BRAZILIAN ELECTRICAL-ELECTRONIC INDUSTRY: ENTRY STRATEGIES AND CHALLENGES OF THE INTERNATIONALIZATION PROCESS

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1 INTRODUCTION

The literature on the internationalization of companies notes five different modes of entrance into a new country: indirect export (through trading companies, for example), or direct (through existing intermediate means in the receptor country, or own channels developed by the company in that country); licensing and franchises, strategic alliances (joint ventures, for example), acquisitions and the creation of a new operating unit (SHARMA; ERRAMILLI, 2004, apud FORTE; SETTE, 2005).

Concerning Brazil, what factors have impelled the internationalization of Brazilian companies and which modes have been adopted?

Brazilian economic data, recorded by BANCO CENTRAL, suggest there has been a significant increase in the degree of internationalization within Brazilian companies. Industrial companies, which in their initial phase – marked by import substitution – were basically focused on the internal market and that, from the second half of the 1960's, started also to seek space in the external market, have been setting up businesses abroad since 1990. Although most are still in the initial phase of internationalization, typified by the export of goods, many of them are already becoming internationalized via foreign direct investment (FDI).

The search for internationalization may have come about as a consequence of the pressures suffered by companies as a result of the economic policies implemented in the 1990's. The opening of the economy - which incited the internal competition – together with the increase in the taxation and the systematic maintenance of high interest rates, left many firms with the option of either succumbing to the pressure or seeking internationalization. At first, the second option would mean attempting to place products in foreign markets, later, in order to support this effort firms would set up enterprises abroad.

The degree of internationalization of firms has been studied by several researchers. It is worth noting the results obtained by Prochnik, Esteves and Freitas (2006, p. 341):

The industrial companies with Brazilian capital that make foreign direct investments have significantly higher rates of productivity than similar companies that merely export. The latter, for their part, have significantly higher rates of productivity than those ones that neither export nor invest abroad.

The above authors go on to add that the degree of internationalization in Brazilian companies is also correlated to the following factors: number of people employed, average level of education of the people employed, average length of employment, average income of the people employed, the quotient (Research and Development Expenditure)/(Net Sales Revenue), total expenditure on innovation, number of Masters and PhDs employed in Research and Development, and the number of people in Research and Development in relation to the total amount of employed people. These factors make it clear that the degree of internationalization is directly related to the nature of the labor employed (e.g., that part engaged in Research and Development) and the introduction of innovations (PROCHNIK; ESTEVES; FREITAS, 2006).

A study carried out by Prochnik and Araújo (2005, apud PROCHNIK; ESTEVES; FREITAS, 2006, p.348) showed the existence of intra-sector barriers against innovation, which led them to conclude that "innovation in less productive firms is more common in less concentrated sectors".

The electrical/electronic industry constitutes one of the sectors of the Brazilian economy that suffered most with the economic opening. Its imports, which rose from US$

11.9 billion in 2000 to US$ 18.7 billion in 2006, have represented around 20% of the total imports in the country (ABINEE, 2007). In order to confront this external competition, it has sought out markets abroad, raising exports from US$ 4.4 billion in 2000 to US$ 8.9 billion in 2006; the recent exports represent around 20% of its earnings from 2000 to 2006 (Ibid).

This is an important sector in the national economy. The electrical/electronic industry spreads development, as the machines, equipment and components produced by it are to be found at the base of other sectors of the economy, being present in the agribusiness, in the manufacture of high precision instruments for the health sector and in the production of capital goods, amongst others.

Earnings in the sector, after falling at the beginning of the decade (1), rose sharply from 2003 on, more than doubling by 2006(2) and its share in the Gross Domestic Product (GDP) rose from 4.6% at the beginning of the decade to 5% in 2006 (ABINEE, 2007). The external sales of the sector represented around 7% of the total exports of the country in the period (Ibid). According to Prochnik, Esteves and Freitas (2006), in the Brazilian electrical/electronic sector there are around 650 firms that export and do not invest abroad, and 25 that export and invest abroad. There was an important increase in labor productivity in the sector: earnings per employee rose from US$ 199.1 in 2000 to US$ 334.6 in 2006 (Ibid). Among the sectors with the most intense use of technology, the electrical/electronic sector has an average number of employees per firm, equal to 123, in those that export and do not invest, and equal to 972 in those that export and invest.

At this point, it is important to consider the internationalization of the companies in this industry. Awareness of the motivations, target markets, difficulties found in the process and the path followed, can offer important insights into the current scenario as well as guiding the elaboration of policies and strategies that may benefit the sector. The aim of this article is to investigate this trajectory and this process through a sample of companies based in São Paulo.

Therefore, firstly, the main internationalization strategies adopted by emerging countries like Brazil will be presented. After which, given the intense interpenetration of electrical/electronic products in the greater economic context, the development and the process of internationalization in the Brazilian industry will be analyzed, based on the relevant facts that have impacted on it.

After outlining the current scenery in the electrical/electronic industry and, bearing in mind that most export companies (54%), associated with ABINEE, are concentrated in São Paulo, the current study will focus on results obtained through empirical research, carried out with a non-probalistic sample of companies from this state.

2 INTERNATIONALIZATION STRATEGIES IN EMERGING COUNTRIES

Internationalization in the emerging countries is an issue that has been increasingly discussed. According to Wilson and Purushothaman's study (2003), given the strength of the growth of GDP, per capita income and financial movement, the group of countries known as BRIC (Brazil, Russia, India and China) would tend to be richer than the current G6 within 40 years.

Developing countries, like Brazil, considered to be emerging economies, will increasingly highlight this issue, due to the, as yet unfulfilled, potential (GHOSHAL et al, 2000; BARTLETT; GHOSHAL, 1992). It is important to point out that Brazil's share of total world trade was just 1% in 2004, with annual exports of US$ 95 billion; this volume puts Brazil in 25th position in the ranking, even though it is the 14th largest economy (IMD; IBGE, 2005).

2.1. Theories about Internationalization

According to Stal and Campanário (2006), the rapid increase in foreign direct investment (FDI) over recent decades occurred in distinct phases.

Until the 1950's, investment was concentrated on the search for natural resources. From the 1960's on, as the relative importance of manufactured products increased, a path was opened for the entrance into the markets of the developed countries, which were, then protected by international competition. In these cases, the size of the market and the possibility of growth were the main determinants in the geographical distribution of FDI. In the 1980's, investment flows changed towards services and high technology industries (NOORBAKHSH *et al*., 2001) and, since then, the developed countries have reduced their restrictions to FDI and to the operations of multinational companies, as these were understood to be ways of financing and employment production and also a way to gain skills, technology and management practices.

In the course of time, authors came to elaborate theories that aim to predict and explain internationalization of companies. The main theories can be classified into three categories: the economic theories, the behavioral theories and the strategic theories.

2.1.1. Economic Theories

The main economic approach used to explain the phenomenon of internationalization is the Eclectic Paradigm (DUNNING, 1980), that was developed from the thesis supported by Hymer, in 1960, which explained the motivation for foreign direct investment, especially as a way of making it impossible for competitors (licensed partners) to appropriate the intangible goods of the company in the external market (HYMER, 1976, *apud* ROCHA; ALMEIDA, 2006). Dunning, in turn, applies the concepts of transaction costs to the decisions made within the firm regarding internationalization, trying to explain which characteristics of the companies and of the markets stimulate internationalization through foreign direct investment, differentiating this process in terms of the characteristics of the product and of the markets.

A multinational exists in order to retain the knowledge developed within the boundaries of the firm (DUNNING, 1980). In case of a knowledge disseminated throughout the market and, therefore, collective, the export strategy might be chosen, since it would not be necessary to keep the knowledge within the organization. However, exportation is subject to barriers (tariffs, rates of exchange and quotas, for example) put in place with the purpose of making importation difficult and so persuading the multinational to develop a subsidiary in the country.

Traditionally, the internationalization process of companies has been explained using the Product Life Cycle model (VERNON, 1966). This is based on the potential of the consumer market: once all the opportunities have been exploited and demand in the home market of the company is satisfied, this would export its technology and saturated operations in the headquarters to other countries in order to restart the profit cycle in another market and improve the global performance of the organization. From this perspective, the multinationals would consider foreign countries as places to be exploited and a big opportunity to raise their demand. The foreign subsidiaries implement a model developed in the headquarters to sell a product or a service tested in the home market.

Dunning (1980) sought to identify characteristics that explain international production from the point of view of the geographic distribution of the company assets and the industrial pattern adopted. Advantages related to Location, "Internalization" and Ownership were assessed in an attempt to find explanations.

The theory developed by Dunning (1980), started in 1976, explains the extension, the form and the investment pattern in other countries to develop the company production. It offers a model that makes it possible to identify the determinants upon which the company would start the production outside its country of origin.

The choice would be based upon three kinds of advantage, identified by the acronym OLI (Ownership, Location and Internalization): Ownership specific advantages allow the multinational company to keep the resource within its domain (to keep the brand and/or technology, for example) used in another country; the comparative advantages among countries, (Location specific advantages) that would be determinant in choosing a place for investment (government incentives to attract investments, for example); and, finally, the Internalization specific advantages, which arise from the construction of a structure abroad to "internalize" the operations that could be carried out by economic agents hired in external markets.

The Eclectic Paradigm explains, therefore, the pattern of foreign investment, although it fails to explain the process, the entrance mode and the sequence of resources commitment.

2.1.2. Behavioral Theories

The literature reveals the existence of two important theories that aim to explain the internationalization process in companies: The Uppsala School Model and Networks Theory.

2.1.2.1. The Uppsala School Model

According to Proença and Oliveira (2006), the behaviorist approach understands that, with companies engaged in a internationalization process, there is a gradual commitment of resources and that cultural proximity is a priority when initiating the process of entering new markets, whereas, on the other hand, economic theories suppose information availability for decision-making. The above authors quote Johanson and Wiedersheim (1975) who, during the 1970's and 1980's, began questioning the foreign investment model, rooted in the economic theory and came to focus on the internationalization process of the firm.

A more recent article, by Johanson and Vahlne (1990), shows that the authors consider the internationalization process of the firm as a growing sequence of resource commitment abroad, related to the development of knowledge in external operations.

The greater the experience of external activity the more knowledge, technology, personnel and money are invested in on other countries. Accordingly, as the company gains experience of the operations in a determined external market, the more the company invests and commits more resources in the chosen market, that is, it develops technology, sends people and money, etc. The commitment is gradual. This model is known as "Uppsala School" due to the origin of the authors. It was developed to criticize the economic theories at that time about foreign direct investment, regarded by critics as being very static, besides neglecting the problem of psychic distance.

According to Johanson and Wiedersheim (1975), psychic distance is a very important factor in the choice of new countries. It is understood as "the sum of the factors that facilitate the information circulation between two markets" (JOHANSON; VAHLNE, 1977, p.24), the language, education, business practices and the culture. This way, the firm chooses markets that are culturally closer when starting an internationalization process. A gradual approach to internationalization beginning with culturally closer markets decreases the risks perceived by company managers. Greater resource commitments in culturally distant countries present bigger risks; the objective is to minimize the perceived risks and make the most of the familiarity with the chosen market.

The Uppsala School offers an internationalization process model based on the gradual involvement approach comprehending two modalities: entrance mode evolution and psychic distance. Thus, considering the first modality, the company would start its internationalization through a minor commitment, normally through direct export or through an agent, making it possible to acquire knowledge of the foreign market. The commitment would deepen with the accumulation of experience, generating knowledge enhancement; at the same time, the company would consider the psychic distance between countries in order to choose the places with which to maintain relations and would start with those psychically close and would continue on to the furthest (SOTTO-MAYOR FILHO; FERREIRA, 2006). The perception of threats and market opportunities, as well as the decisions about them, would change with experience.

According to Urban and Fleury (2006), the Uppsala model was severely criticized, especially because of the changes in the competitive environment that would have led to a break in the sequence proposed in it. To the authors, besides the discussion about the entrance mode sequence, the Uppsala model represents a major contribution due to the emphasis given to the cultural factors in the internationalization process.

2.1.2.2. Networks Theory

According to this theory, a company would be impelled to the international market in order to keep up with the movement of the network, formed from different economic agents, to which it belongs. Advantages could be obtained from this consonant action, such as, for example, greater facility when attempting to access psychically distant markets. According to Rocha and Almeida (2006, p.29), "you can't see the firm as an isolated actor in this process; it's necessary to understand the group movement which is underlying and associated to the individual movement".

2.1.3. Strategic Theories of Internationalization

According to those who support this theory, the internationalization process followed by a company would be strongly linked to its strategic orientation.

2.1.3.1. Strategic Behavior Theory

The attempt to obtain competitive advantage in relation to the competitors lies at the core of this theory. A mix of interests in the competitive sphere (to avoid conflict; exchange threats; to follow the leading company; to keep up with the position in the domestic market), besides a discerned analysis of the risks related to the international movements, may guide a company's choice of entrance mode into the external market (ROCHA; ALMEIDA, 2006).

2.1.3.2. Resource Based View (RBV)

The preservation of relevant strategic factors in the company guides this theory, that is, the chosen entrance mode must not threaten the sustainability of competitive advantage, which is shaped according to the group of competences and resources developed by the company, and which are difficult to imitate.

3 THE INTERNATIONALIZATION PROCESS IN BRAZILIAN INDUSTRY

Following the onset of the industrialization process in Brazil in the 1930's, the Brazilian industrial company underwent three important moments in its trajectory: industrialization based on the internal market; in which stage, without relinquishing the internal market, it increasingly occupied the external market; and there was an advance in the internationalization process through the export of capital .

3.1. Import substitution industrialization

After several industrial bursts, since the middle of the eighteenth century (with the mining cycle), industrialization would only be consolidated as a new phenomenon in the Brazilian economy through the process that took place during the 1930's, in response to the internal impact from the Great Depression. It came to be known as import substitution industrialization precisely because industrial goods that had previously been imported were replaced by goods produced locally (SOUZA, 2007).

In this first stage, the sectors related to popular consumer goods; base products (machines, equipment and intermediate goods in general, such as steel, petrochemical products); and durable consumer goods were implanted - the two of the first sectors being under the control of national, private or state enterprises, and the third under the command of foreign capital. This period, which started in the 1930's, extended until the end of the 1970's.

3.2. The export of industrial products

The new era is the result of the accelerated growth experienced by the Brazilian economy from the late 1960's, which received the apologetic epithet the "Brazilian miracle". In the period from 1968 to 1973, it should be noted, the durable goods industry grew, on average, 23.8% per year. The expansion of durable goods was responsible for providing the strong growth in the GDP experienced in this period, leading to an average rate of growth of 11.5% per year (SOUZA, 2004).

The development of this sector demanded an intense process of income concentration. On the one hand, because, being under foreign control, huge profits were needed in order to simultaneously enable the money required in the headquarters of the foreign companies and the investment for internal expansion; on the other, because, by directing its production to higher income groups within society, further concentration income in favor of those groups was necessary. The real minimum wage in São Paulo decreased by 22% from 1964 to 1967 and the most frequent wage for the diverse labor union categories from the same state decreased 26%; from then on, until 1970, the purchasing power of wages stabilized, but fell again later; from 1970 to 1973, the minimum wage decreased 15%, and the most frequent wage fell by 13% (SOUZA, 2004).

The process of intense income concentration during this period, based on the heavy fall in the real salary, resulted in the narrowing of the internal market of the popular consumer goods industry. Its expansion, then, came to depend heavily on the growth of exports, which was ensured not only the by fiscal incentives policies and export credits but also the Brazilian external policies that, by diversifying the diplomatic relations with foreign countries, also diversified foreign trade.

With the onset of impact of the world crisis in 1974, the rate of expansion of the Brazilian economy was reduced, and the durable goods industry - previously maintained by the easy consumer credit and income concentration – began to experience difficulties in the internal market, and also came to receive incentives to occupy the external market (SOUZA, 2004).

Soon afterwards, the strong impulse received by the basic industries through the II National Development Plan (1974-79), the implantation of which was basically completed in the country, required, as a condition, that this industry occupied the external market. Its fundamental characteristic was to complete the industrialization process through the substitution of imports, that is, the internal market became the priority. However, given the large size of the industrial plants required in this sector, its installation required the surplus of the domestic market (SOUZA, 2004).

In this way, from the 1970's on, Brazilian industry started occupying an increasing share - and, from a certain moment on, a dominant one – of Brazilian exports. The Brazilian industrialization process was, then, completed. From then on, its continuation began to require the incorporation of high technology sectors (information technology, biotechnology, new materials, and communications) and the creation of an internal mass market.

3.3 Capital Export

The economic stagnation the country would experience since the 1980's paralyzed this process. The Brazilian GDP, after growing at an average annual rate of 7% between 1930 and 1980, grew at a rate that was little higher than 2% in the following 25 years.

New facts arose in the early 1990's that determined a change, although of less significance, in the trajectory of Brazilian industrialization. From then on, many industrial companies, which were already exporting goods, started exporting capital too, establishing businesses abroad. With the export of capital, they would experience a new era in the internationalization process.

The data are revealing: the foreign direct investment (FDI) that, from 1983 to 1992, had an accumulated worth of US$ 2.5 billion, would reach US$ 79.3 billion in 2005. These sums do not include the other modes of capital export such as portfolio investment, loans, financing, cash deposits etc. The Brazilian Central Bank only elaborated the first census on Brazilian capital abroad in 2001. Table 1 displays data related to the Brazilian capital abroad from 2001 to 2004:

Table 1: Brazilian capital abroad - distribution per modality (in US$ billions) from 2001 to 2004

	2001	2002	2003	2004	2005
Total	**68.6**	**72.3**	**82.7**	**93.2**	**111.7**
FDI	**49.7**	**54.4**	**54.9**	**69.2**	**79.3**
Other modalities (1)	**18.9**	**17.9**	**27.8**	**24.0**	**32.4**

Source: ***Banco Central do Brasil*** **(Brazilian Central Bank)**

Note (1): portfolio investments, derivatives, financing, loans, leasing, money deposits, and other investments.

Besides the strong acceleration in the flow of Brazilian FDI, its weight, however, remains insignificant in comparison to that of the investments made in the country. According to a study from Unctad, the Brazilian FDI in the period from 2001 to 2003, represented an average of just 0.2 % of the Gross Fixed Capital Formation (GFCF) in the country, against 3.2% in Japan, 4.1% in Germany, 6.6% in the USA, 19% in the United Kingdom and 22% in France (ALEM; CAVALCANTI, 2005, p.50).

However, if we take into consideration the absolute total value of FDI, Brazil is only slightly below, amongst the developing countries, Hong Kong (China), Singapore and Taiwan (ALEM; CAVALCANTI, 2005, p.53).

In the case of Brazil, it is impossible to state there is an excess of capital to be exported, on the contrary, there is insufficiency. The investment rate (GFCF/GDP) shown in Table 2, has been around 20% over the last 10 years, barely sufficient to give an annual GDP growth of around 2.5%. Estimates from the IPEA (Institute of Applied Economic Research) indicate it would be necessary to have a rate of 25% to allow a 5% increase in GDP; although the savings rate is above 20%, this “excess” has been used to remunerate external liabilities.

Table 2. Investment rate (GFCF/GDP) **in (%) from 1995 to 2004**

1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005(1)
20.5	19.3	19.9	19.7	18.9	18.9	19.5	18.3	18.0	19.6	20.1

Source: IBGE

Note (1): Corresponds to the first nine months of the year.

Although it appears paradoxical, one explanation for the export of Brazilian capital may lie at the root of this process: the economic opening that occurred throughout the 1990's (the average export tax, that was 51.3% in 1988-89, fell to 13.1% in 1995, producing then, an effective average tax of 7%, without taking into consideration the extinction of the non-tariff protection measures seen in that period), intensified by the overvaluation of the national currency from 1994 to 1998 and, again, from 2003 on.

Brazilian industrial companies came to be doubly penalized: on the one hand, with the economic opening, they had to dispute the internal market with imported products; on the other hand, they had to bear the triple cost of the high value of the local currency, of the high and growing taxation, according to the Table 3, and the highest real interest rates in the world. Since 1993, the basic real interest rate in Brazil has been kept at a very high level, becoming the highest in the world ranking, from 2004 (GLOBAL INVEST). As a consequence, besides being at a disadvantage in the internal market in relation to imported products, Brazilian companies began to experience increasing difficulty in placing their products abroad.

Table 3. Taxation as a percentage of GDP - from 1993 to 2005

Year	Taxation (% of GDP)
1993	25.72
1994	29.47
1995	29.76
1996	28.97
1997	29.03

1998	**29.73**
1999	**31.79**
2000	**32.49**
2001	**33.92**
2002	**35.53**
2003	**34.88**
2004	**35.88**
2005	**37.37**

Source: *Secretaria da Receita Federal, Ministério da Fazenda* (Secretary of Federal Revenue, Treasury Department).

Confronted with this situation, big Brazilian companies tried to compensate for losses in the internal market and high and growing costs by installing mechanisms that favored sales abroad - either through mechanisms enabling their exports, or through the implantation of enterprises abroad, many of them in support of their exports.

The Brazilian banks themselves that are undergoing internationalization have been attempting to support exporting companies with their investments abroad. It has been the case with the case with the three biggest national private banks. According to Cintra (2006), the three biggest national private banks (*Bradesco, Itaú* and *Unibanco*) increased their levels of internationalization, having, more than 20% of their total assets in the international market at the end of September 2002.

According to the above-mentioned author, "the external expansion has three basic aims: to expand their sources of capture, to offer instruments to export companies and enlarge the investment spectrum of their main customers abroad" (CINTRA, 2006, p. 330).

4 THE CURRENT SITUATION OF THE ELECTRICAL-ELECTRONIC INDUSTRY

The electrical/electronic industry, according to the sector association, ABINEE, after having its exports levels practically stationary at around US$ 4.56 billion a year, throughout the first four years of this decade (2000), started increasing its exports, year by year, from

2004 on, when they increased to US$ 5.34 billion, reaching US$7.77 billion in 2005 and US$ 8.96 billion in 2006 (ABINEE, 2007).

There was a behavior change among the main destinations: whereas the share of the United States decreased from 44% in 2001 to 21% in 2006, the participation of Latin America (organized by ALADI – *Associação Latino-Americana de Integração* – Latin-American Integration Association) increased from 35% to 53% in this same period (ABINEE, 2007).

Throughout the current decade of 2000, cellular telephones have become the main export product in the electrical/electronic industry installed in Brazil, increasing from US$ 849.4 millions in 2001 to US$ 2.66 billions in 2006, when they represented around 30% of the exports in this sector. Cellular phone exports are followed, at a great distance, by hermetic motor compressors, whose exports rose from US$ 387.8 million to US$ 642.7 million, shipped electronics, which rose from US$ 268.6 million to US$ 623.4 million, and industrial components, which increased from US$ 202.5 million to US$ 589.9 million (ABINEE, 2007).

The sector, however, has been experiencing a growing deficit in its relations with the external market: this increased from US$ 7.46 billion in 2000 to US$ 9.73 billion in 2006 (ABINEE, 2007). We have seen that exports experienced significant growth in this period. This is not, therefore, the source of the increasing deficit. This has come about as a result of the intense increase in imports, which rose from US$ 11.89 billion in 2000 to US$ 18.68 billion in 2006 (ABINEE, 2007). This sudden increase occurred, mainly, from 2004 on (in 2002-3, imports were around US$ 10 billion per year). This is no mere coincidence; this tendency is seen at a time when there is a strong increase in the value of the *Real* (the Brazilian currency), making foreign products cheaper in the national currency. This revaluation of the *Real* represents, in practice, to a new opening in the economy, a repetition of what occurred in the 1990's.

There has also been a significant modification in relation to the origin of the electrical/electronic imports: the United States, which in 2001 provided 35% of the total amount, decreased their share to 14% in 2006, whereas the Southeast Asian countries increased their share from 30% to 62% in this period (ABINEE, 2007).

Three products stand out in our electrical/electronic imports: semiconductors, whose import rose from US$ 1.62 billion in 2001 to US$ 3.33 billion in 2006, telecommunication components, which increased from US$ 1.08 billion to US$ 2.42 billion, and computer components, from US$ 899 million to US$ 2.18 billion (ABINEE, 2007).

Thus, an important conclusion can be drawn conclusion: in relation to both the destination of exports and the origin of imports, Brazil has reduced its dependence on a single market, the United Stets, by concentrating its exports on Latin America and its imports in Southeast Asia.

The strong increase in the imports of electrical/electronic products suggests a significant degree of economic opening in the sector, tightening competition in the internal market. This fact has led many companies in the sector to reproduce what has happened in other economy sectors, to adopt internationalization strategies. However, the data reveal that, in general, they are still limited to the first stage of internationalization, i.e., to the export of goods. Hence, the exports of electrical/electronic products practically doubled between the average of the first four years of the present decade and that of the last considered year (2006).

Internationalization by way of foreign direct investment (FDI) is still at insignificant levels, even decreasing in 2004 and 2005, according to records of the Brazilian Central Bank. If we consider the production of machines, electrical equipment and materials, electronic material, communication devices and equipment, according to BC nomenclature, FDI evolved in the following manner: US$ 135 million in 2001, US$ 101 million in 2002, US$ 135 million in 2003, US$ 65 million in 2004 and a derisive US$ 14 million in 2005 (BANCO CENTRAL).

Government measures have positively impacted on specific areas in the electrical/electronic industry, like, for example, the Provisional Measure-255 (reviewed PM-252) concerning the exemption of PIS and Cofins (Social Insurance Taxes) for companies in the information technology area that export at least, 80% of their production (FOLHA ONLINE, 27/10/2005). Evidently, this exemption, besides stimulating exports, allows prices to be lowered and, as a consequence, greater competitiveness in the internal market.

On the other hand, the area of consumer goods, according to the president of the National Electrical/Electronic Products Association – *Eletros*, has suffered competition from the Chinese products, with legal uncertainty of trade with -MERCOSUL, notably with Argentina, and with the lack of preferential access conditions to the most developed markets, which could have been negotiated by the Brazilian government (NETCOMEX, 23/11/2006).

5 THE EMPIRICAL STUDY

With the purpose of discovering the motives behind internationalization, the difficulties encountered in this process and the trajectory followed, research was carried out in exporting companies, associated to ABINEE, located in the state of São Paulo.

Initially, telephone contact was made with all the 46 companies. The export directors/managers were asked to cooperate by filling out a pre-tested questionnaire that would be sent by e-mail.

Although the initial contact was well received, there was a low return rate (26%) from the questionnaires. Based on this non-probabilistic sample, only a qualitative analysis of the replies was realized.

5.1. Results

The 1990's was the period most frequently cited as the beginning of the search for external markets. In relation to the motivational factors, almost all the respondents mentioned the desire to work in new markets and expand business; the need for the knowledge about new technologies, in order to allow a greater competitiveness with foreign products, was also emphasized.

Other references, related the local economy and government actions: poor performance of local economy and weak demand; exports financing program (PROEX) with guaranteed payment by the export insurance; tax exemption; valued and favorable dollar (beginning of the referred decade); and participation in trade fairs and company missions. The increase in internal competition created by the economic opening was also mentioned.

In relation to the receptors of products exported by the companies, the following destinations were indicated: most countries from South America (11); North America (7); Western Europe (5); countries from Africa (4); Oceania (3) and Asia (3).

Several difficulties faced in the internationalization process were mentioned: lack of support from certain government segments (5); adaptation of the product to the norms demanded by quality institutions in the target country (7); unfavorable exchange rate between dollar and real – floating exchange rate (4); competitive price; Brazil cost; precarious infra-structure; expensive services and freight costs (2); bureaucracy (2) and inflexibility exchange rate rules; unprepared Internal Revenue Service with a lot of unexplained and contradictory norms in the same period; high interest; lack of the importers' confidence in the company and in the quality of Brazilian products; Internal Revenue Service strikes; international and national economic crises; lack of marketing knowledge; and cultural differences.

On the other hand, some facilitators were recorded, most of them punctually: the availability of anticipated financial operations, like ECA (exchange rate contract advances) and ADE (advances on delivered exchanges), that finance, at subsidized cost, the operation; being a Brazilian product; visits made to foreign customers and companies in the 1990's; tax exemption; telecommunication market growth, with high investments in the area; support of APEX (exports and investments promotion agency) and *Banco do Brasil*.

The trajectory followed in this process varied a great deal from company to company. The "export" modality was the prevalent strategy (indicated by 9 companies). However, three companies indicated a higher degree level of involvement in their internationalization process, such as the installation of subsidiaries abroad or the installation of production and/or trading joint ventures. In other words, they have started to make direct investments abroad in support of their export activities, reproducing the pattern of the companies, installed in the country, that make this kind of investment. For their part, six companies revealed that they carry out direct exports via their own channels. They did not specify the channels, but it is possible to conjecture about the existence of offices abroad, an embryonic form of FDI.

The following scheme shows the area to which the company in the electrical/electronic industry belongs and the adopted internationalization strategies:

Scheme 1: Entrance mode sequence in the international environment - by electrical/electronic industry area.

Electro-electronic Industry Area	Company (1)	Entrance Modes into the International Environment
Industrial Automation	A	Direct export via own channels in the company → Own subsidiary founded by the company abroad → Direct export via receptor country intermediates
Components	B	Direct export via company own channels
Industrial Equipment	C	Indirect export → Direct export via receptor country intermediates → Direct export via company own channels
Transmission-Distribution Generation	D	Indirect Export → Direct Export via company own channels→ Direct Export via receptor country intermediates
Electrical Installation Material	E	Contractual mode → Direct export via receptor country intermediates → trading joint venture → Direct export via company own channels → Indirect export → production joint venture
	F	Indirect export
	G	Indirect export → Direct export via company own channels
Telecommunications	H	Trading Joint venture → Production joint venture → Own subsidiary abroad by way of acquisition

	I	Direct export via receptor country intermediates → direct export via company own channels
Domestic Utilities	J K	Direct export via receptor country intermediates → Indirect export Direct export via company own channels

Note (1): in order not to prevent the companies from being identified, they are represented by the letters of the alphabet.

It is necessary to highlight that no company conveyed information concerning the adopted strategies.

5.2. Analysis of the results

The directors/managers of the surveyed companies mentioned the matter of technology and weak internal demand as factors that impelled the internationalization process, especially over the last decade. The provenance of such data is supported by the economic opening, achieved in this decade, when national products started competing with the imported ones, which presented, amongst other attributes, more quality; internal demand, in levels considered as low for this sector, merely reflected the growth reported for the Brazilian GDP since 1980 (about 2% a year), that put the activity of most sectors at risk.

The difficulties, a floating exchange rate and high interest rates, found in the internationalization process, not only constitute government instruments for economic stabilization, but also reveal the heavy and increasing levels of taxation existing for more than one decade, which has recorded the industrial activity in the country.

Concerning the internationalization strategies used, most companies in the study followed the Uppsala School model, in the sense that there has been a gradual involvement with receptor countries through the adopted exportation modalities. In addition, it is worth mentioning that 37% of the cited receptor markets within South America and so, retain psychic proximity to the Brazilian market.

6 CONCLUSIONS AND FINAL REMARKS

The aim of the present study was to survey the internationalization process in companies within the electrical/electronic industry installed in Brazil. In order to analyze this process, two references were taken into consideration: on the one hand, the theoretical basis provided by the theories on internationalization and, on the other, the historical elements captured through the internationalization trajectory of Brazilian industrial companies.

Amongst the internationalization theories, we observed that the Eclectic Paradigm explains the pattern of investment abroad, but it fails to explain the process, the entrance mode and the sequence resource commitments. For its part, the Uppsala model, although severely criticized due to the changes in the competitive environment, which it is suggested have led to a break in the sequence proposed within it, offers a great contribution in the form of the emphasis given to cultural factors in the internationalization process.

Concerning the trajectory of the internationalization process in Brazilian industrial companies, it is seen as being basically constituted of two overlapping stages: firstly, while not abandoning the internal market, many companies started going in search of the foreign markets; afterwards, more recently, they have started installing plants abroad, especially to support their export activities. This process is explained, on the one hand, by the increase in the internal competition caused by the economic opening and, on the other, by the internal competitive disadvantages created by the combination of high interest rates, increased taxation and the high value of the local currency.

An attempt was made to confirm whether or not these theoretical and historical elements were manifested in the concrete case of the internationalization of the electrical/electronic industry installed in Brazil. Given the exploratory nature of this study, based on non-probabilistic samples, the results are restricted to the analyzed samples and, therefore, do not allow generalizations to be made. However, it is possible to highlight some relevant aspects in this survey: the main motivation for internationalization was shown to be the search for new technologies and market expansion; most companies at the beginning of the internationalization process tended to opt for direct or indirect exportation as the entrance modality, i.e., they haven’t reached the most advanced internationalization stages yet, represented by foreign direct investment, but some of them have already accessed this stage of internationalization; the most frequently mentioned difficulties found in relation to internationalization are the lack of governmental support (an integrated development policy for exports), the need to adapt to the quality control standards in the target-country and, notably, the floating exchange rate and high interest rates and taxes.

In general, the research findings can be said to support the internationalization theory proposed by the Uppsala School, to the extent that most companies aimed at starting the process through a gradual involvement with other countries and directed their efforts at those with lower psychic distance, i.e., countries from Latin America.

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