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## The internationalization of WEG

### **Abstract**

Although there are a considerable number of research papers dedicated to understanding the WEG internationalization process, we believe that the existing case studies are still extremely restricted to the counterpoint of the institutional narrative and international theories of internationalization. Our perspective, on the other hand, points in the direction of assessing the company's trajectory within the political economy of the sector. That is, it is not possible to analyze the process of transformation of a company over decades without understanding the institutional aspects of the whole sector and of the national policy that regulates and foments it, as well as the transformations in the international economy, in general. In this sense, this paper seeks not only to present WEG's trajectory based on the company's internal strategies and innovations, but also to relate these characteristics to the Brazilian institutional environment, especially during the military government, which seems to have been decisive both for the rise of the group nationally and for its later entry into the international market.

**Keywords:** WEG Electric Motors; Internationalization; Brazil

### **Introduction**

WEG Electric Motors, originally named Eletromotores Jaraguá Ltda, is a recognized Brazilian Company, which successfully internationalized.

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Received 29 January 2018 - Accepted 14 May 2018

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Founded in the early 1960s as a small manufacturer of electric motors in Jaraguá do Sul, in the state of Santa Catarina, within a few decades the company showed amazing growth. Today, it has commercial subsidiaries in 29 countries and 37 industrial parks in 12 countries, selling its products to 135 economies, with an annual production of 13.5 million electric motors, according to its 2016 report.<sup>1</sup> Reinforcing the company's recognized success, a 2014 Boston Consulting Group report highlighted WEG's role as one of the one hundred most globalized companies in the world.

In view of its trajectory, WEG has recently become a recurrent object of investigation among researchers who seek to identify the strategies that have led the company to achieve its place in the international market. One quite common research profile in these studies seeks to compare WEG's history with internationalization theories that have already been duly established in the academic community. Such studies compare the Brazilian company's particular experience with theories that have been developed to understand the process used by North American and European multinational companies to conquer international markets.

Germana Melo, for example, replicates the Uppsala model, arguing that WEG has undergone progressive internationalization, first establishing commercial subsidiaries in order to later build production units in the foreign market. However, according to the author, once internationalization is achieved, Dunning's Eclectic Paradigm seems more suitable for continuous analysis of the process of conquering new markets (Melo 2010, 124). In similar perspectives, while Silva et al. (2010, 17) defend WEG's internationalization as having followed the "classic strategy" of implementing dynamic and gradual learning processes based on experience, Floriani et al. (2009) propose an "integrative framework" of Dunning's economic

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<sup>1</sup> WEG, *Integrated Annual Report*, 2016, p. 9.

and behavioral theories, considering the advantages of firm ownership and significantly emphasizing the organizational competence and dynamic abilities of the company studied. Marson and Dalla Costa (2014, 16), on the other hand, construct a narrative of internationalization phases that resembles the Uppsala model, even though they do not specify the Norwegian model's phases. Following the company's official history, as displayed on its website, they argue that a first phase "occurred in a more casual rather than planned manner. Latin American consumers from countries such as Paraguay, Uruguay, Ecuador, and Bolivia showed interest in the products and WEG responded to this demand". For the authors, the second phase is characterized by the growth of the representative network in various countries; and, finally, the third phase, underway in the last few decades, would be internationalization itself, with the establishment of branches and industrial plants abroad (Marson and Dalla Costa 2014, 17-21).

Looking at the company's internal strategies, Jayme Moraes (2004, 123) emphasizes the management knowledge accumulated by the company, through the training of human resources: "the founders had a decisive influence on the training of human resources, based on their boldness, entrepreneurial judgment and ability to identify and attract talent". In a similar perspective, Predebon identifies the success of WEG's internationalization from 1998-2010 as being the result of an assertive internal policy of adapting the company's strategies to regional integration, generating structural and organizational evolution within the industry. The limits of the internal market would have conditioned the expansion to the foreign market, according to the author, "with the great cycle of technological and economic changes and, within these changes, the new global economic spaces, the organizational geostrategy was unable disregard the analysis of regional integration processes within the internationalization processes, since

the social, political and economic relations resulting from these global movements will form the pathways of future global integration” (Predebon 2010). Also concerning the company’s strategies, the author asserts that since the company was founded, its business has been based on the creation of a highly qualified technical service network, aimed primarily at building customer loyalty, as well as on advertising its products through the accreditation of the first technical service professionals in the early 1960s. Through a wide network of distributors and commercial representatives, the company started supplying its products to more than 60 countries in the 1970s, proving its ability to gain significant economies of scale.

According to Fonseca and Bruno (2009), the adoption of a participatory management model in 1969 was of decisive importance for WEG to begin exporting electric motors to small markets in Latin America. In 1973, the company expanded its products sales to 20 countries, including Canada, the United States and countries in Europe; while in 1975, the expansion reached 41 countries, including Japan. The fact is that the company’s systematic presence in international markets started to demand a business plan with a more daring attitude in order to guarantee competitive strategies within the electrical equipment sector. In highly competitive environments, the development of more aggressive business strategies and a proximity to customers become key aspects for “penetrating new markets or maintaining positions in international trade” (Coutinho and Ferraz 1994, 237).

Although the internationalization process for Latin American companies occurred in the 1990s, as the result of financial and commercial openness and restructuring of production in their economies, it must be noted that the industrial sector has undergone a vigorous process of structural change in global terms since the late 1970s. In 1969, WEG, which had just completed its eighth anniversary, entered into a massive financing agreement with BNDES (Brazilian

Development Bank) to modernize its plants and incorporate German know-how with the support of the engineering Ernest Braun. This investment plan allowed the company to triple its production in its first phase of internationalization, in order to meet the foreign market's needs. The project also provided for cooperation with other motor manufacturing companies and was approved by the Executive Group of the Electric and Electronic Industries (or GEINEE, its acronym in Portuguese), which operates under the Industrial Development Committee at the Ministry of Industry, Foreign Trade and Services.<sup>2</sup>

Parallel to Brazil's industrial policy goals in the 1960s and 1970s, which prioritized the creation of capital-intensive sectors, Amsden (2001) notes that the competitive advantage of business groups in late industrialization countries is primarily linked to their planning strategies, management, logistics and exports, rather than any other specific ability that such groups may have, given that their operational sectors do not generally feature modern technologies. The objective here is to understand how, even in the face of this competitive barrier highlighted by the author, WEG became the largest manufacturer of electric motors in Latin America and the leading Brazilian exporter in this industrial segment.

Although there is a considerable amount of research devoted to understanding WEG's internationalization process, this paper is based on a belief that the existing case studies are still extremely circumscribed to the counterpoint of institutional narrative and international theories of internationalization. The perspective held by the authors, on the other hand, points in the direction of assessing the company's trajectory within the political economy of the sector. That is, it is not possible to analyze the process of a company transformation occurring over decades

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<sup>2</sup> "Financiamento do BNDE triplica produção para o mercado interno e joga a WEG no mercado externo" *O Estado de S. Paulo*, September 26, 1969, 18.

without understanding the institutional aspects of the whole sector and of the national policy that regulates and foments it or the transformations in the international economy in general. In this sense, this paper seeks not only to present WEG's trajectory based on the company's internal strategies and innovations, but also to relate these characteristics to the Brazilian institutional environment: first, during the military government, a decisive period for the rise of the group and for its entry into the international market; and secondly, during recent decades, when the company received great financial support from the BNDES to pursue its goal of internationalization.

### **The development of the electrical equipment sector in Brazil, 1950-1960<sup>3</sup>**

The founding of WEG dates back to the early 1960s and was part of a phase of profound transformation in the industrial structure of the Brazilian economy. Starting with the Targets Plan established by President Juscelino Kubitscheck, the Brazilian economy began to accelerate its process of forming a production assets sector, with the participation of the multinationals that would be established from that point forward. Over the following two decades, what Peter Evans called a "triple alliance" was created, which is the division of the Brazilian market between multinational corporations, national enterprises, and the government (Evans 1982). National companies, especially in sectors demanding large volumes of capital and modern technology, were therefore left with limited or supporting roles in the industrial development led by the multinational heavy industry established in the country.

The electricity sector, in this sense, would be one of those sectors that would undergo great transformation in this period. The government was becoming responsible for providing

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<sup>3</sup> For more on the operations of Eletrobrás in relation to commissioned production within the electrical goods sector, see: Sasse (2015). The following discussion was based on Sasse and Saes (2016).

services, whether through regional government enterprises in the 1950s or through the federal government in the 1960s. Eletrobrás, a company providing commissioned production of electrical equipment, was beginning to be established in the country, with consumption that had up to that point been supplied through imports now being internalized. The Targets Plan put in place during the Kubitschek administration therefore made the energy sector a priority for the government, with this sector receiving 43 percent of all investments made between 1957 and 1961. If the goal was to achieve growth in annual energy output of more than 10 percent a year, certainly the demand for equipment represented a bottleneck to be overcome. After all, the country's industry only supplied electrical equipment for domestic use, electrical installations, wires and conductors, while it depended on imports for generators, turbines and transformers (Lessa 1975, 18-9).

Illustrating the government's new tone in 1956, one of the main characters in the development of the Targets Plan, Lucas Lopes, pointed out the need to "integrate forces" in order to respond to the demand for electrical materials. Lopes also indicated the option of incorporating international private capital into the production of capital goods in the Brazilian economy.<sup>4</sup> In order to overcome the limits of payment balance and allow the industrialization process to continue, the development strategy employed by the Kubitschek administration was to encourage multinationals to enter the Brazilian market. In this sense, while the State fostered economic growth through investments in infrastructure, international private initiative introduced industries through multinational companies that were more technologically sophisticated - reducing the pressure to import products central to industrial development - and

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<sup>4</sup> "O estado de Minas e o Plano de eletrificação do governo federal. Declarações do Sr. Lucas Lopes sobre a participação do capital estrangeiro neste empreendimento". *O Estado S. Paulo*, November 21, 1956. General, 5.

national private groups developed on the fringes of these new industries in order to provide basic equipment and material to those multinational companies (Evans 1982; Lago et al. 1979, 100).

The government's presence was fundamental to articulate investments in infrastructure, opening up favorable horizons for negotiations and for attracting direct investment in the durable consumer goods and production goods industries, within the international scenario of multinational companies' expanding to late industrialized countries (Lima 1995, 76). Among the government's tools for encouraging foreign industries to come to the country, the most relevant was Currency and Credit Board Instruction no. 113, which fostered the opening of the market and, consequently, increased the participation of the capital goods industry in national economic production as a whole, in addition to causing changes in the sector's configuration. According to Venilton Tadini's survey on the structure of the Brazilian industrial sector, the capital goods sector, which accounted for five percent of the manufacturing industry's gross production value in 1949, accounted for approximately 10 percent in 1959. In addition, regarding company capital sources, 75 percent of these companies relied mainly on national capital at the beginning of the period, while in 1961 this share fell to 61 percent (Tadini 1986, 24-26; Lago et al. 1979, 113). This trend would be even more pronounced in modern sectors, since these national companies mostly worked with the production of less technologically complex equipment.<sup>5</sup> On-demand capital goods from the power sector, such as turbines and generators, could take years to be produced if they had to be adapted to the specific aspects of

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<sup>5</sup> Leff states that half of the firms that allowed the capital goods industry to diversify in Brazil, with "the most complex product lines," were subsidiaries of foreign companies (Leff 1968, 24).

each project. This process required a financial and technological structure that was not available to private national groups.<sup>6</sup>

With space open for companies from abroad to now operate in the Brazilian market, there was a notable trend during the period of foreign companies setting up power sector plants. According to data from the Brazilian Infrastructure and Heavy Industry Association (ABDIB – Associação Brasileira para o Desenvolvimento da Indústria de Base), the companies formed in Brazil in the period, or the ones that had set up plants to produce capital goods, were: Sade – Sul Americana de Engenharia. S.A. (Italy), in 1953; Ibrave – I. B. Válvulas e Equipamentos Ltda. (USA), in 1954; CBC Indústrias Pesadas S.A. (Japan), in 1955; Mecânica Pesada S.A., from the Schneider group (France), in 1955; IND.EL. Brown Boveri S.A. (Switzerland), in 1957; Coemsa Eletromecânica S.A. (Italy), in 1960; General Electric (USA), in 1962; and Siemens (Germany), in 1963. (Tadini 1986, 131-3).<sup>7</sup>

Regarding this data, until the mid-1950s Brazil essentially relied on imported equipment to meet the increased demand for power generation. However, with multinationals arriving in the country in the early 1960s, it is possible to affirm that there was already developed production in the country, which was available to the new hydroelectric projects under construction (Table 1). The 29th goal of the Targets Plan was then fulfilled: domestic production of equipment such as hydraulic turbines, generators, transformers and motors above 20HP. This equipment was mainly produced as a result of multinational participation in the national economy.

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<sup>6</sup> Cf. Lessa (1975); Leff (1968); Lago et al. (1979) and Erber (1974).

<sup>7</sup> General Electric and Siemens had already been producing goods in Brazil since the 1920s, but their plants were designed for the production of small-scale products or consumer goods, such as small appliances. With the General Electric factories in Campinas and the Siemens factories in São Paulo, these companies began to offer more complex products, such as hydro generators and higher power transformers (Cachapuz 2006, 252).

**Table 1.** Imports as a percentage of domestic consumption (1949-1961)<sup>8</sup>

Sector	1949	1958	1961
Metallurgical	22	12	12
Electrical Material	45	13	17
Transport Equipment	57	31	19
Chemical and Pharmaceutical	29	20	17
Paper	10	4	4
Rubber Products	10	5	7
Textiles	6	1	1
Mechanical Products	64	42	46

Source: Leff 1968, 145.

Thus, there was an increase in the relative share of domestic production in the domestic market; based on this, from 1958 to 1961, imports in US dollars were 11.7 percent higher, while real domestic output rose by 93.4 percent (Lago et al. 1979, 110). In other words, the Targets Plan allowed the heavy electrical materials industry to flourish in the 1960s through foreign exchange instruments and by making the government an important consumer (Leff 1968, 22, 104).<sup>9</sup> It is worth noting that nationalization of production by establishing capital goods industries in the country did not mean nationalization of the control of these companies. Development of the sector, with government support, was based on stimulus for multinational

<sup>8</sup> Leff's data regard the general consumption of goods in each sector. In relation to the power sector, when solely considering data on the consumption of capital goods in this sector, average imports in the early 1960s is between 30 percent and 40 percent (Lago et al. 1979, 133).

<sup>9</sup> According to Fabio Erber: "between the postwar period and the 1960s, the public sector's share in gross capital formation in the country rose from 22 percent to 55 percent, which provides an idea of the State's demand for equipment" (Erber 1974, 18).

companies to enter the Brazilian market, such as Voith, Brown Boveri, Siemens and General Electric (Table 2).

**Table 2.** Main suppliers of turbines and hydro generators (1969-1986)

Share of national companies supplying turbines in the Brazilian market (%)		Share of national companies supplying hydro generators in the Brazilian market (%)	
Voith	60.0	Brown Boveri	44.7
Mecânica Pesada	31.3	Siemens	33.6
Coemsa-Ansaldo	3.8	Coemsa	3.9
Villares	3.6	General Electric/Villares	17.8
Bardella	1.3		
Total	100.0	Total	100.0

Source: Strachman 1992, 251 and 266.

This was the context in which the metalworking industry in Santa Catarina, especially in northeastern Santa Catarina, reached the southeastern market in Brazil.<sup>10</sup> Driven by government policies, these industries were consolidated in the 1950s, supplying the automotive and public services sectors, such as sanitation and the electrical grid formation. Industrialists in the Joinville region, who maintained close ties with Europe and especially with Germany (for technological research, specialized labor and professional qualification), used their own

<sup>10</sup> In Jaraguá do Sul, local development was linked to that of other nearby cities, such as Joinville and Blumenau. In its home city, WEG, in a sense, shared the market with Kohlbach, which emerged in 1945 from an electrical appliances repair shop run by Rodolfo Kohlbach that had been operating since at least the late 1930s. This company began to manufacture dynamos and alternators in the 1950s; later, in the 1960s, it began small-scale production of electric motors. Kohlbach was acquired by Nova Motores e Geradores Elétricos Ltda. in 1996 (*A Notícia*, August 3, 1938). These electrical equipment sector companies, along with Malwee, Wiest, Marisol and other important companies in the city, had substantial needs in terms of manpower. In order to supply this demand, workers in Jaraguá do Sul were to a large extent brought in from the state of Paraná (where WEG was especially well-known), attracted by the strategies of local firms, such as advertising (Schörner 2006; Moretti 1988).

resources to make investments, but also took advantage of financing, such the FINAME and BNDES/BADESC lines. Therefore, WEG, along with companies such as Hansen, Embraco and Nielson, expanded their activities from the 1950s to the 1980s by setting up units abroad.

This led to completion of a new development model for the national power sector in the 1960s, which would last over the next two decades. The government, through federal and state government-run companies, was responsible for investing in infrastructure through construction of hydroelectric power plants. The result was that from 1962 to 1980, the electricity generation increased from 5.729 MW to 31.147 MW. There had been a time when private international capital contributed to building the sector, both in the provision of services and in exporting equipment to Brazil. However, at that time, this capital was used to internalize production, ensuring these companies maintained their market shares and taking advantage of government support, whether to establish companies in the country or to be the consumer of products. National capital remained at the edges of the market, through industries that would provide inputs to the newly-installed multinationals or that served to produce less technologically complex goods.

### **The founding and growth of WEG during the military government**

Scholars have pointed out that the military government managed to intensify the process of import-substituting industrialization that had been increased since the early 1950s. This movement led to unprecedented industrial growth that was stimulated by a set of economic policies, such as quantitative import restrictions, tariffs, direct exchange control, fiscal subsidies, and easier access to credit. A substantial structural change was also evident and the vertical integration of the intersectoral relationships in industry was another striking feature of

the Brazilian economy during the military period, between 1964 and 1985 (Macario 1964; Baer, Fonseca and Guilhoto 1987).

Modern industries, like electrical goods manufacturing, were greatly benefited by duties and charges applied being to imports that would be considered high by international standards. According to Serra (1984, 81), the Brazilian government gave industrial development a big push in two different ways: (i) by arranging and financially supporting investments that would determine the main structural changes in the economy; and (ii) by creating infrastructure and direct production of intermediate goods that were crucial for the heavy industrialization process. These features express Hirschman's (1968) *late-latecomers* tenet: countries that have a technological gap in relation to more advanced economies.

In this regard, WEG has modified its technology management standard since 1968. While improvements prevailed based on practical knowledge of the workforce and the founding members, German technology was acquired in the late 1960s in a way that boosted production from 1968 to 1974. Investments in machinery, equipment and new materials grew 415 percent from 1967 to 1969, considering the company's resources and the financial support of the BNDES. The main changes that occurred at the company during this period are therefore technical in nature, such as the hiring of engineers and consultants, creation of a training center and laboratories (which would later spawn CentroWEG), and structuring of technical commissions to resolve production problems.

The period of 1968 to 1973 characterized a phase in which the government ended up establishing loan agreements based on supplier credit as the result of its need to find new sources of funds to finance the construction of hydroelectric power plants. That is, foreign loans targeting major hydroelectric power plant projects were contingent upon the purchase of

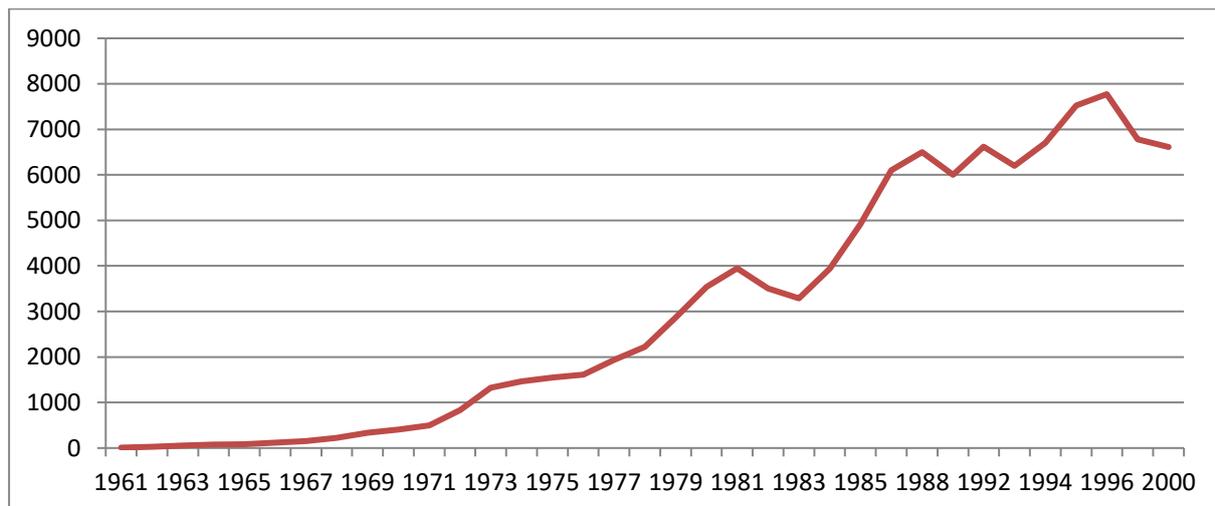
imported equipment specified by creditors. Yet, this policy would have little effect on WEG, as it entered the electrical equipment market with no resistance from the biggest players, whose focus was on producing turbines and generators. Put another way, WEG focused on a portfolio of less sophisticated products, such as engines and transformers. Even when it started to produce turbines, the company emphasized the Small Hydro market instead of businesses that were already dominated by established multinationals in the country.

A second moment of this phase began in 1971. Once again, government resources were fundamental for investments to expand production: together, support from FUNDEC, BRDE, and BNDES financed 50 percent of the company's investment (Coutinho 1995). Moreover, the company went public this same year and its shares began to be traded on stock exchanges. In 1973, construction started on the second plant, which was completed four years later. During this time, WEG began to strengthen its business and it soon cast engine housings, produced copper wires and developed its own precision tooling; even its wooden packaging received investments (Vidigal 2011; Fonseca and Bruno 2009).

In the second half of the 1970s, the company's management underwent professionalization that resulted in technology being developed to produce medium-sized engines and in consolidation of the Technological Center. This was therefore a period of gains of scale and technological improvements that led to production being restructured through the creation of specialized operational units (specialization with intrasectoral diversification) and to initial movement towards intersectoral productive diversification (Coutinho 1995). At that time, the company had already reached markets in 20 countries, mainly in Latin America. In addition, in 1976, it opened an office in Germany whose good results were due to the company's relationship with local producers.

In Germany, the company started to hire technical advisors to develop technology, installing a subsidiary in the country years later. However, it did not establish a direct association with foreign capital, which gave the company greater autonomy. The subsidiary allowed WEG to approach the international market, providing consulting services and maintenance services for exported products. Once established in the international market, WEG went through a profound transformation from 1975 to 1985, the period when it reached maturity. This can be seen in substantial growth in the number of workers, as a result of the expansion of industrial plants and the diversification of its products (Graph 1).

**Graph 1.** Number of workers employed by WEG (1965-2000)



*Source:* Ternes (1997); Goularti Filho (2016); Coutinho (1995)

Movement towards diversification of the production structure, first as a result of the Targets Plan and later due to the Second National Development Plan (II PND), supports some of the arguments made by Dani Rodrik (2007) about the “externalities” that decisively interfere in the implementation of new productive sectors in the economy. Such externalities, which the author calls information and coordination externalities, are important concepts that lead to a belief that

diversification is unlikely to be carried out without the direct intervention of the government or without any other governmental action to encourage private industrial investment.

In the case of information externalities, entrepreneurs should make small adjustments according to the technologies adopted by foreign producers and adapt them to local conditions. This process is called “self-discovery”, according to Hausmann and Rodrik (2003). It can be applied to the fact that, in 1979, WEG announced the formation of a joint-venture with ASEA, a Swedish company, in order to develop of engineering, manufacturing, sales, assembly, and technical assistance projects for electrical products and systems. The association with the Swedish company gave rise to the WEG/ASEA Industrial Ltda. Company. On the one hand, the activities of the Eletromotores WEG Company, which worked exclusively with national capital, continued to focus on the production of AC and DC motors as well as alternators. ASEA, on the other hand, focused on the production of transformers and relays, in addition to electricity generation, transmission and distribution services.<sup>11</sup>

Another challenge inherent to the process of diversification is associated with coordination externalities. Failures in the coordination of investments are common when new industries find advantages in importing their main inputs, thus making the coordination of simultaneous investments unnecessary. In general, it is difficult to predict whether an entrepreneur’s individual investment decision will be accompanied by other complementary initiatives. The government must therefore foster the viability of certain production chains by working with the private sector to coordinate the investments required to ensure an individual return on each project. Otherwise, these projects would fail to generate returns if they were implemented in an isolated manner (Almeida 2013, 278).

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<sup>11</sup> “WEG e ASEA comunicam”. *O Estado de S. Paulo*, November 20, 1979, 28.

Unsurprisingly, the industrial policy implemented during the period of the “economic miracle” was characterized by significant subsidies for exporting manufactured goods. Among the results of this policy is an exceptionally high growth rate (20.5 percent per year) on domestic production of capital goods from 1967 to 1973, which rose from 9.0 million to 27.7 million *cruzeiros* (Bonelli and Malan 1976, 386-387). Granting of government subsidies, in addition to other incentives such as tax exemptions for certain companies and sectors, can be interpreted as government efforts to facilitate the identification of goods whose production the country could efficiently internalize. Given that such incentives were usually aimed at new production activities, the industrial policy of the military governments of the late 1960s and 1970s assumed the role of determining the pace of the import substitution process.

In order to illustrate the topics addressed above, in 1981 WEG received funding from the Industrial Development Council (CDI – Conselho de Desenvolvimento Industrial), which approved almost one hundred industrial projects in that fiscal year. The company was then able to develop its projects geared towards the Eletromotores WEG S.A plants, which took over the activities of WEG Acionamentos S.A. and WEG Máquinas S.A (created in 1980 and located in Jaraguá do Sul, Santa Catarina), making up the electronic core of the group.<sup>12</sup> The company, which became the biggest producer of electric motors in Latin America in the 1980s, started to maintain commercial representatives in the largest cities in southern and southeastern Brazil, in addition to creating three manufacturing units exporting to over three dozen countries. During that same decade, its production and employment figures grew at an extortionate rate, based on the creation of WEG Transformadores (1981), WEG Energia (1981) and WEG Química (1983), in addition to its own research center (1980), allowing for production of the first high power

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<sup>12</sup> “CDI aprova 97 projetos este ano”. *O Estado de S. Paulo*, December 29, 1981, 30.

engines (100-200kw). WEG's movement towards diversifying production included the manufacturing of transformers, large electric machines, and paints and varnishes. This expansion of the company's production schedule was facilitated by the acquisitions of Ecemic Transformadores de Blumenau, which became WEG Transformadores, Quimicaflora de Joinville and Tintas Michigan de Guaramirim (Santa Catarina), which became WEG Química (Ternes 1997; Vidigal 2011).<sup>13</sup>

This growth in the company and diversification in production were the result of the government policy implemented in the mid-1970s under the auspices of the Second National Development Plan, which sought to strengthen national companies' production capacity for intermediate and capital goods, aimed at promoting the import substitution process. This policy intended to relieve the short-term pressures on balance of payment accounts, especially after the first international oil crisis. Among the Plan's proposals was transformation of small- and medium-sized companies in these two sectors into large companies, which would then serve to supply government-owned companies with machinery and raw materials.

In fact, the spread of government-owned enterprises was seen as the key to raising the rate of capital accumulation in Brazil during the second half of the 1970s. Considering all levels of government (federal, state, and municipal), nonfinancial public-sector expenditures as a ratio of GDP increased from 42.7 percent in 1975 to 52.7 percent in 1980, and investments by government-owned enterprises as a ratio of GDP rose from 18.6 percent from 1974 to 1978 to 25.6 percent from 1979 to 1981 (Bulmer-Thomas 2014, 378). The Geisel administration (1974-

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<sup>13</sup> In addition to these activities, WEG Florestal Ltda was created in 1980, which is a supplier of wooden packaging to the group's companies. In 1984, the group acquired shareholding control of Indústria de Pescados Penha (in Santa Catarina), and WEG Penha Pescados was created. The creation of these companies was brought about by the absorption of tax exemptions. Other acquisitions outside of the core business were made in the agribusiness sector, such as a stake in Perdigão and Teka Agroindustrial between 1987 and 1989, as well as in the insurance services sector, with WEG Seguros, founded in 1987.

79) was marked by not only high investment rates and output growth, but also by government expenditures and policies designed to accelerate industrial development, improve private sector profitability, and encourage new private sector initiatives. These were the main goals of the Second National Development Plan (Fonseca and Monteiro 2007).

According to Strachman (1992), the rate of “nationalization” of turbines and hydrogenerators – that is, production within the country, including through multinationals – reached an approximate average of 60 percent from 1969 to 1985. Tadini (1986, 83) even claims that in 1985 this rate reached 90 percent. In the on-demand capital goods sector, an area in which WEG excels, the substitution process was already evident between 1973 and 1981, as shown by Albert Fishlow (1986, 521). The import coefficient of this segment in particular fell noticeably: from 0.66 in 1973, it reached 0.37 in 1979 until leveling out at 0.40 in 1981.

Although sectorial indices were indicating a drop in the share of imports in total supplies, it was only after 1977 that the aggregate import coefficient fell below its 1973 level (Fishlow 1986, 520). At any rate, judging by the main goal of the Geisel administration, which was to expand and diversify the production capacity of the industrial inputs sector, the government stimulated demand through ambitious infrastructure projects that it was unable to finance. The alternative of pursuing accelerated growth through external debt was only a short-term solution for the issue of adjusting the balance of payments. At the same time, internal imbalances soon proved to be the evident limitations of the monetary correction instruments that had been implemented since the early years of the military regime.

### **The conquest of the international market**

From the beginning of the exportation of electric motors in 1970 up until the mid-1980s, WEG benefited from the protectionism practiced by Brazilian economic policy, which allowed the

company to take the lead in the domestic market, with improvements in scale and scope, which are key aspects in becoming internationally competitive. It is also important to mention that WEG's main competitors in the domestic market were Búfalo, Motores Elétricos do Brasil, and GE — three companies that withdrew from the market in the late 1980s — as well as the Eberle and Arno companies. In addition to producing engines, WEG Máquinas and WEG Acionamentos expanded considerably in the 1980s as the result of a typical policy of incentives to create new areas for the Brazilian domestic economy. These so-called “novelty” areas, according to Rodrik (2007), refer both to products considered to be new in the national economy as well as to new production technologies for products that were already being manufactured in the country.

In contrast to the poor performance of the Brazilian economy, companies producing electrical equipment in the 1980s and 1990s in northeast Santa Catarina saw growth in sales. In the field of electric motors in particular, WEG Motores and Kolhbach gained space, to the detriment of their domestic competitors: Arno (SP), Búfalo (SP), Motores Elétrico Brasil (SP) and General Electric (SP). Smaller companies, such as Mega Transformers (oil transformers) and Waltec (low voltage transformers), both from Blumenau, also performed well in the period. Silva (1997) highlights the positive effects of the Geisel administration's economic policy and the investment program in basic inputs and capital goods, the already mentioned Second National Development Plan. In addition, it highlights the role of production financing vehicles during this same period, such as FUNDESC<sup>14</sup>, PROCAPE<sup>15</sup> (which would replace FUNDESC after

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<sup>14</sup> Fundo de Desenvolvimento do Estado de Santa Catarina, which used budgetary resources to acquire shares and debentures of companies in Santa Catarina, later, by Law SC 4.225/68, was modified to operate under a tax incentive scheme.

<sup>15</sup> Programa Especial de Apoio a Capitalização de Empresas, Law SC 5.159/75, state authority that participated in the shareholding of companies with investments in Santa Catarina, and worked until 1983.

1975), PRODEC<sup>16</sup> and the BRDE (Regional Bank for the Development of the Extreme South) and BADESC<sup>17</sup> (Development Bank of the State of Santa Catarina). In this context, “WEG managed to make heavily subsidized investments” (Silva 1997, 484).

Even so, after a phase of production growth during the Second National Development Plan, the company had relatively stagnant production in the first half of the 1980s. In the opinion of Abinee, there was significant domestic demand in the months following the launch of the Cruzado Plan that would allow for recovery in the sector, especially with regard to electronic components manufacturers. Regarding the electrical equipment industry, there was an expectation that recovery would be limited, since its sales were credited to the period preceding introduction of the monetary package. According to the newspaper: “In terms of sales, the businessmen in this segment [electrical equipment] - which is already chronically dependent on supplying government-owned companies - saw their prospects limited even further with the issue of the economic reform.”<sup>18</sup>

In 1985, WEG SA became a holding company and created WEG Motores to take over the operational functions of the group’s main activity, which at that time was responsible more than 70 percent of its revenues. From that point forward, the second half of the 1980s would see a sharp increase in the company’s production, and only WEG Motores would more than double its revenues in the period. Completing the diversification process within the electronics division, WEG Automação Ltda was created in 1986, based on the experiences of WEG Acionamentos, which aimed to broaden the group’s core business (Table 3). This strategy of

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<sup>16</sup> Programa de Desenvolvimento da Empresa Catarinense, Law SC 7.320/88, created to operate with the granting of credit.

<sup>17</sup> Created in 1973. Together with BRDE, it was financial agent of federal funds, such as FUNCENE, FIPEME and FINAME.

<sup>18</sup> “Freio no consumo”. *O Estado de S.Paulo*, July 25, 1986, 96.

seeking to engage in activities with great potential to create new areas of specialization made the company the undisputed leader in the electrical equipment sector, a situation that also had positive outcomes from the financial point of view, according to research based on the financial statements of the companies in this branch of the industry.<sup>19</sup>

**Table 3.** Revenue at WEG Group companies (in millions of US\$) - 1985, 1989 to 1992)

Production Units	1985	1989	1990	1991	1992
WEG Motores	87.8	186.6	198.26	146.21	135.38
WEG Máquinas	7.6	26.9	35.03	18.54	20.19
WEG Acionamentos	7.3	20.1	24.37	18.71	12.72
WEG Transformadores	7.2	17.5	19.22	13.93	13.54
WEG Automação	-	0.3	0.86	1.88	2.52
WEG Química	4.6	14.4	15.16	14.11	16.29
WEG Pescados	6.0	13.3	na	na	na
WEG Florestal	0.1	2.2	na	na	na
Total	121.2	281.4	na	na	215

Caption: na – not available

Source: Coutinho (1995); Ternes (1997)

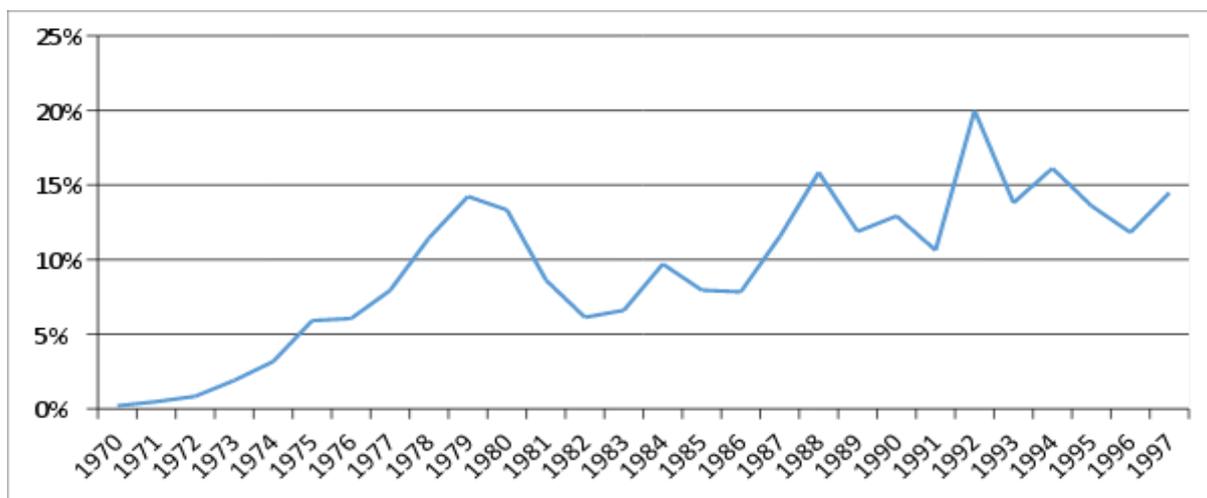
Nevertheless, the concession of the Petrobras Qualidade-86 Award to WEG showed the importance of the public sector as a customer for the electric motor company. In his acceptance speech, Ozires Silva, President of Petrobras, highlighted the quality of WEG's products, whose electric motors with a capacity of up to 5000 HP were used in the company's pipelines, trucks and, especially, at oil production platforms.<sup>20</sup> WEG Motores was also awarded the Cacex

<sup>19</sup> "Indústria repete desempenho satisfatório". *O Estado de S. Paulo*, July 25, 1986, 97.

<sup>20</sup> "Petrobrás dá prêmio à Odebrecht e à WEG". *O Estado de S. Paulo*, October 16, 1986, 35.

Market Achievement Award (Troféu Conquista de Mercado) for its export performance in 1988, which reached US\$ 27 million, and the high share that the company's foreign market sales represented (Graph 2). The company exported to 54 countries at the time, making it the fifth largest company in the world and the largest in Latin America.<sup>21</sup>

**Graph 2.** Share of foreign market sales (1970 to 1997)



Source: WEG (2000)

Given the facts and specificities pointed out so far, it is clear that WEG was one of the companies whose good economic and financial performance was largely due to the government's role as an entrepreneur during the 1970s and 1980s. This role is not exercised exclusively, but it is exercised fundamentally by government-run enterprises, which are at the same time political and economic agents. According to Philippe Faucher (1982, 96): "This presupposes that a whole process of mediation is carried out between competing interests, as well as a conciliation effort to determine the modalities of distribution of costs and advantages in the short and long term". In other words, once State intervention in the Brazilian economy reached its peak during the 1970s (Musacchio and Lazzarini 2014), the government's intention

<sup>21</sup> "SC amplia exportações". *O Estado de S. Paulo*, July 11, 1989, 18.

to not only aid economic growth but, above all, to maximize it became clear. In order to guarantee continued upward growth in the Brazilian economy, which was being limited by structural and economic factors, particularly after 1973, the government was forced to increasingly occupy private sector spaces of economic activity.

The period that began with the Collor administration (1989-1992) and continued with the Fernando Henrique Cardoso administration (1994-2002) was characterized by a policy of opening up to the international market. Even with a more competitive scenario, the company took advantage of tax and credit benefits in order to more aggressively internationalize. Therefore, as the company could depend less on government purchases than the previous decades, it could access funds from the BNDES to buy machinery, equipment and input materials exempt from import taxes (up to one-third of the firm's exports) and use the investments to increase its international market share. All of the companies in the group were negatively impacted by a recession in the early 1990s. WEG Pescados was sold in an effort to focus on the core business of electric machines. Another change came in 1993, when WEG Automação (which at the time of its formation was located in Florianópolis, Santa Catarina, in order to enter partnerships with the Federal University of Santa Catarina) was moved to Jaraguá do Sul, near Manufacturing Plant II, also incorporating the electronics line of WEG Acionamentos (Coutinho 1995).

Along with the resumed Brazilian economic growth in the second quarter of the 1990s, the company significantly grew its exports, adopting an aggressive commercial strategy that point forward, with the opening of subsidiaries in Argentina, the United States, Europe, Australia and Japan. To achieve this objective, WEG was targeted by PRODEC (Program for the Development of the Business Sector of Santa Catarina) from 1998 to 1999, receiving huge

incentives of around R\$173 million, or about 12.2 percent of the program's total resources. Although WEG's internationalization is considered an intentional element that came from top management at the company (from founders Eggon João da Silva, Werner Voigt and Geraldo Werninghaus as well as from the company's directors), the company could not have fulfilled this goal without government support. However, unlike in the 1970s and 1980s, when the government and domestic market demanded large quantities of equipment, it was the international market that had the best opportunities in the 1990s (Table 4).

**Table 4.** WEG exports in US\$ millions, 1978-2017

<b>Year</b>	<b>WEG Exports in millions of US\$</b>	<b>Year</b>	<b>WEG Exports in millions of US\$</b>
<b>1978</b>	5.1	<b>2002</b>	119.8
<b>1979</b>	7.5	<b>2003</b>	173.2
<b>1986</b>	7.6	<b>2004</b>	243.8
<b>1989</b>	22.9	<b>2005</b>	306.0
<b>1990</b>	29.0	<b>2006</b>	434.0
<b>1991</b>	30.0	<b>2007</b>	552.3
<b>1992</b>	37.0	<b>2008</b>	658.3
<b>1993</b>	42.0	<b>2009</b>	518.9
<b>1994</b>	63.0	<b>2010</b>	524.9
<b>1995</b>	78.0	<b>2011</b>	760.8
<b>1996</b>	89.0	<b>2012</b>	625.2
<b>1997</b>	107.0	<b>2013</b>	740.6
<b>1998</b>	113.1	<b>2014</b>	762.3
<b>1999</b>	97.7	<b>2015</b>	581.8
<b>2000</b>	84.0	<b>2016</b>	585.7
<b>2001*</b>	135.7	<b>2017*</b>	545.4

\*Values estimated by multiple linear regression, using 19 observations of the exports of Jaraguá do Sul-SC and the average exchange rate of the year. Relevant statistics: Multiple R: 0,9822; R<sup>2</sup> adjusted: 0,9603; F of

significance: 2,39677E-12; Coefficients: Intersection: -94,4636 (Valor-P: 0,0516); Exports of Jaraguá: 1,2528 (Valor-P: 5,31817E-13); Exchange rate (US\$/R\$): 40,5147 (Valor-P: 0,0333); 95 percent confidence interval. Standard error: US\$ 49.94 million.

*Source:* Vegini, Leite, Fiates (2011); Valente Júnior (2016); Rocha (2004); Revista Exame (2016).

After its first acquisitions of industrial plants abroad in Argentina and Mexico (2000), and later in Portugal (2002), WEG picked up a more intense pace of acquisitions. Between 2004 and 2006, control was acquired over three additional foreign factories: two in Mexico and one in China. As of 2009, a global insertion strategy had already been outlined, in which WEG is an important Brazilian player in the international market. During this phase, the company opened its the fourth factory in Mexico (2009). It built its first plant in India (2010). It made new acquisitions in Argentina (Pulverlux paint factory), Austria (Watt Drive, gearboxes and geared motors) and the United States (Electric Machinery, high voltage rotating machinery) in 2011. It acquired Zest Group of South Africa in 2012 and expanded activities in South Africa with the acquisition of Hawker Siddeley Electric Africa Pty in 2013. It also acquired Württembergische Elektromotoren (electric motors and geared motors), Antriebstechnik KATT Hessen (electric motors manufacturer) in Germany, as well as the Sinya Group and the CMM Group in Changzhou, China, and the FTC Energy Group (automation) in Colombia in 2014; more acquisitions were made with Transformadores Suntec, of Colombia, and Atrial S.L. (electrical panels for industrial plants), of Spain, in 2015. Finally, in 2016, the company bought Bluffton Motor Works, LLC. (electric motors) in the United States and CG Power USA Inc, specialized in distribution transformers. Major industrial investments were made in Asia, Africa, North America and Europe (Figure 1).<sup>22</sup>

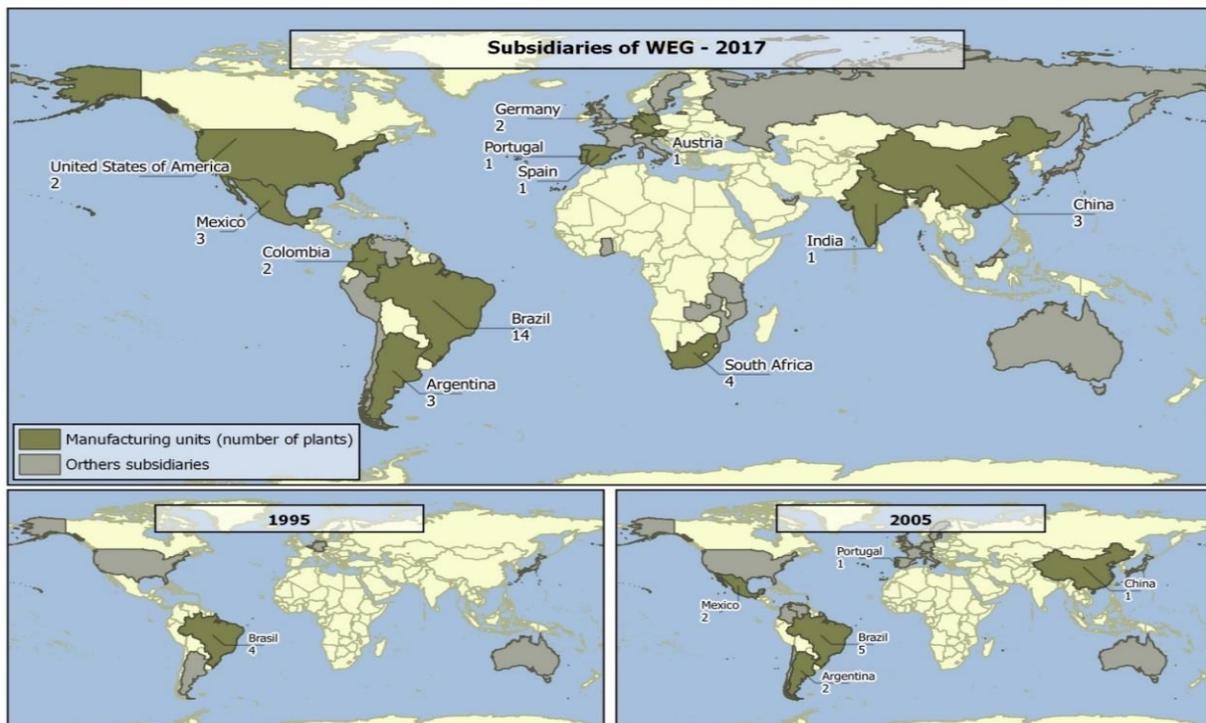
In Brazil, during this same period, the company's industrial asset also added important manufacturing units, reaching 14 manufacturing units in 2017. Since 2010, WEG has continued

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<sup>22</sup> WEG, 2012a; WEG, 2013a; WEG, 2014a; WEG, 2015a; WEG, 2016a; WEG, 2017a.

its internationalization efforts, promoting a series of acquisitions that have made its industrial park more robust outside of Brazil.

**Figure 1.** WEG subsidiaries and manufacturing units (1995-2005-2017)



*Source:* Prepared by the authors from WEG (2018); WEG (2017a); Silva (2010); WEG (2000); Vidigal (2011).

In Brazil, during this same period, the company's industrial asset also added important manufacturing units, reaching 14 manufacturing units in 2017. Since 2010, WEG has continued its internationalization efforts, promoting a series of acquisitions that have made its industrial park more robust outside of Brazil. Acquisitions abroad were therefore combined with acquisitions in Brazil, as in the case of Mesba Motores Elétricos de Guarulhos (a major producer of electric motors for household appliances), acquired in 1997, and more recently HISA (Hidráulica Industrial Ltda., of Joaçaba, Santa Catarina, which has produced turbines and other hydromechanical equipment for small hydro power stations since the 1950s) (Vidigal 2011;

HISA 2017).<sup>23</sup> This movement was apparent from the growth in the WEG Group's Net Operating Revenue. As of 2012, revenues coming from outside of Brazil have outperformed the domestic market (Table 5).

**Table 5.** Net Operating Revenue (millions of US\$ - average sales for the period)

Year	Domestic market	%	Foreign market	%	Total
2010	1.501	63	870	37	2.371
2011	1.733	56	1.365	44	3.098
2012	1.543	49	1.615	51	3.159
2013	1.591	50	1.574	50	3.165
2014	1.647	49	1.684	51	3.332
2015	1.269	43	1.661	57	2.930
2016	1.147	43	1.537	57	2.684
2017	1.317	44	1.667	56	2.984

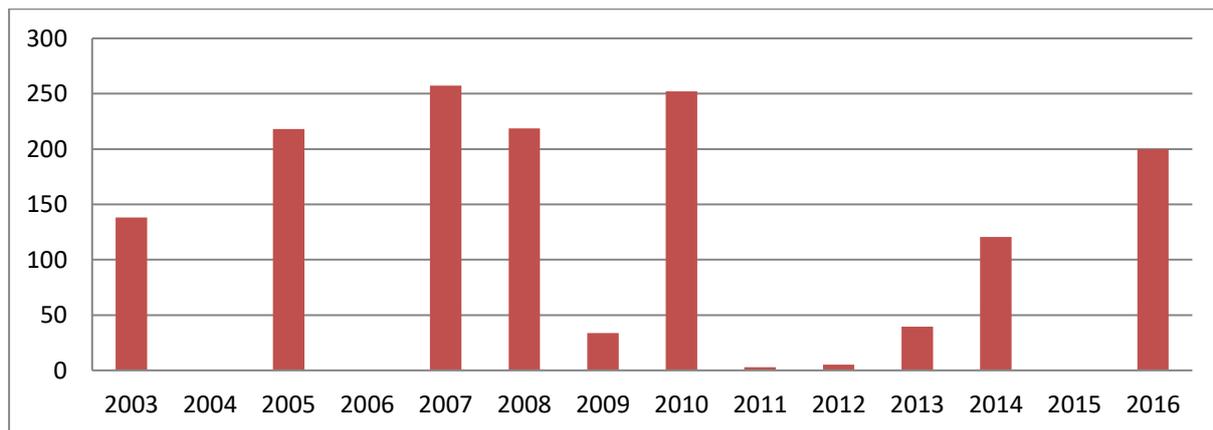
Source: WEG. Annual Reports. 2011-2016; WEG. Financial Statements. 2011-2017.

Again, these results in the international market would not have been reached without government support. WEG's place as a government darling was reaffirmed during the Luiz Inácio Lula da Silva administration (2003-2010). Using the BNDES as an instrument to boost national companies, the policy undertaken by the Brazilian government was to finance national companies so that they could achieve the best position possible in the global market. This was done, for instance, through the internationalization line, through which the BNDES supported

<sup>23</sup> Acquisitions: Hisa (turbines for Small Hydro), in 2007; Trafo (transformers) and Instrutech (electronic sensors) in 2010; Equisul (critical power) in 2011; Stardur Tintas, WEG-Cestari (geared motors) and Injetel (sockets and switches), in 2012; Paumar (paints) in 2013; Efacec Energy Service (maintenance of electrical equipment), Pernanbubo, in 2014; and TGM (turbines and transmissions) in 2016 (WEG, 2012a; WEG, 2013a; WEG, 2014a; WEG, 2015a; WEG, 2016a; WEG, 2017a).

construction of the WEG plant in India (BNDES 2017, 293). From 2003 to 2016, the company received investments of R\$ 1.486 million from this development bank.

**Graph 4.** Direct and indirect non-automatic investments (amount contracted in millions, BRL)



*Source:* BNDES, portal da transparência: CNPJ: 07.175.725/0001-60 - WEG equipamentos eletricos S/A.

Additionally, WEG has been a traditional customer of export financing lines, essentially the pre-shipment financing lines, where BNDES finances part of the company's production destined for export, helping in competitive cost formation so that the company can operate in the international market, offering more favorable prices and conditions to clients, compatible with international competitors. BNDES has therefore helped the company to conquer new markets and consolidate its position as one of the largest Brazilian exporters of capital goods and one of the largest players in the world in its industry. The development of new WEG products and processes is also supported by BNDES through its funds, which contributed to the frequency and consistency of the group's investment in innovation (BNDES 2017, 319-321).

In short, there were three international insertion strategies, as usually recalled in the literature aimed at understanding company's internationalization: distribution and commercial representation by third parties; creation of dedicated companies for distribution and after-sales service; and establishment, or acquisition, of manufacturing plants abroad. These models were

combined and used in parallel. Unlike traditional historiography, the availability of public resources was what permitted such a quantitative and qualitative leap forward by WEG, giving less prominence to the figure of the “innovative entrepreneur”.

### **Final considerations**

At the beginning of 2010, WEG celebrated its fifty-year anniversary. It started as a small electric equipment production company and moved forward to conquer the international economy, becoming a market leader. The history of WEG is filled with elements ripe for an analysis based on the company’s strategy and the internal decisions that would allow for possible internationalization. Its founders have been concerned with the issue of knowledge management, not only by training their employees, but also by establishing international partnerships to keep abreast of technological innovations. The company, in addition, followed with the usual route to internationalization noted in the literature, initially exporting to neighboring markets and expanding its operations with offices and commercial branches abroad, until, in recent decades, conquering the market by building and acquiring plants in a variety of countries.

Notwithstanding these effective achievements at the company, which also highlight relevant decisions made internally by the company’s management, this paper sought to emphasize a dimension that is not widely remarked upon in the literature: the fundamental relationship between the company and the government. As demonstrated, each of the company’s development phases was also marked by an approximation with governmental policies, which catapulted the company from its local operations into becoming a leading company in the sector. Its origin is perfectly articulated with the structure of the division of national markets among national, foreign and government capitals, established by import substitution programs

since the Kubitschek administration. Its development depended substantially on government demands during the military government, central to which was a project to expand the supply of energy based on Eletrobras. Even in the 1980s, when the Brazilian economy entered a profound crisis scenario, the company was continued to benefit from state programs, in a vicious cycle that would allow its continued positioning among the leaders of the national electric sector. More recently, the company has depended on BNDES policy to finance its production and ensure its remarkable market share in the international trade. In short, if the internal decisions of the company are to be considered, understanding their due correctness, the dimension of the development of the sector as a whole cannot be dismissed. Such analysis allows for a more far-reaching and less heroic comprehension of the WEG's achievements.

### Primary Sources

BNDES. *Portal da transparência* (Transparency portal). Available at: <https://www.bndes.gov.br/wps/portal/site/home/transparencia>

BNDES. 2017 *Livro verde: nossa história tal como ele é*. Rio de Janeiro: BNDES.

HISA (Joaçaba-SC). *HISA: Uma trajetória de sucesso*. Available at: <http://www.hisa.com.br/historia>. Accessed on: 17 nov. 2017.

JDV. *Casa Kohlbach pode se tornar patrimônio histórico da cidade*. Available at: <http://www.jdv.com.br/noticia/6484/casa-kohlbach-pode-se-tornar-patrimonio-historico-da-cidade>.

Accessed on: 19 nov. 2017.

*O Estado de S. Paulo*, Newspaper. Select years.

Revista Exame. *Melhores & Maiores: Weg Equipamentos*. 2016. Available in: <http://mm.exame.abril.com.br/empresas/perfil/2016/weg-equipamentos>. Accessed on 24 abr. 2018.

Revista Exame. *Melhores & Maiores: Weg Drives & Controls – Automação*. 2016. Available at: <http://mm.exame.abril.com.br/empresas/perfil/2016/weg-drives-controls-automacao>. Accessed on: 24 abr. 2018.

WEG (Jaraguá do Sul). 2000. *Histórico de vendas físicas*. Jaraguá do Sul: Tabela.

WEG (Jaraguá do Sul-SC). *Relatório Anual 2011*. Jaraguá do Sul-SC: [s.n.], 2012a. Available at: [https://ri.weg.net/ptb/887/RelatorioAnual\\_2011\\_Portugues.pdf](https://ri.weg.net/ptb/887/RelatorioAnual_2011_Portugues.pdf). Accessed on: 21 abr. 2018.

WEG (Jaraguá do Sul-SC). *Relatório Anual 2012*. Jaraguá do Sul-SC: [s.n.], 2013a. Accessed on 21 abr. 2018. Available at: [https://ri.weg.net/ptb/739/Annual\\_Report\\_Portuguese\\_2012.pdf](https://ri.weg.net/ptb/739/Annual_Report_Portuguese_2012.pdf)

WEG (Jaraguá do Sul-SC). *Relatório Anual 2013*. Jaraguá do Sul-SC: [s.n.], 2014a. Accessed on: 21 abr. 2018. Available at: <https://ri.weg.net/ptb/622/RelatC3B3rioAnualIntegrado20131.pdf>

WEG (Jaraguá do Sul-SC). *Relatório Anual 2014*. Jaraguá do Sul-SC: [s.n.], 2015a. Accessed on: 21 abr. 2018. Available at: <https://ri.weg.net/ptb/455/RelatC3B3rioAnualIntegrado2014.pdf>

WEG (Jaraguá do Sul-SC). *Relatório Anual 2015*. Jaraguá do Sul-SC: [s.n.], 2016a. Accessed on: 21 abr. 2017. Available at: <https://ri.weg.net/ptb/1421/RelatC3B3rioAnualIntegrado2015.pdf>

WEG (Jaraguá do Sul-SC). *Relatório Anual 2016*. Jaraguá do Sul-SC: [s.n.], 2017<sup>a</sup>. Accessed on: 21 abr. 2018. Available at: <https://ri.weg.net/ptb/1420/RelatC3B3rioAnualIntegrado2016.pdf>

WEG (Jaraguá do Sul-SC). *Demonstrações financeiras 2011*. Jaraguá do Sul-SC: [s.n.], 2012b. Accessed on: 21 abr. 2018. Available at:

<https://ri.weg.net/ptb/878/DemonstraC3A7C3B5esFinanceirasde2011Completa.pdf>

WEG (Jaraguá do Sul-SC). *Demonstrações financeiras 2012*. Jaraguá do Sul-SC: [s.n.], 2013b. Accessed on: 21 abr. 2018. Available at:

<https://ri.weg.net/ptb/746/DemonstraC3A7C3B5esFinanceirasde2012Completa.pdf>

WEG (Jaraguá do Sul-SC). *Demonstrações financeiras 2013*. Jaraguá do Sul-SC: [s.n.], 2014b. Accessed on: 21 abr. 2018. Available at:

<https://ri.weg.net/ptb/627/DemonstraC3A7C3B5esFinanceirasWEG.pdf>

WEG (Jaraguá do Sul-SC). *Demonstrações financeiras 2014*. Jaraguá do Sul-SC: [s.n.], 2015b. Accessed on: 21 abr. 2018. Available at:

<https://ri.weg.net/ptb/453/DemonstraC3A7C3B5esFinanceirasWEG2014.pdf>

WEG (Jaraguá do Sul-SC). *Demonstrações financeiras 2015*. Jaraguá do Sul-SC: [s.n.], 2016b. Accessed on: 21 abr. 2018. Available at:

<https://ri.weg.net/ptb/304/DemonstraC3A7C3B5esFinanceiras2015WEG.pdf>

WEG (Jaraguá do Sul-SC). *Demonstrações financeiras 2016*. Jaraguá do Sul-SC: [s.n.], 2017b. Accessed on: 21 abr. 2018. Available at:

<https://ri.weg.net/ptb/167/DemonstraC3A7C3B5esFinanceiras2016.pdf>

WEG (Jaraguá do Sul-SC). *Demonstrações financeiras 2017*. Jaraguá do Sul-SC: [s.n.], 2018. Accessed on: 21 abr. 2018. Available at:

<https://ri.weg.net/ptb/1906/Demonstraes%20Financeiras%202017%20WEG.pdf>

## References

- Almeida, Mansueto de. 2013. "Padrões da política industrial: a velha, a nova e a brasileira." In *O futuro da indústria no Brasil: desindustrialização em debate*, edited by Edmar Bacha and Monica de Bolle, 273-293. Rio de Janeiro: Civilização Brasileira.
- Amsden, Alice. 2001. *The Rise of "the Rest": challenges to the West from Late-Industrializing Economies*. New York: Oxford University Press.
- Baer, Werner, Fonseca, Manuel and Joaquim Guilhoto. 1987. "Structural Changes in Brazil's Industrial Economy, 1960-80." *World Development* 15 (2): 275-286.
- Bonelli, Regis and Pedro Malan. 1976. "Os limites do possível: notas sobre balanço de pagamentos e indústria nos anos 70." *Pesquisa & Planejamento Econômico* 6 (2): 353-406.
- Bulmer-Thomas, Victor. 2014. *The Economic History of Latin America since Independence*. 3<sup>rd</sup> ed. New York: Cambridge University Press.
- Cachapuz, Paulo Brandi (Coord.). 2006. *Panorama do setor de energia elétrica no Brasil*. Rio de Janeiro: Centro de Memória da Eletricidade no Brasil.
- Coutinho, Luciano and João Carlos Ferraz (Coords). 1994. *Estudo da competitividade da indústria brasileira*. Campinas-SP: Papyrus.
- Coutinho, Luciano. 1995. *Grupos Econômicos da Indústria Brasileira e a Política Econômica: Estruturas, Estratégias e Desafios: WEG*. Campinas-SP: FUNDAP/FECAMP/UNICAMP-IE.
- Dalla Costa, Armando and Michel Marson. 2014. "A internacionalização de empresas brasileiras de bens de capital: o caso da Romi e da Weg". *CLADHE IV*.
- Erber, Fabio Stefano. 1974. *Absorção e criação de tecnologias na indústria de bens de capital*. Rio de Janeiro: Finep.
- Evans, Peter. 1982. *A Tríplice Aliança. As multinacionais, as estatais e o capital nacional no desenvolvimento dependente brasileiro*. Rio de Janeiro, Zahar.
- Faucher, Philippe. 1982. "A empresa pública como instrumento de política econômica". *Revista de Economia Política* 2/2 (6): 79-105.
- Floriani, Eliete, Felipe Mendes Borini, and Maria Tereza Leme Fleury. 2009. "O processo de internacionalização como elemento gerador de capacidades dinâmicas: o caso da WEG na Argentina e na China." *Revista Brasileira de Gestão de Negócios* 11 (33): 367-382.
- Fishlow, Albert. 1996. "A economia política do ajustamento brasileiro aos choques do petróleo: uma nota sobre o período 1974/84." *Pesquisa & Planejamento Econômico* 16 (3): 507-550.
- Fonseca, Pedro C. D., Sergio Monteiro M. M. 2007. "O Estado e suas razões: o II PND." *Revista de Economia Política* 28,1 (109): 28-46.

- Fonseca, Sônia T. D., Léo Bruno. 2009. *Eggon João da Silva: ideias e caminhos: a trajetória de um dos fundadores da WEG*. Rio de Janeiro: Elsevier, Belo Horizonte: Fundação Dom Cabral.
- Goularti Filho, Alcides. 2016. *Formação econômica de Santa Catarina*. Florianópolis: Ed. da UFSC.
- Hausmann, Ricardo, and Dani Rodrik. 2003. "Economic Development as Self-Discovery." *Journal of Development Economics* 72:603-633.
- Hirschman, Albert. 1968. "The Political Economy of Import-Substituting Industrialization in Latin America." *Quarterly Journal of Economics* 82 (1): 1-32.
- Lago, Luís Corrêa do, Fernando Lopes de Almeida, and Beatriz M. F. de Lima. 1979. *A indústria brasileira de bens de capital: origens, situação recente e perspectivas*. Rio de Janeiro: IBRE/FGV.
- Leff, Nathaniel. 1968. *The Brazilian capital goods industry, 1929-1964*. Cambridge: Harvard University Press.
- Lessa, Carlos. 1975. *Quinze anos de política econômica*. São Paulo: Brasiliense.
- Lima, José Luiz. 1995. *Estado e desenvolvimento do setor de energia elétrica: do Código das Águas à crise dos anos 80 – 1934-1984*. Rio de Janeiro: Memória da Eletricidade.
- Macario, Santiago. 1964. "Protectionism and Industrialization in Latin America." *Economic Bulletin for Latin America* 9: 61-101.
- Melo, Germana Tavares de. 2010. "A reconfiguração dos recursos ao longo do processo de internacionalização de empresas: um estudo de caso na Weg S.A." Master diss., UFRGS.
- Moraes, Jayme. C. de. 2004. "A Trajetória de Crescimento da WEG: A Folga de Recursos Humanos como Propulsora do Crescimento da Firma." Master diss., Universidade Federal do Rio de Janeiro.
- Moretti, Gilmar Antonio. 1988. "Subsídios para a história econômica de Jaraguá do Sul. Jaraguá do Sul". Undergraduate diss., Universidade do Estado de Santa Catarina.
- Musacchio, Aldo and Sergio G. Lazzarini. 2014. *Reinventing State Capitalism: Leviathan in Business, Brazil and Beyond*. Cambridge, Massachusetts: Harvard University Press.
- Predebon, Eduardo Angonesi. 2010. "Internacionalização e integração econômica. O caso da WEG S.A." PhD diss., UFPR.
- Rocha, Isa de Oliveira. 2004. "O dinamismo industrial e exportador de Santa Catarina." PhD diss., FFLCH/USP.
- Rodrik, Dani. 2007. *One Economics, Many Recipes. Globalization, Institutions, and Economic Growth*. Princeton, New Jersey: Princeton University Press.
- Sasse, Carla Müller. 2015. "Capital estrangeiro e energia elétrica no Brasil: estudo sobre as empresas fornecedoras de equipamentos para o setor elétrico." Master diss., FFLCH/USP.

- Sasse, Carla Muller, and Alexandre Saes. 2016. "A Eletrobras e as empresas fornecedoras de equipamentos para o setor elétrico brasileiro (1960-1980)" *Revista de História* 174:199-234.
- Schörner, Ancelmo. 2006. "A pedra, o migrante e o morro: feridas narcísicas no coração de Jaraguá do Sul/SC - 1980/2000". PhD diss., Universidade Federal de Santa Catarina.
- Serra, José. 1984. "Ciclos e mudanças estruturais na economia brasileira do pós-guerra." In *Desenvolvimento capitalista no Brasil: ensaios sobre a crise*, edited by Luiz Gonzaga Belluzzo and Renata Coutinho, 69-138. São Paulo: Brasiliense.
- Silva, Marcos Aurélio da. 1997. "Desenvolvimento e competitividade das firmas de equipamento elétrico do nordeste catarinense." *Anais do Congresso de História e Geografia de Santa Catarina*. Florianópolis-SC: 480 - 491.
- Silva, Bárbara, Djali Valois, Dóris Dávi, Eduardo Sartori, Etyenne Guimarães, and Manuela Jorge. 2010. "Estratégias de internacionalização da Eletromotores WEG SA." Paper presented at the II Seminário de Pesquisa Interdisciplinar, Universidade do Sul de Santa Catarina, Brazil, May 18-20.
- Strachman, Eduardo. 1992. "Estrutura de mercado, competitividade e políticas para as indústrias internacional e brasileira de bens de capital sob encomenda para o setor elétrico." Master diss., Unicamp.
- Tadini, Venilton. 1986. *O setor de bens de capital sob encomenda: análise do desenvolvimento recente (1974/83)*. São Paulo: IPE/USP.
- Ternes, Apolinário. 1997. *Weg: 36 anos de história*. Joinville: Weg.
- Valente Junior, Luiz Carlos. 2016. "A evolução das exportações e importações das empresas catarinenses." *Cadernau* 9 (1): 116-134.
- Vegini, Genésio, L., André L. Leite, and Gabriela Gonçalves Fiates. 2011. "Desempenho competitivo da WEG: uma análise à luz da adaptação estratégica." *Contextus: Revista Contemporânea de Economia e Gestão*, 9 (2): 39-53.
- Vidigal, Allan. 2011. *WEG 50 anos*. São Paulo: DBA.

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