Innovative Firms in Three Emerging Economies:
A comparison between the Brazilian, Mexican and Argentinean industrial elite

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Abstract

Recent data released by the Institute for Applied Economic Research (IPEA) show that companies in Brazil, Mexico and Argentina remain strong competitors in global markets in standardized agricultural and industrial goods. However the data show also that a small, but important group of Brazilian companies – responsible for more than 25% of industrial sales – is participating in international market via exports of medium and high-technology goods. This cluster of highly competitive Brazilian firms generates growth positive spillovers in terms of wage and productivity. Contrary to expectations in Brazil of a a regressive specialization in terms of exports products following liberalization, the new competitive environment in Brazil is unleashing new business perspectives associated with innovation. This process in Brazil is different from the experiences of firms in Mexico and Argentina. The ability of the Brazilian industrial elite to compete successfully in the global economy is rooted in their improved innovative capacity. In response to international and domestic conditions, these innovative firms have changed their business strategies and also their attitudes towards technology, innovation and employment. In the process, they are giving birth to a new entrepreneurship in Brazil.

Introduction

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The remarkable and unmatched growth rates of the advanced free-market economies are what distinguish them most from all other economic systems. In no other system, current or historical, has the average income of the general public risen as quickly as it has in Western Europe, the United States and Japan. The secret of their success is the economic puzzle that undoubtedly is critical to the prosperity our future will be able to achieve. Its answer is what the world's latecomer and poorer Latin American countries are anxious to learn.

The terms *innovation* and *entrepreneur* invariably recur in attempts to explain these achievements, yet in mainstream economic writings these two words are scarcely found.

This article argues that one of the main engines for the successs of the free-market machine must be sought in the activities of industries and firms constituted in them. Basically, it deals with innovation as the main product of entrepreneurial activity, and as the main explanation for the long-run expansion of firms, both in internal and external markets.

This article has three sections that aim to: first, scrutinize current characteristics and growth performance of Brazilian business firms; second, observe the way innovation occurs and impacts Brazilian industrial firms; and third, compare innovation and the performance of firms in Brazil, Mexico and Argentina.

The main conclusions reached reveal the following:

- In all three Latin American countries, innovative efforts are still very low and biased towards the acquisition of machines and other equipment. Standard-product-oriented firms have, consequently, the largest share of exports, employment and sales;
- Innovative Brazilian firms have a larger share of employment, sales and manufacturing than in the other countries, and have more employees in R&D areas in each firm;
- Brazil, Mexico and Argentina are still strong competitors in more standardized agricultural and industrial goods. However there is a significant group of Brazilian companies – responsible for more than

25% of industrial sales – that, for the first time, participates in the international market through medium to high technological content goods;

- Recent data made available by the Institute for Applied Economic Research (IPEA) indicates that Brazil has certain unique traces distinct from conventional perspectives regarding the specialization of developing countries in labor-intensive and natural resource-intensive activities. A small minority of Brazilian-owned firms (1200 in all) are not only exporting to a greater degree than they ever had, but they are also becoming transnational to an unprecedented extent.
- This cluster of highly competitive firms generates growth spillovers in terms of wage and productivity. Instead of spawning a regressive specialization, the new competitive environment stemmed from the opening of the economy has unleashed new business perspectives associated to innovation, different from Mexico and Argentina.
- Although the uniqueness of the Brazilian case requests more research to better understand the deeper processes underneath, data suggest that the ability of these industrial elite to compete successfully in the global economy is embedded in their improved innovative capacity. In response to international and national conditions, these innovative firms have changed their business strategies, their attitude towards technology, innovation and employment, giving birth to a new entrepreneurial wave in Brazil.

The consequences of the widespread opening of the Brazilian economy, which started in the 1980s and expanded from 1990 onward, have already been studied from different perspectives. In general, these have emphasized economic and societal changes.

In comparison, this article emphasizes microeconomic realities based on the evolution of Brazilian firms. Brazil left behind at least part of its protectionist past and has become much more open to the transformative influence of global trade. The economic openness coefficient (trade as a percentage of

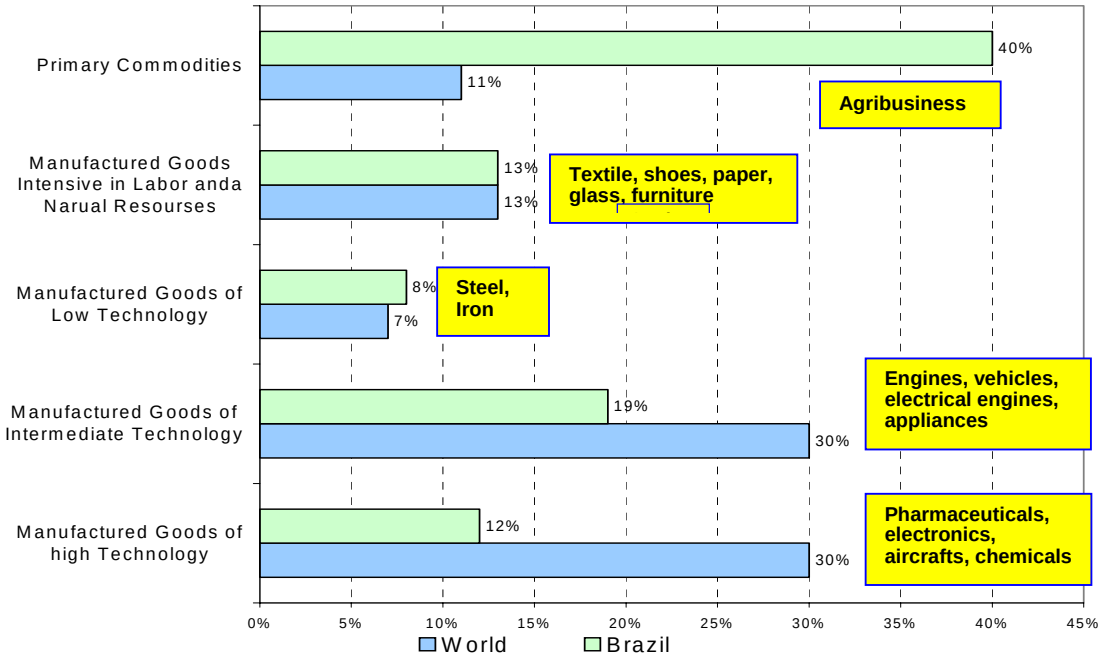
GDP) reached 25% in 2006, the highest level since the 1950s, and increased by 17% in 2006, reaching the highest level of exports to almost US$ 140 billion, triple the level observed ten years ago. Brazil's commodities are responsible for a relevant part of this progression, but around 54% (in 2006) of Brazilian exports are manufactured goods, not just commodities. And more than 40% of Brazil's industrial exports in 2006 have a reasonable degree of technological sophistication. Leading examples of medium and high tech exports include aircraft and aerospace, specialty chemicals, automobiles, and communication equipment.

Although serious research has included some outstanding contributions to the understanding of this new Brazilian reality, they have provided little to suggest what features of business behavior and decision making could account for these changes. Indeed, when the subject is the appreciation of the Brazilian currency, these studies offered reasons to expect the contrary; that is, that Brazilian companies would face great difficulties to switch from an inward to an outward strategy.

In the early 1980s, the conventional analysis was pessimistic on the ability of the Brazilian industry to gain energy to compete and participate significantly in international markets, due to its protectionist habits and small size, compared to international counterparts.

Indeed, Brazilian exports are strongly concentrated in primary commodities, which represented about 50% of the total. However, the mix of Brazilian and world export products are significantly different. On average, 60% of the products exported in the world are of high and intermediate technological intensity while the share of commodities is only 13% (see chart below). Data confirm that Brazil remains competitive in exports of labor and natural resource intensive goods.

Chart 1 **– Structure of Brazilian (2003) and International Exports (2002)**
by types of products classified by technological intensity (in %)



Source: IPEA, 2005, 2006; IBGE/Pintec, 2000. Products by technological Intensity according to UNCTAD methodology.

Nonetheless, recent Brazilian exports show an unusual competitiveness in segments with medium and high technological content (Charts 2 and 3), which calls for explanation.

Chart 2 **– Brazilian exports by technological intensity**
1996-2005 (US$ bln)

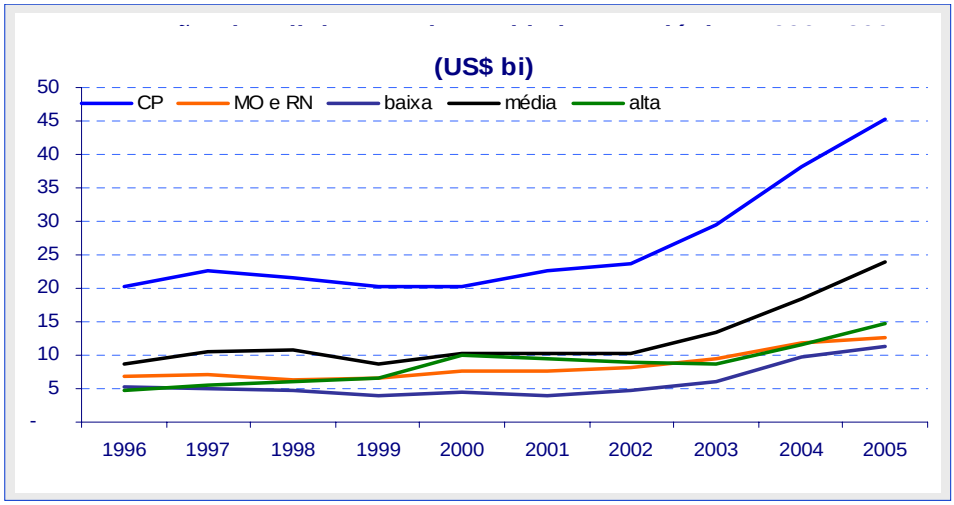
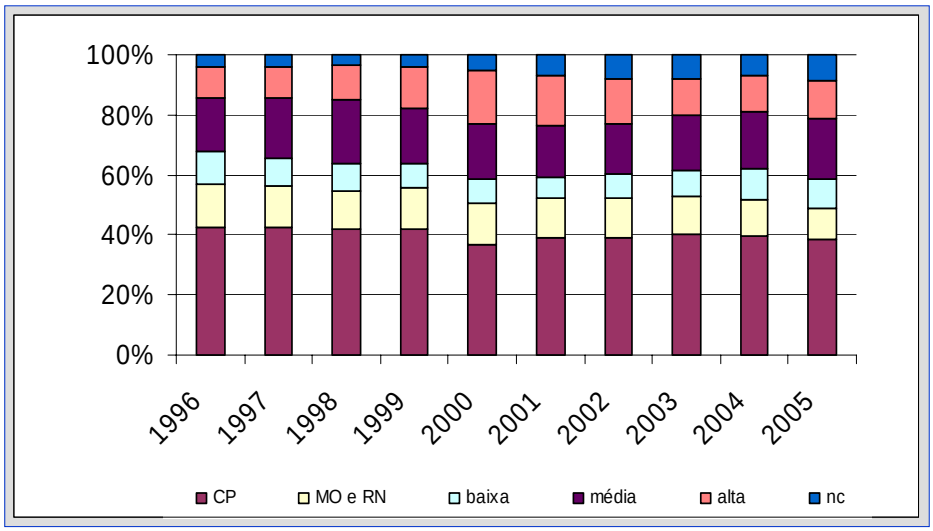


Chart 3 **– Brazilian exports by technological intensity**
1996-2005 (US$ bln)



Source:
IPEA (2005, 2006);
DeNegri et al., 2006;
Methodology: UNCTAD

Commodities
High tech goods
Labor intensive
Medium tech
Others
Low tech

What are the reasons to explain this unexpected performance? How could Brazilian industrial companies export to such demanding North American and European markets, exhibiting relevant levels of competitiveness? Certainly, the answer must emphasize economic pressures that have shaken Brazilian firms during the 1990s, but it is reasonable to go further into this issue.

Exploring Brazilian Firms New Performance

This article argues that a group of Brazilian firms are behaving differently from the past and assuming new corporate strategies towards exports and employment based on more permanent innovation processes.

A recent survey revealed that this new group of Brazilian firms: obtains a special price in the international market when compared to other Brazilian exporters; are more productive; invest more in R&D and pay better salaries to their employees; invest more in training and capacity building; and grow faster than other Brazilian companies.

In 2003, the Institute for Applied Economic Research (IPEA), the Brazilian government's most important think-tank, started researching this new group of companies, based on a new methodological approach[2]. IPEA defined a unique taxonomy to categorize industrial firms according to their competitive strategies, producing a detailed and precise industrial diagnosis for the period between 1998 and 2004.

IPEA sorted industrial firms by their corporate strategic policy competition in terms of product differentiation that enables companies to obtain a premium price in the markets[3]. This product differentiation strategy, based on innovation, is distinct from the spurious competition that had predominated in emerging countries for decades. It better rewards companies and society due to the fact that the competition is no longer based on lower wages and extended working hours.

IPEA first separated Brazilian firms from foreign firms by ownership (Brazilian firms have 50% or more of national capital), and divided strategic competition into three groups:

1. **Firms A**: firms that innovate and differentiate products. Firms in this group carried out any innovation to the market and obtained a price-premium equivalent to 30% in exported goods when compared to other Brazilian exporters of the same product. Group A emphasizes R&D, marketing, quality and brand management.

2. **Firms B**: firms specialized in standard products where competitive strategy is based on cost cutting activities, instead of value added creation like in the previous category. This group contains exporting firms not included in the previous category and non-exporting firms with the same or better efficiency than the exporting ones. Group B firms put stress on operational manufacturing, management, control and logistics, and seek lower costs.

[2] IPEA (2006) dealt with data collected by the Instituto Brasileiro de Geografia e Estatística (IBGE)/Industrial Research on Innovation Technology (PINTEC) and Industrial Research (PIA); RAIS/MtB; SECEX/MDIC; Censo do Capital Estrangeiro/Central Bank; Registro of Capitais Brasileiros no Exterior/Central Bank; Compras Governamentais/Ministery of Planning.

[3] Firms obtain additional returns for their products, different and higher than other companies.

3. **Firms C**: firms that do not differentiate and have lower productivity, as well as firms that do not fit into the previous groups. Firms C are non-exporting companies that are able to perform better in less dynamic markets by means of low prices or low salaries.

A survey over more than 70,000 Brazilian-owned firms confirmed that the vast majority could not really be classified as innovative in terms of launching new products or new processes into the global or internal market.

Nonetheless, what was new in the IPEA survey was what it brought to light about the higher performance of the small minority of Brazilian-owned companies that truly do innovate, around 1200 in all (See Table 1).

Table 1 – Brazilian Industrial Firms' Competitive Strategy

Competitive Strategy	Number of firms (#)	Share in wages (%)	Share in employment (%)
Innovative firms (A)	1,199 (1.7%)	25.9	13.2
Standard products (B)	15,311 (21.3%)	62.6	48.7
Lower productivity (C)	55,495 (77.1%)	11.5	38.2
Total	72,005	100%	100%

Source: IPEA (2005, 2006), based on IBGE (Pintec 2000), and PIA/IBGE, Secex/MDIC, CBE and CEB/Bacen, MPOG and Rais/MTE.

Although these firms represent only 1.7% of all industrial companies, they account for more than 25% of total industrial sales in Brazil and 14% of total employment in industry.

These companies are much larger than most industrial firms in Brazil, and they are more efficient, show higher productivity and leadership capacity (Table 2).

Table 2 - Size, Efficiency, and Leadership in Brazilian Industrial Firms

Competitive Strategy	Employees (average) #	Total Sales (R$ million)	Efficiency[a]		Productivity per worker (R$ 1.000)	Leadership market share[b]
			Scale efficiency (index)	Technical efficiency (index)		
Firms (A)	545.9	135.5	0.77	0.30	74.1	0.02
Firms (B)	158.1	25.7	0.70	0.18	44.3	0.004
Firms (C)	34.2	1.3	0.48	0.11	10.0	0.00028

Source: IPEA (2005, 2006), based on IBGE (Pintec 2000), and PIA/IBGE, Secex/MDIC, CBE and CEB/Bacen, MPOG and Rais/MTE; DeNegri et al., 2006.

a. Technical and Scale efficiency refer to firm's productivity difference relative to the most productive scale within the industry.
b. Market share of each firm within its industrial sector.

Table 3 shows the average difference in wages per employee among Firms A (R$ 1,254.64 Reais), Firms B (R$ 749.02), and Firms C (R$ 431.15). It is clear that the performance of A-type firms is correlated with higher wages and more educated workers than their counterparts. On average, workers in Firms A have 9.13 years of education and stay 54.09 months, on average, in the same company.

Table 3 – Salaries, Schooling and Premium Wages in Brazilian Industrial Firms

Competitive Strategy	Wage Average (R$/month)	Schooling Years	Tenure (months)	Wage Premium (%)[a]
Firms A	1,254.64	9.13	54.09	23
Firms B	749.02	7.64	43.90	11
Firms C	431.15	6.89	35.41	0

Source: IPEA (2005, 2006), based on IBGE (Pintec 2000), and PIA/IBGE, Secex/MDIC, CBE and CEB/Bacen, MPOG and Rais/MTE. [a]Bahia and Arbache (2005).

Schooling and effective time on the job are especially relevant variables in analyzing firms' competitive strategy. These indicators are frequently associated with technological learning processes that tend to require better-trained and educated workers.

To better understand these attributes, Bahia and Arbache (2005) reduced the effect of more than 200 variables[4] to isolate and focus only on innovation. They set out the limits of the wage-innovation-differential: A-type firms pay 23% more than C-type firms and 11% more than B-type firms. The authors' findings pointed out how innovation exerts a positive impact on salaries and raises the quality of jobs.

IPEA's survey (2005) revealed as well that innovative firms are more likely to participate in international trade. According to the survey, of 1,611 foreign companies in the Brazilian industry, 1,215 (75.4%) have not been labeled as innovative companies, suggesting the continuity of foreign companies' preference towards the Brazilian internal market, natural resources and relatively cheaper labor[5].

Araújo (2004) evaluated the innovative effort (internal R&D expenses in relation to sales), firm by firm, and found that Brazilian A-type companies spend around 3% of sales on research activities. This is 80.8% higher and far in excess of the R&D spending of foreign multinational subsidiaries in Brazil during 1998 through 2000. He calculated that innovative foreign multinational subsidiaries in Brazil purchase abroad more R&D than national A-type firms. Foreign firms spent 0.21% of their total sales on external acquisitions and 0.80% on internal acquisitions, compared to 0.14% and 0.26%, respectively, for national firms, suggesting that subsidiary R&D spending is basically aimed at adapting products and processes coming from their headquarters.

De Negri and Freitas (2004) showed that technological innovation is the main determinant factor to foster firms' exports: a Brazilian innovative firm is 16% more likely to become an exporter than a Brazilian firm that does not carry out any technological innovation. Fernanda de Negri (2005) revealed that Brazilian firms are capable of exporting products with higher technological intensity to competitive markets (such as the US and Europe), and that there is a strong association between these exports and innovation processes

[4] Such as firms' earnings, sectors, geographic localization, employees, scale, tenure, turnover, export and import coefficients, and so on.

[5] Multinational companies seem to concentrate innovation processes in their headquarters. Their strategy in developing countries like Brazil remains oriented towards the domestic market or low technology exports.

conducted by these firms. Moreover, the Brazilian case seems to be different from other Latin American economies because it manages to export high tech products associated with imported machines, components and equipment. Such pattern is comparable to multinational subsidiaries in the country.

The internationalization of a group of Brazilian firms is a very recent tendency revealed by IPEA's survey as well. According to the Brazilian Central Bank, in 2003 there were $82.7 billion US dollars of Brazilian capital located in foreign countries. The stock of Brazilian direct investment summed up to $54.9 billion US dollars. Of this total, Brazilian industrial firms were responsible for $13.7 billion US dollars of foreign direct investment (FDI).

Arbix, Salerno and De Negri (2004) showed that the internationalization process developed by some Brazilian firms improves their export performance. According to the authors, firms' external performance is due to innovation based on new information or technology from abroad.

Arbache (2005) pointed out that technological innovation is positively connected to firms' growth. Firms that invest abroad, via FDI, show a larger expansion and growth potential[6].

Arbix, Salerno and De Negri (2005) confirmed the hypothesis that there is a strong association between technological innovation, internationalization of Brazilian industrial firms and price premiums in exports. The authors stated that innovation is strongly correlated to efforts of internationalization, as firms tend to widen their knowledge and R&D network, seeking to sustain their position in the markets. Brazilian companies with FDI in North American and European markets are 17.40% and 14.01%, respectively, more likely to export to these markets than Brazilian non-internationalized firms. These results suggest that competition strengthens Brazilian firms' innovative and exporting abilities.

Arbix, Salerno and De Negri (2004b) also brought to light the differences in external sources that support innovation processes. For specific markets, like the United States and Europe, information for innovation comes both from

[6] Brazilian firms with FDI are present in almost all industrial sectors, such as textile, cellulose, metallurgics and steel.

suppliers and clients, and is positively correlated with the search for price premiums. In less demanding markets, as in Latin America, Brazilian firms look for additional information only occasionally.

Brazilian firms are inclined to form cooperative alliances and partnerships to access technological innovation. However, in-house engineering and R&D remain the main sources of information for Brazilian companies (See Table 4).

Table 4 – Brazilian Firms and Innovation Sources

Competitive Strategy	Internal sources	Other companies of the same group	Machine suppliers	Clients and consumers	Competitors
Firms A	60.7	28.1	29.9	49.6	19.9
Firms B	53.2	9.5	40.8	37.9	22.1
Firms C	44.1	1.1	35.7	34.3	22.5

Source: IPEA (2005, 2006), based on IBGE (Pintec 2000), and PIA/IBGE, Secex/MDIC, CBE and CEB/Bacen, MPOG, and Rais/MTE.

A-Type firms consider “internal sources”, information from “other companies of the same group” and “clients and consumers,” as highly important for their corporate strategies. In comparison, B- and C-type firms rely heavily on “machine suppliers” and “competitors,” which is consistent with cost-reduction-led strategies or imitation processes.

Particularly relevant to the improvement of firms’ competitiveness is their capacity to promote structural and organizational changes. There is no simple causal relationship between these changes and technological innovation, for technological innovation, simultaneously, stimulates and is stimulated by change. Nonetheless, based on information declared by companies, A-type firms have experienced deeper organizational and managerial changes than B- and C-type firms (See Table 5).

Table 5 – Innovation and Competitive Processes

Competitive strategy	Product		Market		
	Quality programs	Product offering #	Stable market share	Increasing market share	Success in new markets
Firms A	61.2	46.8	55.8	47.5	34.9
Firms B	57.1	28.7	50.6	39.9	23.7
Firms C	55.6	24.0	47.7	34.6	21.0
Competitive strategy	**Process**				
	Increasing productive capacity	Environmental impact reduction	Labor costs reduction	Raw material reduction	Energy reduction
Firms A	34.1	28.8	23.7	10.6	8.8
Firms B	42.5	27.4	24.2	9.2	9.0
Firms C	43.6	22.2	22.3	7.2	8.3

Source: IPEA (2005, 2006), based on IBGE (Pintec 2000), and PIA/IBGE, Secex/MDIC, CBE and CEB/Bacen, MPOG, and Rais/MTE.

Brazil, Argentina, Mexico

In all of the Latin American countries, standard-product-oriented firms have the largest share of exports, employment and sales. However, in the shadow of the commodity boom, Brazil's adaptable private sector is responding to a competitive global marketplace in innovation and technology.

Table 6 – **Brazil, Argentina and Mexico: Firms' Profile According to Competitive Strategies**

	Brazil			
Competitive Strategy	**Total of firms (share of the total)**	**Employees (share of the total)**	**% of country's total sales**	**% of country's exports (average)**
Firm A	721 (4.58%)	(17.64%)	25.19%	33.16%
Firm B	6,066 (38.55%)	(52.35%)	64.19%	66.83%
Firm C	8,949 (56.87%)	(30,00%)	9.80%	----
Total	15,737 100%	3,776,499 100%	100%	100%
	Argentina			
Competitive Strategy	**Total of firms (share of the total)**	**Employees (share of the total)**	**% of country's total sales**	**% of country's exports (average)**
Firm A	242 (6.06%)	(9.48%)	12.71%	12.75%
Firm B	2,064 (56.34%)	(64.67%)	80.11%	87.25%
Firm C	1,357 (37.04%)	(25.85%)	7.61%	---
Total	3,663 100%	639,984 100%	100%	100%
	Mexico			
Competitive Strategy	**Total of firms (share of the total)**	**Employees (share of the total)**	**% of country's total sales**	**% of country's exports (average)**
Firm A	263 (3.23%)	(5.29%)	5.30%	3.48%
Firm B	4,179 (51.29%)	(62.75%)	82.70%	96.52%
Firm C	3,705 (45.48%)	(31.96%)	11.99%	---
Total	8,147 100%	1,918,942 100%	100%	100%

Source: De Negri, 2006. Based on:
Mexican Innovation Survey did not interview Maquila firms.

Brazilian A-type firms compare favorably in terms of innovation and R&D effort to their counterpart domestic companies in Argentina and even Mexico, whose domestic B-type firms are producing more standardized products for sale into the US market. Innovative Brazilian A-type firms have a larger share of employment, sales and manufacturing than in Mexico and Argentina.

Mexican B-type firms, which are standard-product-oriented, are stronger than those in Brazil and Argentina, and are more productive than those that invest in innovation as a competitive strategy.

All of the three countries show that R&D investment remains very low (Table 7).

Table 7 **– Brazil, Argentina, and Mexico: R&D Efforts**

Brazil			
Competitive Strategies	R&D/Total sales %	R&D Employees (Average #)	% of total staff
Firm A	1.40	30.6	3.31%
Firm B	0.36	3.6	1.10%
Firm C	0.36	0.9	0.76%
Industry Total	0.61	3.3	1.39%
Argentina			
Competitive Strategies	R&D/Total sales %	R&D Employees (Average #)	% of total staff
Firm A	1.08	7.9	3.29%
Firm B	0.08	3.0	1.59%
Firm C	0.15	1.4	1.20%
Industry Total	0.21	2.7	1.65%
Mexico			
Competitive strategies	R&D / Total sales %	R&D Employees (Average #)	% of total staff
Firm A	0.81	7.1	1.79%
Firm B	0.04	1.1	0.41%
Firm C	0.06	0.4	0.26%
Industry total	0.08	1.0	0.44%

Source: De Negri (2006); INDEC (2003; 2005)

For purposes of illustrative cross-national comparisons (taking into account that information available has strong methodological differences), in Germany the R&D/industrial sales indicator is 2.7% and in France 2.5% (OECD, 2004).

According to Table 7, in Brazil, there are more people employed in R&D in each firm. But the percentage (%) of total employees as a proportion of the total is not very different than in Argentina, because of the larger scale of the Brazilian companies.

In Mexico, the R&D/industrial sales indicator reaches the lowest value, only 0.08%. As the Mexican Innovation Survey did not interview *Maquila* firms, the

first candidate explanation is that Mexican A-type firms' competitive strategy is not emphasizing innovation.

The series of charts presented below show the distribution of innovation expenditures in Brazil, Argentina and Mexico (Charts 4, 5 and 6)[7].

Chart 4 – **Brazil: Distribution of Innovation Expenditures**

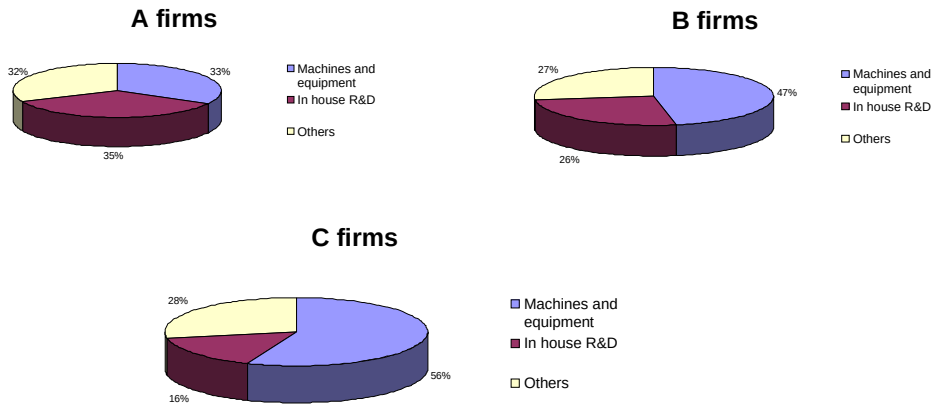
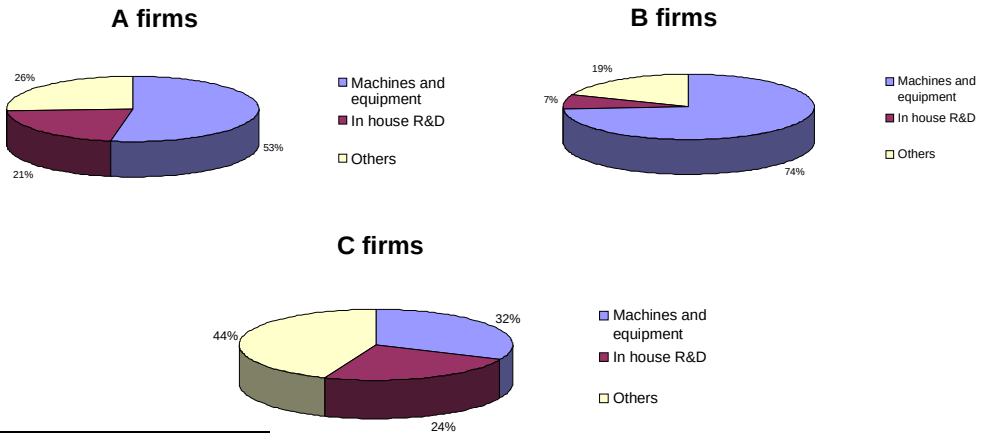
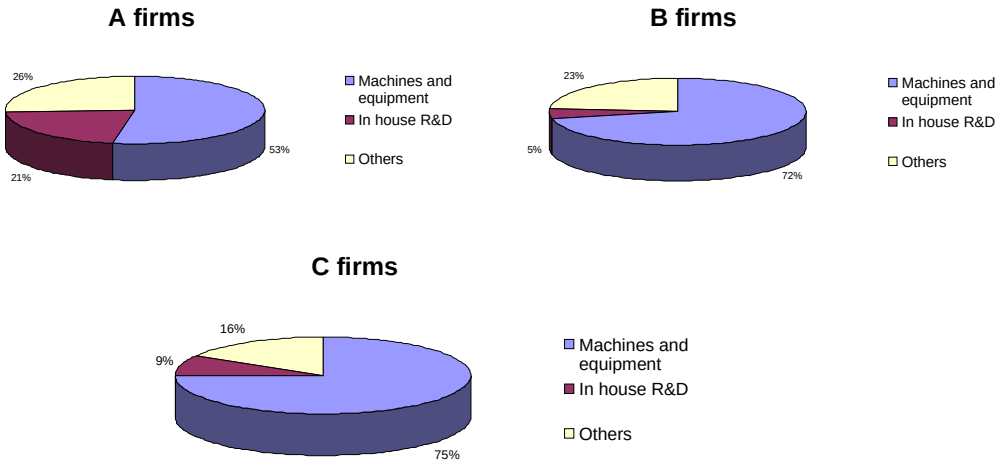


Chart 5 **– Argentina: Distribution of Innovation Expenditures**



[7] Based on De Negri (2006).

Chart 6 **– Mexico: Distribution of Innovation Expenditures**



In all of the three Latin American countries, innovative efforts are biased towards the acquisition of machines and other equipment related to innovation processes. But in Mexico, the pattern above is much stronger than in Argentina and Brazil, another sign of the standard-led Mexican technological and competitive strategy.

Although Brazil is recognized for its competitiveness in more standardized agricultural and industrial goods, there is a significant group of Brazilian companies (A-type firms) whose R&D expenditures represent 35% of the total invested in innovation processes. This stands in stark contrast to the 21% spent by Mexico and Argentina respectively.

To summarize, IPEA's survey uncovered new realities involving Brazilian industrial firms:

(1) Innovation has been confirmed as the key element to explain the successful performance in the external market executed by a small, although significant, emerging elite of Brazilian industrial companies;
(2) Innovation is positively correlated to exports, productivity, quality, market share, and environmental concerns;
(3) Compared to past experience, this highly competitive industrial cluster is growing faster than their counterparts, and generating spillovers in terms of wages and productivity, based on a new outward-oriented strategy;
(4) To carry out that strategy, this cluster of highly innovative Brazilian companies has changed its business strategies in the last twenty years in response to international conditions, and widened its knowledge networks to capture new trends, absorb new technologies, processes, and management expertise;
(5) These firms pay higher wages and hire much more educated workers than their Brazilian counterparts;
(6) These Brazilian companies also appear to compare well against the international competition in the key category of R&D spending about 3% of sales on research activities. This is higher than the average

spent in most of Europe, and far in excess of the R&D spending of foreign multinational subsidiaries in Brazil;

(7) The Brazilian industrial elite firms are not only exporting to a greater extent than they ever have, but they are also becoming transnational to an extent unprecedented in Brazilian history. In fact, for the first time, direct investment abroad by Brazilian firms in 2006 was higher than inward flows.

(8) This cluster of Brazilian industrial companies draws attention to the singularity of the Brazilian case when compared to Mexico and Argentina, countries that underwent a similar ISI process, and until recently had a very analogous industrial structure. While the strategy of Brazilian A-firms has incorporated innovation efforts and a clear outward orientation, domestic companies in Argentina and in Mexico are more standardized-product-oriented.

Signs of a new entrepreneurial wave in Brazil

Innovative (type-A) firms represent 25.9% of Brazilian industry sales. 39% of these firms have changed their strategies over the past 15 years. All the innovative Brazilian firms have absorbed information abroad to carry out technological innovation, and 23.1% of them have changed internal processes and adjusted themselves to international norms and standards, becoming more technology and export-oriented.

The economic relevance of these companies indicates that part of the Brazilian industrial elite, in reaction to the new business environment, resulted from the exhaustion of National Developmentalism and the opening of the economy, and developed new catching-up strategies based on innovation. In the past, the Brazilian State worked as a kind of substitute to the lack of business entrepreneurship[8]. With the State withdrawal after privatization, new structural changes started prospering in Brazil and impacted the very subtle economic mechanisms. This new competitive environment pushed forward

[8] Gerschenkron elaborated more on this subject. See: Gerschenkron, A. “The modernization of Entrepreneurship”, in R. Swedberg, *Entrepreneurship*. Nova York: Oxford Un. Press, 2000.

important economic segments – either in services, industry and agriculture – to go through a period of structural transition.

The opportunity was not unique. The Brazilian industry's transition from the 1970s to the 1980s had already offered an historic opportunity to correct its course by reducing protectionism, incorporating new information and communication technologies, and seeking international involvement in advanced markets. Unfortunately, a long macroeconomic crisis and consequent instability kept industry stagnant throughout the 1980s. Along with government political indefinitions, the Brazilian industry could not overcome these obstacles and renovate the industrialization process.

The opening of the economy and trade liberalization in the beginning of the 1990s offered a new occasion to the recovering industry but under conditions to confront international competitors both in domestic and foreign markets.

Fifteen years later, although the majority of the Brazilian industry found itself even more technologically behind, there is an emergent small group of companies better-equipped for innovative activities. Their competitiveness is based on increasing productivity and efficiency. They face competition by product differentiation, and not by cost and salary-downsizing.

In this new wave of entrepreneurship, companies are dealing with innovation to foster competitiveness, seeking new alliances with domestic and foreign firms, investing overseas, and seeking for new knowledge abroad. These companies buy, absorb or generate knowledge and technology as their main tool to innovate, transform and expand themselves. New alliances with foreign and domestic firms contribute to improve their export performance, by means of giving access to new trade chains, adapting products to specific markets, accessing cheaper financial resources, and appropriating new technology[9]. In 2003, according to the Brazilian Central Bank, there was US$ 82.7 billion in Brazilian capital overseas. Brazilian industrial direct investment – stockholdings above 10% and inter-company loans – accounted for US$ 13.7 billion of a total of US$ 54.9 billion.

[9] Burt (1992) has shown how entrepreneurs' chances of success are determined by the structure of their networks.

The 1990s created the scenario for greater economic transformation and have opened up new possibilities for the industry, yet any attempt to implement policies to foster industrial competitiveness failed during the Collor Plan. The new Industrial and Foreign Trade Policy (Politica Industrial e de Comercio Exterior – PICE) defined by the government in 1991 has only supported foreign trade liberalization.

Nevertheless, deep institutional changes have impacted Brazilian economic and social institutions, along with macroeconomic stability, privatization, regulatory agencies and the Brazilian competition defense system, forcing companies to improve productivity to survive. Trauma and losses have occurred, but nothing similar to any deindustrialization processes announced by some analysts.[10]

The significant increase in Brazilian exports after 2000 was, therefore, accompanied by an increased ability of Brazilian firms to succeed in more technological markets. De Negri (2005) tested and confirmed the hypothesis that productivity gains acquired during the 1990s contributed to the increase in efficiency of these firms, with clear positive consequences for their international competitiveness.

In the international arena, different surveys and authors (Reynolds, 2000; Audretsch and Thurik, 2001) have shown that entrepreneurship, based on firm creation and firm growth, makes innovation processes more dynamic. The special ability of entrepreneurship to promote growth is emphasized by Audretsch and Thurik, who also present further empirical evidence regarding the relationship between the level of GDP growth and creation and expansion of enterprises (2001).

Entrepreneurship is related to the ability to transform an idea into a market reality, by the means of a firm. Entrepreneurial behavior refers to the capacity to develop new business via the creation or structural remodeling of

[10] Trade and financial opening combined with low inflation based on high real interest rates and in an overvalued currency were supposed to stimulate distortions in the Brazilian industry competitiveness. In this scenario, companies supported by natural resource-intensive and labor-intensive production would be able to compete internationally, weakening higher value-added sectors and spawning regressive specialization (Coutinho, 1997; Kupfer, 1998).

companies. Entrepreneurs are related to corporate strategy-building, founded on knowledge-intensive activities.

Although there is a growing theoretical literature on this subject, it is difficult to find answers in the standard microeconomics of firms which has little to say about innovation and its knight, the entrepreneur. As Baumol stressed, “the Schumpeterian entrepreneur is a widely respected concept, but in formal theory he is an invisible man” (2002). That is why, theoretically, all firms seem to be entrepreneurless.

In spite of the pioneering work by Schumpeter that asserted the role of entrepreneurship as the engine of innovation and economic development, many economists have tended to focus their analysis on the economic function of the entrepreneur, rather than on trying to understand or explain the process by which new firms emerge or restructure themselves based on new competitive strategies. This absence underestimates the importance to of capturing entrepreneurs’ initiative and its main product, innovation. Mostly, economic models consider entrepreneurial activity as being essentially the same as management. Entrepreneurs, in this case, are seen as second-class actors, only reacting mechanically to the external environment without interfering in it.

What happens in the world where firms permanently strive to compete is a very different process, which is related to management, but fundamentally connected to new entrepreneurial processes. That is why in recent decades, the debate on entrepreneurship has been reevaluated, and the entrepreneurial process seen as a more complex phenomenon involving the interaction of social and economic factors.

Shane and Venkataraman view entrepreneurial opportunities as the discovery of different means-ends relationships, through which new goods, services, and resources are created (2000). Cohen and Levinthal have underlined that entrepreneur is a history maker, who needs to make choices for there is no certainties in this world (1990). That is why investment in new knowledge increases the technology opportunity and individual ability to devise future.

This is precisely, the space where entrepreneurship resides, and where individuals play a central role.

Facing risk, investing, and trading in the global world is closely linked to the form in which knowledge is created, disseminated and transformed by entrepreneurial firms in market goods. The ability to innovate is closely associated with the capacity to develop new business, expand to new markets, find niches in international trade, and control the effects of price volatility of the products traded by the country.

The new manner in which a group of Brazilian industrial companies are becoming transnational is able to stimulate a virtuous circle of innovation, investment, and growth of firms. This course of action could represent a new chapter in recent Brazilian history, perhaps a small step forward away from the old protectionism but a step closer to a more impressive integration in the international market.

Bibliography Reference

Araujo, R. D. d. (2005) Esforco tecnologico das firmas transnacionais e domesticas, In *Inovacao, padroes tecnologicos e desempenho das firmas brasileiras*, (Eds, DeNegri, J. and Salerno, M.) IPEA, Brasilia, pp. 119-170.

Arbache, J. (2005) Inovacoes tecnologicas e exportacoes afetam o tamanho e a produtividade das firmas manufatureiras? Evidencias para o Brasil, In *Inovacoes, padroes tecnologicos e desempenho das firmas industriais brasileiras*(Eds, DeNegri, J. and Salerno, M.) IPEA, Brasilia.

Arbix, G., Salerno, M. and DeNegri, J. (2004) A. Internacionalização com foco na inovação tecnológica e seu impacto sobre as exportações das firmas brasileiras, *Dados - Revista de Ciencias Sociais,* 32**,** 71-102.

Arbix, G., Salerno, M. and DeNegri, J. (2005) Internacionalizacao gera emprego de qualidade e melhora a competitividade das firmas brasileiras, In *Inovacao, padroes tecnologicos e desempenho das firmas brasileiras*, (Eds, DeNegri, J. and Salerno, M.) IPEA, Brasilia, pp. 171-192.

Audretsch, D. B., Audretsch, D., Grimm, H. and Wessner, C. W. (2005) The Emergence of Entrepreneurship Policy, In *Local heroes in the global village: Globalization and the new entrepreneurship policies*International Studies in Entrepreneurship. New York: Springer, pp. 21-43.

Bahia, L. D. and Arbache, J. (2005) Diferenciacao salarial segundo criterios de desempenho das firmas brasileiras, In *Inovacoes, Padroes Tecnologicos e Desempenho das Firmas Industriais Brasileiras*, (Eds, DeNegri, J. and Salerno, M.) IPEA, Brasilia, pp. 47-74.

Baumol, W. (2002a) *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism,* Princeton University Press, Princeton, New Jersey.

Baumol, W. J. (2002b) Towards Microeconomics of Innovation: Growth Engine Hallmark of Market Economics, *Atlantic Economic Journal,* 30**,** 1-12.

Burt, R. S. (1992) *Structural holes: The social structure of competition,* Harvard University Press, Cambridge, MA.

Cohen, W. M. and Levinthal, D. A. (1990) Absorbtive capacity: A new perspective on learning and innovation., *Administrative Science Quarterly,* 35**,** 128-152.

Coutinho, L. (1996) O Brasil e o Viés Antiindustrializante, *Rumos do Desenvolvimento,* 21**,** 26-30

DeNegri, F. (2005) Padroes tecnologicos e de comercio exterior das firmas brasileiras, In *Inovacao, padroes tecnologicos e desempenho das firmas brasileiras*, (Eds, DeNegri, J. and Salerno, M.) IPEA, Brasilia, pp. 75-118.

DeNegri, J., DeNegri, F. and Freitas, F. (2006) Does Technological Innovation Lead to Exports in Brazil and Argentina?, Brasilia, pp. 25, mimeo.

DeNegri, J. and Freitas, F. (2006) A influencia das estrategias competitivas das empresas sobre os salarios, In *Tecnologia, exportacao e emprego*, Vol. 1 (Eds, DeNegri, J., DeNegri, F. and Coelho, D.) IPEA, Brasilia, pp. 69-100.

Gerschenkron, A. (2000) The modernization of Entrepreneurship, In *Entrepreneurship*, Vol. 1 (Ed, Swedberg, R.) Oxford University Press, Nova York:.

IPEA (2005) Pesquisa sobre Inovacao, Padroes Tecnologicos e Desempenho das Firmas Industriais Brasileiras, IPEA, Brasilia, pp. 714.

IPEA (2006) Tecnologia, expportacao e emprego, (Ed, Planning, M. o.) IPEA, pp. 534.

INDEC, “Segunda Encuesta Nacional de Innovación y conducta tecnológica de las empresas argentinas. 1998-2001”, Serie Estudios, N° 38, Buenos Aires.

INDEC (2005): “Encuesta Nacional a Empresas sobre Innovación, Investigación y Desarrollo y Tecnologías de la Información en Comunicaciones; año 2004” Mimeo 2001

Kupfer, D. (1998) Trajetórias de reestruturação da indústria brasileira após a abertura e a estabilização: temas para debate, . *Boletim de Conjuntura,* 18**,** 30-40.

OECD (2005) S*cience, Technology and Industry: Scoreboard 2005,* OECD, Paris.

Reynolds, P. D., Westhead, P. and Wright, M. (2000) Sociology and Entrepreneurship: Concepts and Contributions, In *Advances in entrepreneurship*Elgar, Cheltenham, U.K, pp. 91-114.

Shane, S. A. and Venkataraman, S. (2000) The promise of entrepreneurship as a field of research, *Academy of Management Review,* 25**,** 217-226.