Evolution and challenges of the recent industrial policy in Brazil
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Introduction
The objective of this paper is to provide a reflection on the present stage of industrial policy in Brazil. Industrial policy was a key component in the Brazilian process of industrial development from the 1930s to the 1970s. In the 1980s, a serious macroeconomic crisis marked the abandonment of the previous strategy. In the 1990s, a successful process of stabilization, accompanied by privatization and other liberal reforms, put industrial policy in second place. Nevertheless, in 2003 the electoral victory of the Partido dos Trabalhadores resulted in the revival of industrial policy, which was the object of three different programs until 2014. The objective of this paper is to investigate the main lines of industrial policy since then, addressing how the effort was undertaken and how it can be improved.

Before that, previous issues need to be addressed. Firstly, I intend to summarise, in a very synthetic way, arguments related to why industrial policy is necessary, how it should be implemented and how to avoid the mistakes which marked previous experiences. As the article intends to show, industrial policy is favoured when it achieves a certain degree of social consensus. The present article, by attempting to provide a clear analysis and learning with successful experiences, aims to contribute to the achievement of this consensus.

Industrial policy tends to be a very controversial topic. This is in part explained because it touches on a key issue which has marked economic science since its foundation: the division of attributions between the state and the market. Secondly, the controversy is related to methodological issues inherent to economic science. A lot of economists are trained in deductive and quantitative methods and tend to base significant parts of their arguments on mathematical models. Another group tends to rely largely on historical and institutional approaches. This divergence tends to hinder the dialogue and the achievement of a certain degree of consensus. Thirdly, the

1 Lecturer and Researcher – Escola de Governo – Fundação João Pinheiro; in 2015, visiting scholar at Cambridge University. I would like to thank Jackson De Toni and Mauro Borges Lemos for the interviews and bibliographical indications which made significant difference in the development of this article. I also would like to thank CAPES for making possible this very important experience as a visiting scholar.
2 This methodological dispute is not new and has, as an eminent predecessor, the XIX century controversy between neoclassical economists and the German historical school.
industrial policy debate is very influenced by ideology and by the fact that different policies have distinct political impacts. Monetary, regulatory and exchange rates policies affect distinct social and economic groups very differently. In addition, national development policies affect the interests of international banks and enterprises involved in their respective economies frontally. For all these reasons, industrial policies have a strong political economy dimension, which is critical to understand not only the capacity of certain states to successfully adopt development strategies, but also different national trajectories and changes in those trajectories.

Divergence is paramount in the history of economic development discipline, a field of studies which emerged in the post Second World War to address the perspectives of transformation in developing economies. Since then, many strategies to promote industrialization have been attempted, but only a few are considered incontestable cases of success. There is a huge controversy about the features responsible for their success and the role played by state intervention.

In general, neoclassical economists are reluctant in accepting that developmental policies played a key role in defeating backwardness. Regarding industrial policy, they argue that there is no evidence that it played a key role in increasing productivity or for the success of the industrialization strategy. These economists argue that industrial policies were applied everywhere and in most countries had been conducted to negative results. In the few cases of success, other factors, such as human capital and correct macroeconomic policies, are claimed to be the factors responsible for success (Pinheiro et. all, 2006).

By contrast, structuralist development economists undertake analyses of the successful cases and argued that state guidance and industrial policies were a key part of the process (Amsden, 1989; Chang, 2006; Johnson, 1982, among others). According to structuralist economists, states played a key role in encouraging investments in new sectors, in nurturing competitive enterprises and in strengthening technological capacity. A key variable is the state’s capacity to coordinate the strategy and induce the private sector action (Evans, 1995). In this sense, not only the policies matter, but also the capacity to design and implement them. In both points and subjects, important lessons are learned from the classical developmental states experiences.

It is important to emphasise that controversy is also nurtured by the nature of the object. The transmission mechanisms of industrial policy are complex and hard to
understand. In addition, the possibility of evaluating the impact of sectoral programs is difficult, since it is hard to separate the effects of industrial policy from other effects and there is also the question of endogeneity in addressing causality (Devlin and Moguillansky, 2011). For this reason, it is impossible to find incontestable evidence able to convince each group of economists. As the sceptics argue, it is impossible to find clear evidence that industrial policy works; the fact that successful countries adopted selective industrial policies is not evidence that it works. For the supporters, it is also impossible to find evidence that it, if well implemented, does not work; in addition, countries should not avoid industrial policy only because neoclassical theory argues to do so (Devlin and Moguillansky, 2011). An argument in favour of the second group is that among the countries which recently caught up, most adopted systematic programs of intervention in order to upgrade industrial structure. Among the countries that failed, it is easy to identify problems related to design and implementation (Devlin and Moguillansky, 2011; Shapiro, 2007).

In the 1980s and 1990s, the neoliberal ideology became prominent in the development debate, penetrating into the main international development institutions and influencing policies around the world. According to this ideology, failure in great parts of the developing world was attributed to excessive state intervention, which distorted prices and provoked inefficiency and rent seeking. That agenda espoused liberation of market forces, viewed as a requisite to wake up the entrepreneurial forces, to attract foreign capital and to produce balanced and productive strategies of development. In Latin America, this strategy was embraced by most countries, a precondition to obtain financial resources and other forms of international support.

Despite achieving stabilization and improving macroeconomic variables, the results were disappointing in terms of development. Increase in exports and in foreign direct investment was not able to aggregate value and to stimulate other economic sectors. Impacts on employment were limited, productivity did not increase and most of the countries were marked by reprimarisation of exports and by precocious processes of deindustrialization (Palma, 2011; Shapiro, 2007; Cimoli, Nelson, Dosi and Stiglitz 2009). Although several problems were structural, the liberalization strategy, instead of addressing them, aggravated the difficulties. As a consequence, the frustrating results of neoliberal policies brought to power opposition governments which proposed a very different development strategy. Industrial policy returned to the agenda, being necessary
to understand what role it can play, how to make it work and what to learn from previous experiences.

The objective of the present article is thus to construct a clear and persuasive analysis about the stages of recent industrial policy in Brazil and the steps necessary for its success. I believe that by bringing the contributions of the recent literature and the lessons from recent cases, it is possible to establish certain propositions which tend to be shared by a large group of economists and policy makers. I believe that it is possible to agree on a range of issues related to procedures, institutional building and instruments which, if adopted, tend to increase the chances of success.

In order to achieve the objectives, the next section explores basic general issues related to why industrial policy is necessary. In section 3, I bring factors and procedures which contribute to successful implementation of industrial policy. Examples and experiences are brought to illustrate and highlight the relevant points. Sections 4 to 6 explore different moments in the recent evolution of industrial policy in Brazil, summarizing the main advances and difficulties. Section 7 concludes the article, highlighting several directions for improving the effectiveness of industrial policy.

**Industrial Policy: why it is necessary**

Industrial policy has, in general, a very broad definition, including a diverse range of measures aimed at promoting industrial growth, strengthening industrial structure and increasing productivity, competitiveness and employment, among other objectives. Horizontal policies, including investments in infrastructure, education, training and research and development (R&D), tend to be accepted and considered necessary by most of the economists. Divergence emerges when the issue is selective intervention aimed at promoting specific sectors. Neoclassical economists tend to oppose these measures on the grounds that bureaucrats are not better positioned than businessmen to know the best sectors to be promoted.³

A key issue in this controversy is if development prospects are affected by the types of goods which a country produces: does it make any difference to produce complex and elaborated goods rather than basic and simple products? According to mainstream

³ In addition, costs of opportunity are invoked to defend the concentration of resources on education and infrastructure, while selective policies are criticized for facilitating the capture of the state by private groups. Those arguments were well addressed by Hirschman (1958) and Chang (2006), among others, and it is not my intention to repeat them here.
economists, in general adept to comparative advantage theory, it makes little difference: what matters is the capacity to produce in a competitive way (Lazzarini, Jank and Inoue, 2013). This justifies the decision to focus on products in which the country has comparative advantage, the attempts to depart from this rule being the main cause of industrial policies failure (Lin and Monga, 2013).

By contrast, structuralist authors argue that there are important reasons to diversify and to produce more elaborated goods. The first reason was given by Albert Hirschman in the 1950s: it is necessary to stimulate goods whose linkage effects push the development of other sectors. This is, according to Hirschman (1958), what development is about: a process able to create tensions and unbalances, demanding responses and transformation in other parts of the economy. The problem with concentrating on primary goods is that these products have little capacity to induce transformation in the economy. A second reason is related to the lower income elasticity of demand for primary products, also emphasized by structuralist economists in the 1950s. As recent research has reinforced, complex and elaborated goods have more capacity to capture demand in OECD countries, besides being less vulnerable to international crises (Palma, 2010). Thirdly, elaborated products increase the chances of differentiation and of obtaining higher profit margins (Dosi, Cimoli and Stiglitz, 2009). Fourthly, when a country advances along the stages of development, wages tend to rise and it tends to suffer competition from poorer countries, demanding the development of other sources of competitiveness.4

An original contribution is given by Hausmann and Rodrik (2006). The argument is based on the notion of sectoral capabilities: when a country produces certain goods, it accumulates capabilities which increase the chances of successful diversification to adjacent activities. A key point is the identification of affinities and contiguity in the productive chain, compared by the authors to a forest. For a respective country, it is easy to jump (diversify) to neighbouring trees, i.e., to sectors which share technical and productive requisites. The risks are much higher when a country attempts to jump (diversify) to very distant sectors. As Hausmann and Rodrik (2006) point out, “to jump from garments to electronics may be too big a step”. In an analysis supported very much by empirical data, Hausmann and Rodrik show how some sectors tend geographically to

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4 In addition, the argument is supported by historical and empirical data, which shows that countries which significantly improved per capita income tended to advance towards a higher degree of diversification (Shapiro, 2007).
develop together. They argue that the capacity to produce certain goods is a very good predictor of the sectors in which a country tends to advance in the future. In this sense, “a country tends to become what it exports.”

A key point is that capabilities are sector specific; the property rights which matter in this case are those specific to sectors. When a country does not have the requirements (inputs) for certain economic activity, they need to be provided or accumulated, creating conditions to make productive activities attractive to the private sector. The worst situation is faced by countries with a very simple and restricted productive structure, which faces hard difficulties to produce the necessary requisites.

There are important implications in terms of policies. The first is that there are opportunities for diversification in contiguous sectors, a key role of industrial policy being to provide cooperation with the business sector in a process of “self-discovery”, i.e., in the identification of viable niches. The other is that the promotion of capabilities in other sectors tends to increase the chances of future diversification. Although the development of “distant” sectors may involve challenges and require subsidies, its success tends to strengthen the opportunities to diversify the industrial structure.

Another reason to diversify production and upgrade industrial structure is related to the fact that certain goods are intensive in learning, knowledge and innovation and tend to have spillover effects on the economy. Innovation is one of the main sources of productivity, competitiveness and economic growth, opening new economic opportunities to be explored. Although the advance towards knowledge intensive goods involves significant efforts to improve education, training, research and development, it is a central objective to be pursued by a strategy of industrial development (Dosi, Cimoli and Stiglitz, 2009).

In face of those arguments, a clear direction for developing countries, accepted by most of the economists, is to aggregate value in goods in which they already have comparative advantages. Choices have to be made combining possibilities and

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5 According to Dosi, Cimoli and Stiglitz (2009), it is necessary to abandon the idea that there are plenty of opportunities to be explored, waiting only for the provision of favorable property rights. The possibility of diversification requires capacities which are specific to the sectors, a requisite to make investments viable.

6 Hausmann and Rodrik (2006) give Bolivia’s example, whose export capacity is very concentrated on few products and which tends to face hard difficulties to diversify. Another interesting example is the comparison between Malaysia and Colombia. Although having similar per capita income (at the time of the comparison), Malaysia had a more complex industrial structure and more possibilities to diversify and develop.
feasibility and a country should refuse to promote goods too distant from its present capabilities (Lin and Chang, 2009). However, this does not exclude the possibility of strategies which, well designed and having the necessary support, tend to produce linkage effects and stimulate diversification in the future. A key point to stress is that a country should not accept the argument that the best strategy is to concentrate on the production of a few elementary goods and wait for the advantages of trade specialization, the naïve original comparative advantage argument. Some decisions are not natural and should be induced, being necessary to the adoption of policies which increase the chances of developing sectors considered strategic and viable (Lin and Chang, 2009).

Productive diversification and the advance in R&D imply risks and the costs inherent to the learning process, requiring policies and incentives. Two concepts are critical for understanding why the state should provide support in such issues: market failures and externalities. In activities which involve risk, the expected return of private investment may be lower than social return. As a consequence, investments with potential to bring positive effects to society may not be undertaken; firms may opt for less risk and less productive strategies. One important example is the “first mover externalities”: when moving to a new sector, a firm may suffer high losses in cases of failure, while in cases of success it may face difficulties in curbing copy and in retaining the fruits of innovation. A second case involves complementary investments, in which investments, although not very attractive if undertaken in isolation, may be very lucrative if undertaken together. In this case, governments can provide the incentives to the simultaneous realization of the investments. A third example involves investment in training: the incentive for a firm to invest in workers’ qualification tends to be reduced by the risk of poaching by other companies. In this case, governments may intervene providing incentives or investing directly in training programs. In brief, externalities are part of the economic process and tend to be present in activities which imply diversification, learning efforts and innovation, justifying policies to support the

7 In the recent history of economic development, we find examples of decisions which, aimed at developing new sectors distant from the country’s original capabilities, played a key role in the further process of development. A very good example was South Korea’s decision to promote the steel industry, followed by programs of stimulus to the heavy industry and to electronics. The provision by the state of inputs and complementary measures, including support for R&D, was critical for the success of the strategy (Lin and Chang, 2009; Chang, 2006).
investment (Hausmann and Rodrik, 2006; Hausmann, Rodrik and Sabel, 2008; Lauridsen, 2010; Lim, 2013).

Nevertheless, externalities are not the only reason to justify state intervention in the economic process. As Mazzucato (2011), Dosi, Cimoli and Stiglitz (2009) and others argue, economic development is a dynamic process in which learning, capabilities accumulation and innovation play an essential role. Innovation is an interactive and not linear process, benefitting from interactions among enterprises, universities, suppliers, clients, public R&D institutes and other actors. The government tends to play an important role in building research and development framework, stimulating interaction and promoting the strengthening of enterprises’ capacities. This involves efforts to socialize R&D costs and results, create laboratories, undertake research in public institutions and stimulate public-private consortiums.

Mazzucato (2011) shows very convincingly how a government’s role in spurring innovation is much wider than usually accepted. According to her, a government’s investments, undertaken on a large scale, were the engine behind the development of many technologies which became critical for future cycles of investment, including the internet, genetic sequence, the pharmaceutical industry and biotechnology. Governments went much further than funding innovation, approximating science and technology and supporting commercialization. They opened windows, detected opportunities and engaged in very uncertain research activities. According to Mazzucato (2011), anything more than support or correct markets, the governments create them.

The objective of fostering innovation gives special importance to the development of the industrial sector. Advances in knowledge and innovation depend on the enterprises’ engagement in R&D activities, which is more probable in industry, where enterprises are larger, they maintain R&D departments, they employ large number of researchers and scientists and are less averse to risk. Industrial activity is also marked by strong inter-sectoral linkage effects and by high learning spillover effects. The critical role of the industrial sector had been emphasized by Nicholas Kaldor a long time ago, who stressed the strong correlation between industry’s performance and increases in productivity (Palma, 2011; Greenwald and Stiglitz, 2013).

8 In this instance, when technology was in a very incipient stage and there were no immediate perspectives for productive application, venture capital has a very small role to play.
Implementing a successful industrial policy

Once accepted that governments should adopt policies aimed at moving up the production ladder, it is necessary to better understand the factors responsible for successful industrial policies. It is not a trivial question. As Devlin and Moguillansky (2011) emphasize, the literature has not fully understood the “how” of industrial policy in terms of process organization, internal organization of the government and implementation. Nevertheless, important lessons are learned from both the classical development states and recent experiences. The notion of embedded autonomy, developed in Peter Evans’ authoritative work, captures important requisites to the success of industrial policies.9 A critical challenge is how to develop embedded autonomy in democratic contexts and in countries in which state-society relations are very different from the paradigmatic East Asian cases.

A recent and very original contribution is given by Mushtaf Khan (Khan, 2007; Khan and Blankenburg, 2009; Khan, 2013; Khan, 2015). According to Khan, a key challenge for developing countries is to acquire the capacity to produce, with quality and in a competitive way, goods which technology has already made available to world markets. The process involves a huge effort of learning, given that a large part of the knowledge is tacit, inherent to the routines of the productive process. A team has to be trained and abilities have to be achieved in many stages, including the setup of the factory, the employment of machines, the establishment of quality control systems and the provision of post sales services (Khan, 2013). This process involves a huge effort of learning by doing.

Success at this stage requires certain capacities and requisites, such as managerial capacity, work force ability and access to the necessary inputs and services at competitive prices. However, it also involves a huge effort and commitment by the enterprises to the learning process. The process is uncertain and involves risks, as the enterprise, during the learning phase, tends to produce at higher costs than the main competitors. Incentives and policies are thus necessary to engage them in such an effort.

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9 Embedded autonomy implies the conciliation of a certain degree of autonomy, achieved through a well prepared and meritocratic bureaucracy, and the development of links and channels of interaction with the business sectors, necessary to have access to information and to implement the policies (Evans, 1995).
Once policies are adopted and rents conceded, a key point is to guarantee that they are in fact conducting an engagement in the learning effort, and are not accommodating and/or lobbying to make the incentives permanent. In most of the previous industrial policies experiences, firms failed to succeed in the learning process. According to Khan (2013; 2015), a key reason was governments’ incapacity to build governance arrangements and establish mechanisms to compel firms to engage in the necessary effort. The result, in most cases, was low productivity, incapacity to compete and dependence on incentives and protection.\(^{10}\)

In the successful cases of South Korea and Taiwan, states were strong, bureaucracies relatively autonomous and there was little interest in protecting losers. The government was thus successful in making credible the commitment that incentives would be removed in case of failure. Business groups knew that they had to succeed. However, state-society relations were (and are) very different in most of the developing countries. In the cases of India and Latin America, for example, the policies failed to increase competitiveness in many sectors. Business groups were able to shape alliances inside the state apparatus and to guarantee the preservation of the incentives. The high costs of production were paid by consumers and taxpayers (Khan and Blankenburg, 2009).

A key point is to emphasise the rationality of the firms. Although one may argue that they are for the most part interested in succeeding and in having access to world markets, it is necessary to consider that international competition involves high risks and requires permanent effort to innovate and increase competitiveness. From a profit maximization point of view, it may be more rational to lobby for the preservation of the subsidies.

Khan’s analysis significantly adds opening the industrial policy process and providing insights into understanding why it failed in most of the cases. The author goes further and gives examples of how to create mechanisms to improve the chances of success in countries with imperfect governance. A good example is India’s agreement with the Japanese firm Suzuki in the 1980s (Khan, 2015).

Suzuki was invited to form a joint venture with national producers, and were committed to producing, in a five year period, a high quality model with a domestic

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\(^{10}\) The monitoring of the learning process is not simple, since information is internal to the firms. Nevertheless, the results may be monitored by performance targets, such as export and productivity increase. According to Khan, the main challenge is the insufficient political capacity to remove the incentives in case of an enterprise’s failure in not fulfilling the expected performance.
components content of 60%. In the case of success, the prize would be free access to the Indian market, while competitors would keep paying import tariffs of 85%. The point to emphasise is that the arrangement provided an ex-post rent, which gave the company the incentive to increase productivity and to collaborate with the Indian partners. The experiment was revealed to be very successful indeed, creating organizational and competitiveness capacities and being applied later with other companies. As a consequence, Indian automobile industry significantly advanced and was successfully inserted into international markets. The example provides interesting insights towards understanding in which conditions industrial policy may be successful (Khan, 2015).

Another important contribution comes from Hausmann, Rodrik and Sabel (2008). According to the authors, the key issue in development policy is neither to let the prices correct themselves nor to pick winners, but the successful concretization of new activities and the consequent accumulation of new sectoral capabilities. As emphasized, they show how contiguities in the productive structure tend to indicate paths of diversification. The process, nevertheless, is not straightforward. It involves a close partnership between the government and the enterprises in order to identify niches in which the firms can be successful, and the necessary inputs and the obstacles which have to be tackled. According to Rodrik, Hausamm and Sabel (2008), while in traditional industrial policy the departure point is the identification of strategic sectors, in their approach is the institutionalization of cooperation with the business sector. Cooperation should be permanent, since institutions and market co-evolve and transaction costs tend to be revealed when opportunities emerge.\(^\text{11}\)

A second requisite is to provide the industrial agency with the financial resources and instruments which enables them to respond to the opportunities and demands which tend to emerge during the consultation process. The industrial policy apparatus should have a source of financial resources not dependent on further approvals by parliament, a pre-condition to respond with agility. The incapacity to respond tends to emasculate the councils and to discourage business participation.

Another principle is that actions should be centred on increasing productivity and capabilities and not on protecting sectors with low productivity. The purpose, by centring on a single objective, is to pursue a more focused action, to provide

\(^{11}\) In the next paragraphs, I emphasise the principles and requisites which were more directly connected to the objectives of the article. For a complete approach of the authors’ arguments, see Hausmann, Rodrik and Sabel (2008).
transparency and to facilitate evaluation. Therefore, actions aimed at protecting sectors or regions in difficulties, although relevant, must be the object of other agencies and policies. It is also important to establish ex ante criteria of success, facilitating the identification of underperformed firms and providing the necessary corrections. The government should make clear, from the beginning, that the incentives are temporary (Hausmann, Rodrik and Sabel, 2008).

An important and related requisite is the capacity of permanently monitoring and evaluating the process, detecting the factors responsible for the non-achievement of the objectives. Promotion of auto discovery, as the authors stress, is uncertain and mistakes are inherent.\(^\text{12}\) Therefore, permanent evaluation, undertaken by people with different expertise and including external evaluation, is a critical part of the process. As permanent issues, it is necessary to verify if the council includes the suitable participants, if the discussions are able to identify the best projects and which are the main failures in terms of decision making (Hausmann, Rodrik and Sabel, 2008).

Permanent evaluation is also a precondition to achieve transparency and legitimacy. Industrial policy tends to be favoured when the arrangements are transparent, making clear which are the main instruments and how they are employed for the achievement of strategic social objectives. This is another important point: the objectives should be clear and presented as a matter of national interest, a precondition to giving the policy the support and time necessary to produce the expected results.\(^\text{13}\)

As Rodrik, Hausmann and Sabel (2008) conclude, the industrial policy arrangement, if well designed and having the necessary political support, can conduct a win win game. Consultation and dialogue are essential for identifying sectors and inputs and for providing the necessary measures. Clear objectives, precise functions and targets for each agency and a transparent agenda are critical for reducing the chances of rent seeking and for effectively monitoring the process.\(^\text{14}\)

Another important contribution for the “how” of industrial policy is given by Devlin and Moguillansky (2011). Their analysis is centred on summarizing the policies and the

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\(^\text{12}\) The occurrence of no mistakes may be evidence that the process is not ambitious enough.

\(^\text{13}\) The government should make clear, for example, that strengthening industrial capacity in certain sectors is necessary to increase productivity and employment. The government should be able to defend the policies and instruments in response to criticism from opposition parties.

\(^\text{14}\) Lauridsen (2010), in an analysis also very concerned with the “how” of industrial policy, reinforces and complements the points advanced by Hausmann, Rodrik and Sabel (2008). According to Lauridsen, policies should be selective, anticipatory and strongly based on benchmarking. Latecomers have the advantages of learning from successful cases and obtaining the necessary information to emulate them.
organization of the industrial policy apparatus in ten of the fifteen countries which, from 1960, were successful in closing the per capita income gap with the United States by 10 per cent points or more. Devlin and Moguillansky (2011) argue that among the 15 countries, only Hong Kong adopted a strategy close to the neoliberal precepts. Most countries adopted systematic proactive policies aimed at removing obstacles and creating comparative advantages.\(^{15}\) Promotion of specific branches and activities were part of a strategy also marked by balanced (sound) macroeconomic policies and actions aimed at strengthening secondary and higher education and advancing other horizontal industrial policies. Most of the countries adopted strategies of industrial diversification and exports upgrade and in several of them long term strategies were accompanied by multiyear plans to allocate resources.\(^{16}\)

As Devlin and Moguillansky (2011) argue, success in industrial policies requires institutionalization of embedded autonomy, including an institutional design able to organise public-private cooperation. A key part, as emphasized, is the constitution of well prepared and meritocratic bureaucratic agencies. The consolidation of an esprit de corps plays an important part in integrating the bureaucracy, achieving certain consensus and providing informal forms of coordination. A certain degree of institutionalization in state-business relations is also critical to reduce the risks of capture. When the channels of communication are informal and the mechanisms of control are weak, the risks are high, but they tend to be significantly reduced in an arrangement in which the objectives are clearly established, monitored and evaluated. A good example is Singapore, which shares a bureaucracy with a high esprit de corps, a strong culture of accountability and an independent and powerful anti-corruption agency (Devlin and Moguillansky, 2011).

Another key requisite is the organization of councils which, joining representatives of government, business, labour and civil society, act as key spaces for exchange of information and consensus achievement. The experiences show that successful councils tend to be marked by the adoption of clear and transparent rules of recruitment and by the inclusion of members who enjoy a high reputation in their respective groups. Another key component is the existence of clear mandates and the support from top

\(^{15}\) These countries include Australia, Ireland, Finland, New Zealand, Sweden, Spain, South Korea, Malaysia, Singapore and Czech Republic.

\(^{16}\) Other policies included attraction of foreign direct investment, internationalization of local enterprises and measures aimed at being integrating into international chains of value. In recent years, increasing importance has been given to innovation.
political authorities. In order to facilitate the achievement of consensus, the councils should adopt a forward looking approach, avoid current disputes and focus on negotiation and compromise. In addition, the support of experts contributes to settling a common ground on which to address the main challenges.

A very good example is the Irish National Economic and Social Council (NESC), which played an important role in the 1980s in landing the foundations for a wide social negotiation over wages, taxes, social spending and employment. Once it had tackled the macroeconomic challenges, it turned to issues related to industrial policy, competitiveness and innovation. NESC joined representatives of the relevant state departments and ministries, business, labour and civil societies and its main focus and objective was the achievement of consensus in issues related to the national strategy of development. It was considered a key agent for the successful strategy of economic development adopted from the 1990s, illustrating how a pragmatic behaviour can be conducted towards a certain consensus even in cases of conflicts of interest (Devlin and Moguillansky, 2011).

Another critical point emphasized by Devlin and Moguillansky (2011) is the capacity to achieve coordination among ministries and agencies, a very complex challenge in sophisticated strategies which involve agencies with high degree of autonomy. Coordination is essential when one considers that complementary measures are necessary for the achievement of certain objectives. In addition, coordination is very important in a political process marked by intra-bureaucratic conflicts and the overlapping of attributions. In the face of conflicting objectives, industrial policy tends to be favoured when it is an attribute of a powerful industrial agency. This is well illustrated by the developmental state paradigmatic cases, in which the presence of powerful pilot agencies was critical to the preservation of strategies which, although under attack, were later revealed to be very important.

Another component of the successful industrial strategies summarized by Devlin and Moguillansky (2011) was long term thinking aimed at forecasting tendencies and future events, an important step towards creating consensus about future possibilities. Forecasting practices tend to be more effective when undertaken in panels joining

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17 Their capacity also tends to improve when they are supported by independent agencies with technical capacity to prepare the meetings and the relevant discussions.

18 A good example was the policy of information technology in Korea in the 1970s, which faced resistance from many organs and actors which considered it very risky and with little chance of success (Lim, 2013).
experts in the industry and researchers with multi-disciplinary knowledge.\textsuperscript{19} Another critical issue is the capacity of evaluation and assessment. Devlin and Moguillansky (2011) show that although only a few of the twelve countries investigated had undertaken impact assessment, most of them had increased their concern with the forms to assess the policies. While some countries engaged in more careful analyses,\textsuperscript{20} others opted for ad-hoc evaluations, with different levels of rigor. The point is that assessment is not a trivial process and a rigorous assessment centred on empirical evidence is very difficult to undergo. An alternative is to combine methodologies, including creation of control groups, econometric exercises and contrafactual subjective evaluations. Another alternative is to collect information about the firm before and after the implementation of the policies. Notwithstanding the limitations inherent to the methodologies, evaluation is increasingly seen as a key component for the success of industrial policy (Devlin and Moguillansky, 2011).

Finally, a key factor for the success of industrial policies is the political dimension of state capacity. Political support is essential to the adoption of certain policies, especially when they have a significant transformative impact. It is also critical for the preservation of policies which require continuity. As a consequence, limited capacity to shape alliances, presence of persistent opposition and incapacity to achieve agreements tend to hinder the institutionalization of the policy on a long term basis. The necessary political capacity depends on many political and institutional factors inherent to the respective country, including the characteristics of political system, the power of different groups, the government’s capacity of leadership and the sense of urgency of the policy (Doner, Hicken and Ritchie, 2009).

A good illustration is provided by the comparison between Singapore and Thailand, countries which, after a first phase of industrialization centred on the attraction of foreign capital, attempted to adopt policies to aggregate value, diversify production and develop technological capacities. In Singapore, the government succeeded in orchestrating a set of measures to improve industrial and technological capacity. Training and high education institutions were strengthened, providing a significant

\textsuperscript{19} Finland, in particular, gives special attention to the elaboration of projects to identify future competencies in science, technology and industry.

\textsuperscript{20} A good example is Finland, where groups of independent experts and academics are joined to evaluate the programs, taking into consideration the initial targets and the results in terms of scientific impact and efficiency. Failures are considered part of the process, even in a country marked by high reputation in the management of the technology policy. In 2002, one fifth of the projects of innovation failed partially or totally (Devlin and Moguillansky, 2011).
improvement in the supply of skilful managers and engineers. A set of policies was adopted to approximate scientists from enterprises and significant advances were achieved in R&D infrastructure. This advance in education, science and technology was critical to attract foreign enterprises in high technology niches and to induce FDI to undertake more elaborate parts of the production. The government’s success was based on the capacity to shape a coalition in support of the strategy and to break private sector resistance. An effective structure of coordination provided coherence for the policies and instruments (Won, 2011).

The results were very different in Thailand. Many attempts were made to increase the autonomy and quality of the universities, improve the training apparatus, modernize and promote key industrial niches, promote industrial technical design and create technological agencies. However, the large number of veto players impeded the adoption of a consistent strategy aimed at improving training, education and innovation. The problem is related to the political system, marked by the large number of parties and by the necessity to form very broad coalitions. In the attempt to obtain political support, the government had to distribute key posts in ministries and state agencies to political allies. This negatively affected the coherence of policies, and at the same time increased the number of veto forces with the capacity to block certain policies and strategies. As a consequence, policies in general, including education, training and industrial and technological policies, were negatively affected by corruption and patronage (Doner, Hicken and Ritchie, 2009).

The Thai case is very interesting for its similarities with Brazil and Latin America. The upgrading in the economic model demanded a consistent and long term program to improve education and training and achieve an advance in competitiveness, science and technology. The effort, nevertheless, was opposed by groups which had other priorities and the governments failed to achieve the necessary support for the required measures. The capacity to effectively promote the programs required mechanisms able to tie the hands of the veto players, institutionalizing certain steps. This was, nevertheless, not an easy process; political capacity to a significant change of directions is usually beyond the capacity of most governments.

Doner, Hicken and Ritchie (2009) provide an interesting interpretation about the circumstances in which certain states obtain the necessary political support to implement a rupture with traditional strategies. A critical variable is systemic
vulnerability, a result of external threat, domestic dissatisfaction and constraints of resources. In a context of high vulnerability and uncertainty, differences tend to be reduced and social mobilization orchestrated to defeat a common challenge and promote national objectives. According to Doner, Hicken and Ritchie (2009), this was the South Korean and Taiwanese situation at the beginning of their successful development strategy. It was also the case of Singapore which, after Great Britain’s exit, faced ethnic and geopolitical disputes and significant threat to its survival. At that moment, the international threat produced unity and favoured the emergence of a strong state able to shape a national strategy of development. Thailand and Latin America, by contrast, illustrate a situation in which the crises and external threat were never serious enough to provide a “compromise” able to overcome national divergences. The resistance of veto players was a permanent obstacle which impeded consistent advances in the project of technological and industrial development.

In brief, this section summarized and highlighted many experiences and aspects which contribute to understanding the success or failure of industrial policies. I tried to base the section upon recent works and experiences, bringing policies which were adopted in the present stage of capitalism. I am aware that there are many other examples and aspects of recent industrial policies which deserve to be approached, but it would make this article too long. The relevant point is that important aspects were included, providing a broad and rich benchmark to investigate and evaluate other experiences of industrial policy. The recent Brazilian experience is investigated in the next sections.

**The Revival of Industrial Policy in Brazil – 2003 – 2007**

Industrial policy was a key part of the Brazilian strategy of development from the 1930s to the 1970s. After a serious macroeconomic crisis in the 1980s, characterized by an uncontrolled inflationary process, stabilization was finally achieved in 1994. It was, nevertheless, accompanied by a package of liberal policies which included privatization, trade and financial liberalization and measures to stimulate the flow of foreign capital. In the 1990s, segments of the Brazilian industry suffered from a macroeconomic policy characterized by high interest rates and overvalued exchange rates. In a decade of neoliberal hegemony, industrial policy had a very limited role.
In the second Cardoso government (1998-2002), segments inside the government opposed neoliberal policies and demonstrated increasing concern with the challenges faced by industry. The period was marked by the creation of a specific fund to stimulate industrial innovation, an important landmark. Nevertheless, the developmentalist ministers were defeated by the powerful Finance Ministry, who were very sceptical in regard to selective industrial policies (De Toni, 2013). Competitiveness was believed to be achieved through competition and market forces.

The victory of the opposition in the 2002 election marked the shaping of a different project of development. The elected president, Lula da Silva, had built his career as a trade union leader and had a commitment to revive Brazilian industry. He was supported by a group of industrialists who, frustrated with liberal policies, had departed from the main business associations and demanded an active state role for the recovery of the national industry.

Lula’s team included economists and technicians who considered that an essential step was to recover the state’s capacity for intervention. They also recognized that industrial policy had to be shaped through a close interaction with the private sector (De Tony, 2013). A key role was played by high level technicians and economists employed in the Institute of Applied Economic Research (IPEA) and in São Paulo University (USP), who had personal relationships with eminent members of the government team. An important step was the settlement of the Chamber of Economic Policy (Câmara de Política Econômica - CPE), joining ministers and top directors of economic agencies and having the objective of defining key directions of the economic program (Mirra and Salerno, 2015).

The debates in CPE and in the National Council of Economic and Social Development (CNDES) were very important for the definition of the main lines of the Industrial, Technological and Foreign Trade Policy (Política Industrial, Tecnológica e de Comércio Exterior - PITCE), adopted in 2004. PITCE had three main lines. The first was the promotion of horizontal measures, including the improvement of the institutional environment and the stimulus to innovation, exports and small and medium enterprises. The second was the promotion of strategic sectors: capital goods, information technology, semiconductors and pharmaceuticals. The third was the

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21 Important debates took place also in the Council for Economic and Social Development (CDES), a top council created by Lula to provide interaction between the government and civil society.
promotion of “sectors of future”, including biomass, biotechnology, nanotechnology and renewable sources of energy (De Toni, 2013).

The group behind industrial policy saw the necessity of an agency to increase the capacity to formulate and coordinate industrial policy. Coordination of industrial policy had been a critical difficulty in Brazilian previous industrialization, marked by frequent conflict of attributions and divisions inside the state (Guimarães, 2003). Previous experiences of government-business councils and sectoral coordination had been marked, with few exceptions, by low effectiveness. In addition, it was considered that the Brazilian state lacked technical capacity to formulate an integrated program of industrial development. This was the rationality behind the creation of the Brazilian Agency for Industrial Development (Agência Brasileira de Desenvolvimento Industrial - ABDI), which aimed to provide technical expertise to formulate an integrated plan for industrial development. In addition, the group intended to attribute to ABDI two other important roles: the main channel of interaction with business sector and a high level chamber to achieve inter-ministerial coordination (Mirra and Salerno, 2015; De Tony, 2013).

ABDI was created in 2004 with legal private status and operational autonomy. Its funding was provided by a specific social contribution tax, guaranteeing financial autonomy. Its directors were appointed by the President of the Republic for a mandate of four years and its staff were recruited by meritocratic exams. However, the objective of creating a powerful agency to deal with the imperatives of industrial policy was blocked by one of the powerful Ministers, who argued that the role of industrial policy formulation and implementation should be played by the government and not by a specific agency (De Toni, 2013). This veto was neither a surprise nor something new in Brazilian history, given the politicians’ resistance to losing control of important measures and instruments.

As a consequence, ABDI was created with much less power than had been previously intended. It attained high technical capacity and became essentially an organ of analyses specialized in industrial issues, contributing to the fulfilment of technical deficiencies in the Ministry of Industry, Commerce and Development (Ministério da Indústria, Comércio e Indústria - MDIC). However, it did not obtain the instruments and

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22 Agencies such as BNDES and FINEP had capacity to develop sectoral analyses, but lacked an integrated approach (Mirra and Salerno, 2015).
the capacity to implement and coordinate industrial policy. This result had very significant implications for the following evolution of industrial policy. Although the government managed to create a powerful inter-ministerial council, it failed to institutionalize the process. As a consequence, the attempts at achieving coordination were undertaken in a very precarious way, in a process marked by the overlapping of attributions and dependence on personal networks, which was an unstable base upon which to build a successful industrial policy.

The obstacles were temporarily compensated by the creation of the National Council of Industrial Policy (CNDI), which played a decisive role in the approval of relevant industrial policy measures. CNDI was composed by the main ministers related to the economic area, the president of BNDES, ten business representatives and two labour union leaders. It was headed by the Minister of Development, Industry and Trade, Luis Furlan, who played a critical role for its success. Furlan, himself a business man, had very good relationships with the business class, which favoured the selection of the business representatives and their disposition to participate. Furlan also revealed a very skilful articulator. When he left the government, in 2007, CNDI lost effectiveness (De Toni, 2013).

Other factors contributed to CNDI success. Firstly, it was very well organized and had an annual schedule of meetings, prepared many months in advance. Each meeting lasted two hours and was centred on up to three topics, in order to keep the focus and permit the adequate treatment of each issue. After a presentation of the topic, each member could participate and make comments for 2 minutes. Furlan’s role in the coordination of the debate was essential. Another key feature was the support received from the president of republic. The meetings took place in the saloon at the presidential palace and the president used to show up to greet the participants (De Toni, 2013).

CNDI revealed a very effective space for strategic debate and search for coordinated solutions. It permitted the approximation between the Finance minister and those ministers related to development, industry and science and technology, addressing critical issues for the success of the policy. Secondly, the council, by joining the relevant actors, provided agility for the adoption of the necessary measures. Thirdly, it provided the dialogue between government and top productive sector representatives. In brief, CNDI provided a space to achieve agreements which would be very difficult by

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23 ABDI worked as CNDI executive secretariat.
other means. As De Toni (2013) points out, it worked as an office of ideas responsible for important projects for the development of Brazilian industry.\(^\text{24}\)

From 2003 to 2007, CNDI approved relevant measures. The presence of the Finance Minister was essential for the approval of reduction in tax on strategic sectors, including a special tax regime for capital goods. Important sectoral programs were created, including the National Program for the Industry of Oil and Natural Gas and a program for pharmaceutical industry. CNDI also approved the creation of a state enterprise in biotechnology and of a law for the information technology sector. The Intellectual Property Institute and the Brazilian Agency of Exports Promotion were also reformed.\(^\text{25}\)

A critical measure approved by CNDI was the Innovation Law, in 2004. The council debated the subject three times and achieved the conclusion that the problem was not a lack of resources, but inadequate regulation and lack of instruments. Brazil suffered from a strong dissociation between science and technology and scientists and researchers had very little incentive to cooperate with enterprises. In addition, legislation tended to hinder the destination of public resources to specific sectors.

The Innovation Law approved changes in regulations which permitted the discrimination of strategic sectors to receive public resources and obtain other incentives. Measures were also adopted to approximate scientists and researchers from enterprises. Temporary leaving and additional payment were allowed to researchers employed in public institutions in order to collaborate with other institutions and enterprises (De Toni, 2013). By doing this, Innovation Law contributed to changing the culture of the universities and increasing the disposition to cooperate with the business sector. It also reduced bureaucracy in the concession of resources and facilitated the sharing of R&D infrastructure. In brief, as Almeida and Schneider (2012) conclude, the three key contributions of innovation Law was to stimulate corporate innovation, approximate science and technology and produce an environment favourable for partnership among universities, technical institutes and companies.

Innovation Law was followed by the Good Law (Lei do Bem), which significantly facilitated the concession of incentives to enterprises engaged in the innovation effort. Before the Law, the enterprises had to submit a project and participate in an application.

\(^{24}\) According to members interviewed by De Toni (2013), CNDI meetings were very open and “the cards were put on the table”. Business representatives attested its relevance and affirmed the feeling that they were contributing to building a national project.

\(^{25}\) For a detailed row of the measures approved in CNDI, see De Toni (2013).
process which was bureaucratic and time consuming. As a result of the Good Law, the enterprises simply declared how much they spent and automatically deduced it from the due tax.

PITCE played an important role by bringing industrial policy back to the agenda. The creation of ABDI improved expertise and technical capacity and CNDI provided a rare experience of successful inter-ministerial coordination and cooperation with the private sector. PITCE was also marked by the expansion of support to sectoral programs. The National Bank of Economic and Social Development (BNDES) disbursed a high amount of resources to capital goods sector and created funds to support the pharmaceutical and software industry. There was also an increase in resources to fund innovation, with the increase of Financial Agency for Studies and Projects (Financiadora de Estudos e Projetos – FINEP) budget and the creation of BNDES special lines of credit (Massi, 2014).

Nevertheless, PITCE also faced significant limits. A very significant one was the difficulties made by the macroeconomic policy which, leading to an overvalued exchange rate, had very negative impact on industry (Suzigan and Furtado, 2006). A second one is related to the weakness of ABDI and the difficulties in providing a more incisive and coordinated action. The third one was the limited scope of the sectors supported, which explains the weak impact on industrial development (Coutinho, Ferraz, Nassif e Oliva, 2012). In fact, the main advances took place in the policies of innovation, which is explained by the powerful position occupied by the Finance Ministry and by the resistance of top neoclassical economists against selective industrial policies (De Toni, 2013). Another limit was the low articulation with other government programs. Finally, PITCE suffered from the lack of targets and performance criteria, a common feature in the following industrial programs.

**Productive Development Program – (Programa de Desenvolvimento Produtivo)**

In 2008, the government adopted the Productive Development Program (PDP), which represented a substantial increase in magnitude when compared with PITCE. At the moment of PDP formulation, the economy was growing at high rates and the government saw the opportunity to adopt a very ambitious program to push industrial activity (Coutinho, Ferraz, Nassif and Oliva, 2012). PDP involved many sectors and resources and demonstrated a high degree of pragmatism, centring on measures of
immediate implementation. This is explained by the relationships with the business class and by the necessity to increase political support (Almeida and Schneider, 2012).

PDP contemplated a set of horizontal objectives which included innovation, infrastructure, export promotion, support to small and medium enterprises and advance of integration with Latin America and Africa. In addition, it had three axes centred on the development of specific sectors. The first one was centred on strengthening the sectors in which Brazil had a comparative advantage, including oil, gas, petrochemical, aeronautic, pulp and paper, mining, bioethanol, animal protein and steel. The second axis was centred on building capacity in sectors intensive in technology and with high potential, including segments of the health sector, telecommunications, nuclear energy, defence, biotechnology and nanotechnology. A third set of measures was targeted on sectors which faced problems of competitiveness and threat from international competition. This axis joined the largest number of sectors, including textiles, automobiles, shipbuilding, capital goods, textile and apparel, timber, furniture, cosmetics, housing, services, shipbuilding, leather and footwear, agro-business, biodiesel, plastics, wheat, consumer electronics and toys (Guerreiro, 2012; Coutinho, Ferraz, Nassif and Oliva, 2012).

The main instrument was BNDES’s loans, which were significantly increased as a result of the government’s decision to transfer resources from the Treasury. From 2006 to 2010, BNDES disbursement grew from R$ 51 billion to R$ 168 billion (approximately US$ 101 billion at December 2010 - Massi, 2014). As a response to the crisis, the Program of Investment Sustaining (PSI) was created to provide credit in favourable conditions for investment projects. Other instruments included fast depreciation of capital, tax exemption and subventions, stimulus to innovation, purchases from the government and technical support, including certification, metrology, business capacititation and training (Guerreiro, 2012; Coutinho, Ferraz, Nassif and Oliva, 2012).

A strong emphasis was given to government purchase policies and on exigencies of national content. They were employed mainly in the oil and gas sector where the

26 There were specific objectives for each sector. In beef processing and bioethanol, for example, emphasis was given to the expansion of sales to foreign markets. In steel, mining and pulp and paper, the aim was to aggregate value and increase innovation. In oil and aeronautic, the target was to put Brazil in a position of technological leadership, strengthening technological capacity, the national suppliers and the quality of labor force (Guerreiro, 2012).

27 The instruments involved incentives but no sticks. According to the policymakers, the main stick came from international competition and from the challenges put forward by the international crisis.
national state enterprise, Petrobrás, directed a large part of its demand towards promoting the capital goods and the shipbuilding sectors. PDP intended to export this model to the health and defence sectors, but the main advances only took place in the following government.

PDP had a very articulated and complex structure of governance. A key role was played by the executive committees, composed from representatives of the relevant government organs. CNDI was responsible for the articulation between the government and the private sector and by the accompaniment of the measures. A secretary of general coordination of the Plan, subordinated to CNDI, was an attribute of MDIC. An executive secretariat, formed by ABDI, BNDES and the Finance Ministry, was responsible for monitoring the activities of the executive committees and to report them to the secretary of general coordination and to CNDI. In addition, there was a specific coordination for each axis of the Program. The coordination of systemic actions was the responsibility of the Finance Minister. ABDI was responsible for the “strategic highlights” and the Minister of Science and Technology for the coordination of strategic areas. MDIC coordinated the actions for strengthening competition and BNDES the actions aimed at consolidating leadership. Finally, the forums of competitiveness were responsible for the sectoral relationship with the private sector, while the Chief of Staff Office coordinated the relationships with other government programs (Guerreiro, 2012).

The policy makers responsible for PDP emphasised several points they considered advances in industrial policy governance. The first one was the coordinated employment of the instruments. The second was the increasing dialogue with private sector, achieved through the strengthening of the channels of interaction. The third was the introduction of sectoral targets for R&D, sales and exports. The fourth was the monitoring: an online system was developed by ABDI to follow each measure of the program. According to the policymakers, the large number of sectors of PDP was not a problem. According to them, Brazil has a diversified industrial basis and it was difficult to adopt a selective approach. They also argued that the increase in BNDES resources permitted the contemplation of every sector, while non-written priorities were adopted to prioritise sectors with high spillover effects (Coutinho, Ferraz, Nassif and Oliva, 2012).

PDP represented a significant offensive to stimulate Brazilian industry. The instruments and the significant amount of resources provided support to investments
during a very turbulent international conjuncture. PDP measures, accompanied by policies to stimulate consumption, encouraged investments in different economic sectors and softened the immediate impacts of the crisis. It is possible, nevertheless, to emphasise many PDP features which critically influenced its design and chances of success.

The first one is related to the broadness of the policy and to the decision to support a large number of sectors. Notwithstanding the official justifications, the main reason was the political difficulties to exclude sectors and the attempt to obtain political support. Despite the presence of disguised selective mechanisms, a broad policy, combined with the lack of strict evaluation, reduced its transparency and increased its vulnerability to criticisms that the government was giving money to unproductive sectors.

A second criticism is related to the precarious institutional structure and to the obstacles to coordination. Despite the complex structure of governance and the official justifications, inter-ministerial integration was rare. CNDI did not work effectively and the list of integrated programs was more a list of the government’s intentions than something real (De Toni, 2013). Similarly, public-private consultation did not work as intended. It took place during PDP elaboration but the government failed to institutionalize it. In addition, the competitive forums failed to establish a routine and were not effective; they met very rarely, had a very broad agenda and did not have the necessary support. Fourth, the excess of organs involved provoked overlapping of attributions and reduced agility. It is interesting to contrast PDP with the Program for Acceleration of Investment, PAC, an infrastructure program which was government’s top priority. The responsible minister, the Minister Chief of Staff, was in charge of articulating the instruments, coordinating actions and asking for results, independent of other agencies and ministries involved (Guerreiro, 2012).

A third and very serious limit is related to the lack of monitoring and evaluation. Although sectoral targets were adopted for exports, R&D and participation of small and medium enterprises, they were dependent on other variables and were not necessarily related to the industrial policy measures. In many cases, they said very little, since the objective was merely to support the industrial sector, without exigencies related to

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28 Lula, in the attempt to increase political support, had nominated business representatives to important posts in his government and opened many councils and channels with private sector representation (Diniz, 2011).
29 According to Mirra and Salerno (2015), PDP was basically a BNDES’ policy, which suffered from a lack of coordination among policies and instruments.
productivity or competitiveness. In addition, there were no exigencies related to sectoral change, re-organisation of production and other initiatives to increase productivity and competitiveness. In brief, the targets were more a set of intentions than a requisite to the effective monitoring of the industrial policy. In the face of the lack of evaluation, the government had little capacity to know if the policy was working (Almeida and Schneider, 2012).

A fourth difficulty is related to the scope of the policy. Although having many objectives, PDP policies gave high priority to the promotion of national champions and to the consolidation of national leadership in several sectors. According to Almeida and Schneider (2012), eight from the ten largest BNDES loans in 2008 were conceded to sectors with low to medium technology. From 2008 to 2010, loans of US$ 4.4 billion were conceded to a single enterprise in the Beef processing sector. The main criticism, according to Almeida and Schneider (2012), is that, given the lack of evaluation, the government had no idea about the policies capacity to promote technological spillover, strengthen national suppliers and advance other objectives.30

A last criticism is related to the macroeconomic impacts. The argument that BNDES had enough resources to finance all the sectors misses the important point that its operations had a clear fiscal impact. This is explained by the fact that the Treasury issued bonds at market rates, while BNDES conceded loans at subsidized rate. As a consequence, the substantial increase in BNDES loans was made through an increase in public debt. This is an important issue when one considers the necessity to conciliate industrial and macroeconomic policies, a critical challenge in Brazil’s previous (and present) process of industrialization.

PDP represented a return to an intense developmentalist program to strengthen Brazilian industrialization. However, the program had many difficulties in its design and implementation, being very distant from the industrial policy directions suggested by Hausmann, Rodrik and Sabel (2008), as emphasised in the first part of this article. It is possible to see that the policy makers were aware of certain necessities, as illustrated by the adoption of targets and other measures and by the justifications present in the official discourse. However, the measures and mechanisms were much more intentions than effective initiatives to achieve the necessary directions. Effective policies required

30 In the case of the beef processing firm, one of the consequences of intervention was the creation of a situation of monopsony in the beef sector, having negative impacts on the domestic cattle producers (Almeida, Oliveira and Schneider, 2014).
to deal with two critical points: the low institutional capacity of coordination and the capacity to impose burdens and concessions on the business class.

**The Great Brazil Plan (Plano Brasil Maior - PBM – 2011-2014)**

In 2011, the Dilma Roussef government adopted the Great Brazil Plan (PBM), a plan which shared many similarities with PDP, a result of the continuity of the economic policy and of large part of the economic team. PBM, similarly to PDP, combined a horizontal and a sectoral agenda, given significant attention to infrastructure, reduction in energy costs, increase in labour force quality and stimulus to innovation.

PBM “innovates” in two aspects. The first one was the emphasis given to protection, a response to quantitative easing and to other measures considered by the government as predatory and unfair competition. This is very well illustrated by changes in regulation of public purchase policy allowing the acquisition of domestic goods at prices up to 25% superior to international competition (Almeida and Schneider, 2012).\(^{31}\) The government also strengthened the policies adopted in the oil and gas sectors to channel public demand to national producers, a result of the discovery of substantial oil reserves offshore and of the consequent potential impacts on demand for capital goods, services and ships. The second aspect is related to the efforts of integrating public purchase in the health and defence sectors with industrial policy, an objective which had not advanced as expected during PDP.\(^{32}\) In addition, PBM tried to integrate industrial policy with two other huge government programs: PAC, in infrastructure, and the program of house construction for poor people.

BNDES loans continued to occupy the central role, given the decision to maintain and increase the transfers from the Treasury. Strong emphasis was also given on tax exemptions and special tax regimes were adopted in many sectors. The lines to support innovation were also strengthened. Another important measure was the reduction in payroll tax in several sectors, an intention to reduce labour costs. Although having a wide scope and contemplating nineteen sectors, PBM also promoted a disguised choice of sectors, prioritizing those with a high technological spillover, such as ethanol, defence, aeronautics and petrochemicals (Lemos, 2015).

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\(^{31}\) Another example was the strengthening in the capacity of the organs responsible for trade defense.

\(^{32}\) According to Lemos (2015), PBM achieved significant success in this objective.
Another critical characteristic of PBM was its compensatory nature. The government justified certain measures as a form to compensate enterprises for other problems in the economy, such as problems of infrastructure and the excess of complexity in the tax system. Given the incapacity to approve structural reforms, industrial policy was used as a form of compensating the enterprises for factors which negatively affected their competitiveness. As Schapiro (2014) points out, most of the PBM instruments were centred on measures of systemic nature, dealing with deficiencies which affected the industrial sector as a whole.

PBM promoted significant advances in the technological area. The adoption of the plan Inova Empresa, in 2013, represented an effort to stimulate basic and applied research and to develop centres of expertise in science and technology. Inova Empresa conceded R$32.9 billion (US$ 13.9 billion in December 2013) to support innovation, arising a huge demand from the private sector, an indication of the high disposition to invest in R&D. A large part of the resources was channelled to sectors intensive in knowledge and considered to be of high potential (Arbix and De Negri, 2015). An important advance took place in FINEP, subject to a process of restructuring aimed at increasing the instruments and improving its services. Internal processes were modernized to provide agility and quality in the analyses of the projects. The institution also became more insulated and increased its capacity to judge and approve projects on technical terms. In brief, the objective was to transform FINEP in a powerful technological agency, able in future to supply R$ 40 to R$ 50 billion of resources annually (Arbix and De Negri, 2015).

PBM governance had many similarities with PDP. CNDI was at the top of the hierarchy and worked as a consultative council. The Council of Management and the Executive Groups, both headed by MDIC, were subordinated to CNDI. The Executive Groups were responsible for the coordination of the Executive Committees, which had the role of formulating and implementing the nineteen sectoral programs and were supported by the Competitiveness Councils, responsible for the interaction with the private sector. Finally, there were spaces responsible for systemic forms of coordination, supporting the Executive Group in transversal objectives such as innovation, foreign trade, investment, training and qualification and regional development (Schapiro, 2014).
Likewise, both programs shared the difficulties in providing intra-government coordination. The coordination of PBM was not an attribute of a state agency, but took place in “institutional hubs” with representatives of different agencies and ministries. The result, as Schapiro (2014) emphasizes, was an empty institutional arrangement: the formal decision competences and attributions were not in the councils responsible for coordination, but in the respective organs. The representatives have fidelity to their respective organs and the measures approved were related to the organs’ necessities and possibilities, and not to industrial policies priorities. The difficulties are very well illustrated by the power held by the Finance Minister, who responded for the largest number of PBM measures. The problem is that the mandate of the Finance Ministry is not to promote industrial policy, indicating a conflict between the priorities of the Ministry and the necessities of industrial policy (Schapiro, 2014). Another problem came from the overlapping of attributions and the incapacity to identify the role of each organ and make them accountable for the measures.

Difficulties also marked public-private interaction. Public-private interface did not follow a decision making routine and lacked tools of public control. The competitiveness councils dealt with very general topics, lacked an effective agenda and failed to establish a credible relationship with the private sector. As Schapiro (2014) points out, it was not possible to identify a path going from the council meetings and decisions to the adoption of policies. As a consequence of the debility of the formal channels, informal forms of public-private interaction gained importance.

In addition, CNDI did not have a structured schedule of meetings and objectives and the competitive councils had a fragmented representation, joining different business associations, federations and enterprises. The excessive number of interlocutors hindered effective and agile decision making and impeded an encompassing business representation. Business representatives acted as distributive coalitions, bargaining for immediate and particularistic interests (Schapiro, 2014).

Another difficulty was the already mentioned broadness of the policy and the lack of conditionality. Most of the incentives were conceded in a compensatory nature, 33

As Schapiro (2014) points out, quoting one interviewer, it is impossible to do industrial policy without the Finance Minister, but it does not mean that the Finance Ministry knows how to do industrial policy. So, it is necessary to have an adequate space to debate the topics and make the decision, also having the power to implement them.

In 2012, for example, CNDI had its first meeting on 31/10/2012. The agenda was centred on presentations about economic conjuncture, the measures of PBM and previous industrial policies. There was no agenda of topics to be discussed and measures to be approved (Schapiro, 2014).
independent on performance in terms of productivity or competitiveness. The measures were ineffective in terms of promoting transformation and improving the patterns of competitiveness (Schapiro, 2014; Almeida and Schneider, 2012). A similar problem was the lack of evaluation. According to Mauro Borges Lemos, president of ABDI and Minister of Industry, Trade and Development in that period, attempts were made to introduce evaluation by the World Bank and by independent consultants, but they were blocked by influential people inside the government (Lemos, 2015). A similar attempt, made to condition the reduction in payroll tax to productivity performance, was also refused. As a result, despite the determination to support industry and the advances achieved in specific areas and programs, features such as lack of focus, excess of sectors, incapacity to specify credible targets and the lack of evaluation reduced PBM’s transparency and effectiveness and increased its vulnerability.

**Industrial Policy in Brazil – general evaluation and challenges**

“We are very good at analysing, good at proposing, terrible at implementing and a nullity when evaluating” João Carlos Ferraz – the previous vice president and current director of BNDES (In Guerreiro, 2012: 216).

From 2013 to 2014, industrial policy returned to the agenda and the government consolidated a substantial effort to support industry. The process was marked by institutional advances, such as the creation of ABDI and the positive experience of CNDI, and by significant support to many economic sectors. Besides the huge credit concession and special tax regimes, the government widely utilized the policies of public purchases to stimulate industrial sectors, mainly in the oil and gas sector but this also extended to other sectors, such as health and defence.

Advances marked the policy of innovation, with the approval of Innovation Law, the strengthening of FINEP and the significant increase in resources to fund the activity. BNDES resources for innovation increased from R$ 161 million in 2004 to R$ 5.2 billion in 2013 (Ferraz; Marques and Alves Jr, 2015) and FINEP resources increased more than 20 times since 2002. As a consequence, R&D expenditure as a share of GDP increased from 1,01% in 2003 to 1,24% in 2012, while business R&D expenditure increased from 0,49% to 0,56% of GDP (Arbix and De Negri, 2015). The number of postgraduates employed in R&D activities in the enterprises increased from 2953 in 2000 to 5632 in 2011 (Laplane, 2015). There was also advance in Brazilian
participation in the world production of scientific articles and in the number of scholarships conceded to students abroad. Although the numbers are still very small, the new policies and institutions have potential for further advances.

Arbix and De Negri (2015) highlight the advance in the quality of technological policy, which became centred on specific demands and technological opportunities and acquired a predictable budget. However, the policies are still considered insufficient, being necessary to diversify the number of instruments and offer different products. Most of the resources are applied as lines of credit, being also necessary to increase non-refundable concessions as a form to stimulate high risk investments. In addition, the recent measures reached only 1/3 of the enterprises which undertook R&D activities and few projects promoted integration between enterprises and universities. Despite the challenges, Arbix and De Negri (2015) consider that the policy is in the right direction, as illustrated by the increasing disposition to invest in R&D. According to them, Brazil has human resources, a huge industrial basis and high potential to advance in knowledge intensive sectors.

Notwithstanding the advances, industrial policy was marked by features which reduced its effectiveness and transparency and increased its vulnerability. A very serious liability, strongly emphasised, was the failure to institutionalize a proper structure of coordination. As a result, the process was marked by precarious inter-ministry coordination, overlapping of competencies, improvisation, adoption of ad-hoc instruments, failure to provide reliable channels of public-private interaction and strong dependence on personal networks. In addition, it failed to input clear competencies and responsibilities on the respective organs and presented debility in implementation. In brief, the institutional apparatus failed to be a reliable basis for an effective and transformative industrial policy.

Another difficulty stemmed from the fragmented corporatism and the vicissitudes of business representation. Industrial associations in the last decades were subjected to a deep process of transformation and modernization. A very good example is the National Confederation of Industry (Confederação Nacional da Indústria - CNI), a very broad confederation which represents innumerous business associations. However, the

35 Brazilian participation in world articles increased from 1.62% in 2002 to 2.63% in 2008; the number of scholarships in priority areas increased from 2,4 to 3,7 thousand (De Toni,2013).
36 Before the 2014 presidential election, CNI elaborated a broad and very detailed analysis about the steps necessary to modernize the Brazilian industry. Lemos (2015) emphasised CNI modernisation and its role
pattern of business-state relationships, marked by innumerous associations, by the lack of institutionalized routines and by the weakness of formal forums, has not been favourable to an encompassing process of negotiation able to achieve the necessary concessions and agreements to modernize Brazilian industry. As seen, the process has been marked by particularistic demands and individual forms of access into the state apparatus (Schapiro, 2014; Almeida and Schneider, 2012).

Another difficulty is related to the broadness and imprecision of the policy, in terms of both sectors and objectives. The policy, as seen, is not centred on clear objectives such as an increase in competitiveness or productivity. In many cases, the objective is to support sectors in difficulties and to compensate for other problems in the economy. A related criticism is that most of the measures neither correct market failures nor promote diversification, expected objectives of a modern industrial policy (Almeida and Schneider, 2012). Another problem is the lack of evaluation of the impact of the policies; in general, there is no evaluation, but only contra-factual arguments saying that in the absence of the program things would be worse (De Toni, 2013). In brief, industrial policy in Brazil is very far from the Hausmann, Rodrik and Sabel (2008) predicament that industrial policy should have clear and transparent targets, a form to increase support and legitimacy. The broadness and lack of precision increases its vulnerability and makes it an easy target for opposition politicians in search of opportunities for change.37

It is worth a brief examination of the Program of Mobilisation of the National Industry of Oil and Natural Gas (PROMIMP), one program of high magnitude which, according to Almeida, Oliveira and Schneider (2014), is one of the programs which most advanced in terms of embedded autonomy. PROMIMP, as mentioned, has the objective of conciliating the advance of the production of oil and gas with stimulus to national suppliers. It is centred on a close contact between Petrobrás and the suppliers,

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37 This is very well illustrated by the position of three eminent Brazilian economists, who tend to occupy key posts in an eventual opposition government. According to Almeida, Lisboa and Pessoa (2015: 8), “policies of sectoral industrial protection may be efficacious in specific cases, if they were accompanied by performance targets and careful monitoring of the results, being reformed in case of failure. The excessive expansion of public benefits, without adequate management and control of outcomes, results only in subsidies and in private privileges, without producing economic growth and creation of employment.”
in which the state oil state enterprise presents the estimated demand while the suppliers introduce their capacity to fulfil the orders and the main sources of difficulties. A list of capital goods and services is elaborated by the National Oil Agency (ANP) in order to provide the exigencies of local content.

However, the policy has been criticized for not having focus and priority regarding the segments and products to be promoted. The process is marked by excessive bureaucracy and many regulatory specifications are vague and imprecise, increasing uncertainty and opening possibilities for juridical contest. In addition, the domestic content targets tend to be too high and the national producers tend to overestimate their capacity of delivery. As Guimarães (2013) argues, it is necessary to define priorities and to focus on products and systems which Brazil has productive capacity and technology to produce at competitive standards. The departure point should be the identification of the potential niches, consulting available studies which forecast the demand to be generated and the potential transformation in the respective niches. A key difficulty, nevertheless, is how to exclude the segments which cannot produce with enough quality and efficiency.

Another important direction would be the adoption of a specific policy for foreign capital. Multinational companies have played a key role in the Brazilian industrialization since the 1950s; its significant role in the economy is a feature which distinguishes the Latin American model of capitalism from other models (Schneider, 2013). During the 1990s, changes in legislation concerning the concept of national enterprise provided a very favorable condition to transnational corporations, which significantly increased their participation in the economy. Denationalisation took place in sectors such as textile, machinery and equipment, auto-parts and electronics (Diniz, 2011).

Instruments of the industrial policy, such as BNDES loans, discriminate foreign capital and give priority to domestic enterprises. However, other policies, such as incentives to innovation, make no distinction. An important direction would be to adopt a specific policy for foreign capital, intending to promote deeper integration into the national economy and to develop domestically more elaborated activities, such as industrial

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38 The objective is to increase domestic participation in as many components as possible.
39 According to Almeida and Schneider (2012), 71% of the resources of the Good Law in 2005 were absorbed by three sectors. One of them was controlled by MNCs and the other two had participation of foreign enterprises.
design. In brief, besides a strategy of strengthening the domestic national capital, it is necessary a pragmatic policy aiming at increasing the impact of foreign capital in the economy.

A key challenge for the continuity of industrial policy is its conciliation with macroeconomic stability. This was a critical issue during import substitution industrialization, in which macroeconomic unbalances negatively interfered in the pursuit of the industrial objectives. Despite stabilization in 1994, the conciliation between macroeconomic and developmental objectives is still a big challenge. Inflation is much higher in Brazil than in developed countries, above 6% during the last years and close to 10% in 2014 (despite the deflationary numbers around the world). In addition, Brazil has one of the highest interest rates in the world. During the whole year of 2015, fiscal unbalance and the uncertain stage of the economy caused severe damage, negatively affecting the government programs and the industry’s performance.

The conflict between developmentalist and neoliberal economists, still very present, reveals the excessive role played by ideology in the recent economic debate. During the 1990s, radical neoliberal policies had a harmful impact on segments of industry. In recent years, on the other hand, the insufficient attention given to the fiscal issue and to macroeconomic imbalances had intensely contributed to the current economic difficulties (Almeida, Lisboa e Pessoa, 2015). For many developmentalist economists and politicians, macroeconomic stability is associated with neoliberal policies. They missed the point that sound monetary policies were and are important component both of developmental states experiences and of encompassing welfare states regimes. The point is not only that macroeconomic imbalances tend to have negative impact on investment and on government policies. They tend to discredit government, strengthen opposition and, in face of the mentioned vulnerabilities, threaten the continuity of industrial policy.

Brazil faces in 2015 a very serious political and economic crisis which, after two decades of relative political stability, puts the institutions and the normal working of political and economic systems at risk. The crisis, although very related to a huge scandal of corruption in the state enterprise Petrobrás, is also related to structural characteristics of the political system. They include the pattern of relationship between executive and legislative and the government’s necessity to form broad coalitions in order to govern, which is achieved through distribution of key posts in ministries and in
state enterprises to political allies. Another ingredient came from the electoral process, which has tended to be marked by huge programs of marketing without a necessary relation with what parties intend to do (or can do) when in office.

The impasse illuminates important issues regarding industrial policy. It not only implies impasse in the economy and a shortage of resources to maintain government programs. It reveals a situation of political polarization and instability which is very negative to the achievement of the degree of consensus necessary for the preservation and advance of a sustainable industrial policy.

Brazil has suffered from a precocious process of deindustrialisation. The share of industry in GDP has reduced before achieving industrial density and the capacity to insert itself into international productive chains (De Toni, 2014; Palma, 2011). Brazilian industry, after decades of macroeconomic crisis and neoliberal experience, lost momentum and capacity to insert itself successfully into strategic sectors, such as microelectronics and electronic consumption goods. Productivity has been stagnated since the 1980s. The domestic challenges are substantial, including many infrastructure problems and regulatory aspects related to the Brazilian cost. The tackle of these challenges requires a substantial effort, marked by the utilization of the right instruments and by high capacity of coordination. It has more chances to succeed if pursued through a clear and transparent industrial policy, determining targets, making clear what the policy intends to accomplish and providing monitoring and accompaniment. In this case, it strengthens legitimacy and the chances of obtaining a mandate to reverse deindustrialization. A clear and transparent industrial policy also facilitates the generation of inter-party agreements which may be critical for the maintenance and improvement of the policy.

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