revista Brasileira de Comércio Exterior**, vol. 1, nº 3 (jan/fev/1986).

"Industrial Structure and Manufactured Exports", **Pesquisa e Planejamento Econômico**, vol. 16, nº 1 (abr/1986).

"Trade Balance Dynamics in Brazil: 1970/84", **Revista Brasileira de Economia**, vol. 41, nº 2 (abr/jun/1987).

“Export Financing in LCDs: The Role of Subsidies for Export Performance in Brazil”, **World Development**, vol. 16, n° 7 (1988).

"Industrial Structure and Public Policy; Four Case Studies", ÉPICO Series, n° 11, INPES/IPEA (mar/1988).

"Effective Protection in Brazil: Estimates from price comparison", ÉPICO Series, n° 13, INPES/IPEA (abril/1988).

"Productivity and Comparative Advantage Dynamics in Brazilian Industry: 1970/83", Internal Discussion Paper n° 140, INPESI/IPEA (jun/1988).

"The Role of Foreign Direct Investment on Growth: The Case of Brazil", in Antonio Jorge e Jorge Salazar - Carrilho (eds.), **Foreign Investment, Debt and Economic Growth in Latin America**. London: Macmillan (1988).

“The Entry of Portugal and Spain into the EEC and Euro Brazilian Trade”, with Peter Coffey e Luiz Corrêa do Lago (eds.), **The EEC and Brazil - Trade, Capital Investment and Debt Problem**. London: Pinter Publishers (1988)

"Industrial Policies and Multinational Enterprises in Latin America", in Sylvain Plasschaert (eds.), **Multinational Enterprises and National Policies**. Rome: Herder (1989).

"Total Factor Productivity of Brazilian Industry: 1970/83”, **Pesquisa e Planejamento Econômico**, vol. 19, n° 2 (ago/1989).

"Trade Policies in Brazil", in Dominick Salvatore (ed.), **National Trade Policies**. New York: Greenwood Press (1993).

"Technological Imports and Technological Effort: An Analysis of their Determinants in Brazilian Firms”, **The Journal of Industrial Economics**, vol. XXXIX, n° 3 (mar/1991).

“Free Zones in Latin America: The Lessons”, in **World Economic Processing Zones Association (WEPZA), The Role of EPZs in the Era of Regulated Trade**. Flagstaff: The Flagstaff Institute (2001).

“Prospects for South American Free Zones under the Free Trade Area of the Americas”, **Foreign Direct Investment** (Oct./Nov. 2003).

“Industrial Policy for the State of Amazonas”, Research Report, FGV/IBRE/ISAE (dez./2000).

“Tax Policy and Foreign Trade”, Research Report, FGV/IBRE (jul./2000).

“Export Financing in LCDs: The Role of Subsidies for Export Performance in Brazil”,
World Development, vol. 16, n° 7 (1988).

EDUCATIONAL BACKGROUND

Ph.D. in Economics – Getulio Vargas Foundation, Rio de Janeiro, Brazil, 1978.

Post-Doctoral Studies – University of Chicago, Ill., USA, 1979.

Professor of International Economics, Industrial Policy and Fiscal Policy – Federal University of Rio de Janeiro, Brazil; State University of Rio de Janeiro State, Brazil.

Alexandre Darzé

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PROFESSIONAL EXPERIENCE

Development Alternatives, Inc. (DAI) Group (September 2001 – present)

Managing Director, DAI Brasil (January 2006 – present). Responsible for managing DAI Brasil’s portfolio of projects and for developing new business.

Practice Manager, Microfinance and Enterprise Development, DAI Brasil (May 2003 – December 2005) Responsible for Managing and providing technical assistance to the portfolio of microfinance and enterprise development projects of DAI Brasil, a DAI Network Company. Manages new business development efforts, mobilizes and supports DAI Brasil projects in his practice area, develops models for analyzing the micro enterprise sector of local economies and microfinance markets, and trains junior staff in application of models.

Chief of Party, Micro and Small Enterprise Trade-Led Growth Program (January 2006 - present). DAI Brasil is implementing a program to promote export strategies for the small and medium enterprises located in the Northeast (the poorest) region of Brazil. The program has three components: implementing sustainable trade opportunities for the clusters of the region; creating an enabling environment to trade (based on interventions such as financing and regulatory changes); and enhancing the use of the techniques by other institutions operating in SME development in Brazil.

Deputy Chief of Party, Micro and Small Enterprise Trade-Led Growth Program (September 2004 – present). DAI Brasil is implementing a program to promote export strategies for the small and medium enterprises located in the Northeast (the poorest) region of Brazil. The program has three components: implementing sustainable trade opportunities for the clusters of the region; creating an enabling environment to trade (based on interventions such as financing and regulatory changes); and enhancing the use of the techniques by other institutions operating in SME development in Brazil.

Project Manager, Municipal Development, Palmas – Tocantins, (March 2004 – July 2004). Developing socio-economic audit and designing a development strategy for the municipality.

Project Manager, Market Study for Microfinance, SEBRAE-Espírito Santo, (June 2004 – January 2005). Conducted qualitative analysis of the microfinance market in Espírito Santo, applying the MicroSave-Africa methodology.

Project Manager, Microfinance Strategic Planning, FINCA International, (May 2004 – July 2004). Developing a market research on the microfinance Brazilian market and supporting the design of FINCA International business plan for entering the Brazilian market.

Market Specialist, Microfinance Training Course, Brazilian Service for Micro and Small Enterprise Support (SEBRAE) (November 2003-present). Development of curriculum and training of SEBRAE consultants in the area of market analysis for microfinance

Project Manager, Microfinance Strategic Planning, Government of the State of Tocantins and SEBRAE-Tocantins (March 2004 – present) in Northern Brazil. Developing a microfinance development strategy for the state along with key stakeholders and financial service providers from the public and private sectors.

Project Manager, Market Study for Microfinance, SEBRAE-Tocantins, (November 2003 – June 2004). Conducted quantitative and qualitative analysis of the market in Tocantins for microfinance, including development and use of secondary quantitative data and development of primary data through focus groups with current and potential microfinance clients.

Project Coordinator, Institutional Development Program, BNDES / Inter-American Development Bank (September 2001 – November 2003) Provided technical expertise to the Institutional Development Program (PDI), a \$5 million project between the National Economic and Social Development Bank of Brazil (BNDES) and the Inter-American Development Bank (IDB) designed to strengthen the microfinance industry in Brazil. Specific responsibilities include:

Management of the portfolio of microfinance institutions supported by the program.
Direct assistance to high-potential microfinance institutions for activities such as new product development, market strategy, information technology upgrades, and board development.
Other activities sponsored by the fund target the field in general and include training seminars, software development, and financial performance assessments.
Strategic advice to the BNDES and to partner financial institutions serving micro and small enterprise and low income clients throughout Brazil.

Team Leader, Project Design, USAID/Egypt (July-August 2003). Designed a business development services (BDS) program to use vouchers with information to build the BDS market.

Project Manager, Microfinance Market Study for Planet Finance, Rio de Janeiro (May-August 2003) Market Study using focus group methodologies in the *favelas* of Rio de Janeiro to examine clients perceptions of microfinance services.

Microfinance Market Research, Portosol, Rio Grande do Sul, Brazil (August 2002). Conducted comprehensive market research for a microfinance institution in Southern Brazil using the PRD methodology. The results of this research were presented at the Inter-American Development Bank's Fifth Annual Micro enterprise Forum.

Appraisal of Microfinance programs of Regional Development Agencies, ABDE, Brazil (October - November 2002) Conducted comprehensive appraisals of microfinance programs of various state development agencies around Brazil for the Brazilian Association of Development Agencies (ABDE).

Construtora Norberto Odebrecht S.A. (1997 – 2000)

Planning Engineer (September 1999 – February 2000)

Conducted design review and evaluation, scheduling, cost estimating, and detailed construction inspection on an EPC contract (Engineering, Procurement and Construction) of a hydroelectric plant. Also reduced, along with the entire planning department, the construction deadline, which anticipated the electric power generating date, creating additional economic value for the client.

Resident Engineer (April 1998 – September 1999)

Responsible for the civil construction scheduling and execution at a mineral-industrial modular enterprise, consisting of a Uranium processing plant. Led a production team of 350 employees, reduced the total civil construction costs by 15% and contributed to the expected rate of return of the enterprise from 24% to 35%. Also responsible, in the last six months of the enterprise, for the commercial and financial departments.

Trainee (January 1997 – March 1998)

Responsible for budgeting changes during the construction of two luxury residential towers. Also supported the resident engineer in managing the production activities.

EDUCATION

MBA, Emphasis in Finance and Strategy, COPPEAD – The Graduate School of the Federal University of Rio de Janeiro, 2002

B.S. in Civil Engineering, Federal University of Bahia, Salvador, Brazil, December 1997

SKILLS AND ACTIVITIES

MicroSave-Africa Training of Trainers Course for Conducting Qualitative Market Research for Microfinance. Uganda - Africa, May 2002.

Proficient with SPSS 8.0 for Windows (Statistics software), Office 2000, and an advanced user of Excel's Financial and Statistical Library.

Computer Skills: SPSS 8.0 for Windows (Statistics software), Office 2000, Advanced user of Excel's Financial and Statistical Library

Fluent Portuguese and English

PUBLICATIONS

Darzé, Alexandre Sahade with Barretto, A.S., Gomes. “Microfinance.” L.F.B. BNDES Social, nº 7, Rio de Janeiro, 2002.

Darzé, Alexandre Sahade (Technical Coordinator). “Marketing for Microfinance”. Institutional Development Program, BNDES / IDB, Rio de Janeiro, 2002.

Darzé, Alexandre Sahade (Technical Coordinator). “External Audit for Microfinance”. Institutional Development Program, BNDES / IDB, Rio de Janeiro, 2002.

Darzé, Alexandre Sahade. “Sectorial Risk Factors and Country Factors: a Study of Latin American Stock Markets”. Rio de Janeiro: Federal University of Rio de Janeiro (UFRJ) / COPPEAD, 2002. Thesis (Master in Administration).

Darzé, Alexandre Sahade with Walter, L. Caderno Dissente, “Service Recovery”. UFRJ / COPPEAD, 2001.

Working jointly with CEPS (Insurance Studies and Research Center): study of the “Financial Services and Markets Bill [Bill 121]” as introduced in the House of Commons on 17th June 1999, United Kingdom.

Working jointly with CEPS: study of the “Insurance Act 1973” of Australia.

Joana Monteiro

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PROFESSIONAL EXPERIENCE

- **Development Alternatives, Inc. (DAI) Group** (December 2003 – present)

CRESCE – Creating a Responsible Environment for SME Competitive Exports, USAID, Northeast of Brazil (October 2004 - present)

Manage the monitoring and evaluation component and develop a series of analysis and field visits to support the design phase of CRESCE project which include:

- Responsible for the implementation of CRESCE impact assessment
- Enabling environment analysis to identify constraints to SME exports in Brazil
- Field visits to select clusters to be supported
- Analysis of procedures required to export a product in Brazil
- Interviews with traders to understand their trading process and identify partners to participate in CRESCE’s pull strategy

Integrated Local Development Program, Municipality of Rio Grande, Rio Grande do Sul, Brazil (March 2004–October 2004).

Coordinate implementation of a Strategic Plan for local development for the municipality of Rio Grande. The final product will serve as a baseline to guide future investments and orient community participation in order to achieve social, economic and environmental sustainability. Activities include:

- Conduct holistic Socio-economic diagnostic of the municipality of Rio Grande;

- Design, implement and monitor the municipality Strategic Development Plan based on a cluster approach;
- Develop and implement capacity-building workshops for the local government on an ongoing basis

CREDIAMIGO Evaluation, World Bank, Fortaleza, Brazil (October, 2004)

Support the design of experimental study to evaluate Banco do Nordeste Microfinance Program (CrediAmigo) conducted by World Bank. Activities include: the design of baseline survey, the pre-test of baseline survey and the implementation of a system to random select clients to control and treatment groups.

Mundo Maya Sustainable Tourism Program, Inter-American Development Bank, Mexico and Guatemala (July 2004-August 2004).

Work on the Productive Initiatives Project – one of the 8 components of the Maya World Tourism Program. The project was carried out in 5 countries in Central America: Belize, El Salvador, Guatemala, Honduras and Mexico. The main objective was to increase community- based tourism in the villages located around the Maya archeological sites. In order to support community participation in business related directly or indirectly with tourism, the following tasks were performed:

- Field work to identify the productive initiatives (enterprises) offering services or products related to tourism in the selected communities;
- Identification of capacity building or strengthening needs ;
- List of the financial mechanisms available for the sector in each country;
- Recommendations for market accesses improvement, especially for handicrafts.

Palmas Anniversary Project, Sebrae Tocantins, Palmas, Brazil (April 2004)

Study on the fifteen years of existence of the city of Palmas, Tocantins, focusing on the social-economic and environmental development of the city. Main activities:

- Characterization of the city;
- Survey of the opportunities and challenges for the development of the city;
- Selection and elaboration of sectorial projects;
- Communication strategy for implementation of the development plan

Market research of the demand of microfinances in Tocantins in the scope of the Technical Support to the *Banco da Gente* SEBRAE Program, Sebrae Tocantins, Tocantins, Brazil (January-February 2004)

Social-economic analysis of the state of Tocantins through the compilation and analysis of quantitative and qualitative data and the elaboration of a report on the economy, demography, infrastructure, social indicators, and profile of the microentrepreneurs of the state.

Economist, IETS/SEBRAE, Rio de Janeiro, Brazil (October 2003)

Team member of the reformularization of the research questionnaire of the Urban Informal Economy (ECINF) of the IBGE with the objective to improve the search of information for use of the SEBRAE.

Reporter, Building Sustainable Microfinance Institutions Seminar, IFC, Rio de Janeiro, Brazil (October 2003)

Reporter of the seminary “Building Sustainable Microfinance Institutions” organized by the IFC with the objective to argue the main impediments to the development of the micro-financial sector in Brazil.

Economist Assistant, Professor Jorge Chami Consulting, Rio de Janeiro, Brazil (April-July 2001)

Elaboration of analytical text and update of the Brazilian historical series of the external sector for the book “Statistics of the 20th Century” of the IBGE.

Evaluation of the conjuncture and competitiveness of the sector of industrial goods in Brazil.

Study on the impacts in the Brazilian trade balance of an agreement Brazil and the European Union based on the analysis of the elasticities and market-share of the main commercialized products.

Intern, EDP International, Lisboa, Portugal (October 2000 –February 2001)

Financial analysis of the investments of the EDP in electric companies abroad.

Elaboration of a benchmark of the electricity distribution companies in Brazil.

Intern, Finance Exportation Area, BNDES, Rio de Janeiro, Brazil (July 1999-August 2000)

Analyze and operate finance requests for the exports of companies in the food, siderurgy, oil, and gas sectors.

Intern, Professor Jorge Chami Consulting, Rio de Janeiro, Brazil (October 1998-June 1999)

Assistant in the elaboration of the bulletin on Brazilian conjuncture for The Economist Intelligence Unit (EIU).

EDUCATION

2004 - Catholic University of Rio de Janeiro (PUC-RJ)

M.Sc., Economics

2001 - Federal University of Rio de Janeiro (UFRJ)

B.A., Economics

2000 - Lisbon Technical University

Superior Institute of Economy and Management (ISEG)

Courses in International Financial Management and European Economy.

SKILLS AND ACTIVITIES

Portuguese (native), English (near-fluency), Spanish (near-fluency).

CONTESTS

IPEA/CAIXA

Contest “IPEA 40 anos - IPEA-CAIXA 2004”

First place in the national competition of thesis in economics on the subject “The Challenges to Economic Growth in Brazil.” Paper awarded: “Outgoing the shadow: the impact of the SIMPLES law on micro-enterprises formalization”.

Annex 2 – List of Specialists, Institutions and Database consulted

The following institutions, foreign trade and sector specialists and databases were consulted during the selection phase in order to help the research team compose and refine a list of promising cases:

Database:

Export data (SECEX)
Balance of Payments (Brazil Central Bank)
Industrial Production (IBGE)
Trade Annual Research (PAC/IBGE)

Institutions:

- Associação Brasileira de Games - ABRAGAMES
- Associação Brasileira da Indústria de Máquinas e Equipamentos – ABIMAQ
- Associação Brasileira da Indústria de Plásticos - ABIPLAST
- Associação Brasileira da Indústria Química - ABIQUIM
- Associação Brasileira da Indústria Têxtil - ABIT
- Associação Brasileira de Biotecnologia - ABRABI
- Associação Brasileira das Agências de Publicidade - ABAP
- Agência de Promoção à Exportação do Brasil - APEX
- Banco Nacional de Desenvolvimento Econômico - BNDES
- Banco Central do Brasil - BACEN
- Empresa Brasileira de Pesquisa Agropecuária - EMBRAPA
- Instituto de Estudos para Desenvolvimento Industrial - IEDI
- Instituto de Pesquisa Tecnológica de São Paulo - IPT
- Instituto Brasileiro de Geografia e Estatística - IBGE
- Financiadora de Estudos e Projetos - FINEP
- Ministério do Desenvolvimento Indústria e Comércio - MDIC

Specialists:

- Nilton Calixto
Macroeconomic analyst of Credit Suisse First Boston Bank

- Benedicto Fonseca Moreira
Brazilian Trade Association President