

Industrial policy as an effective development tool: Lessons from Brazil*

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10.1 Industrial policy is back in the game

The literature on industrial policies is, to say the least, very passionate: pro and con arguments are usually constructed based on proponents' visions on the roles that the State and the market should play in economic development. The empirical evidence does not help much; it is not conclusive, leaving room for opposite interpretations – industrial policies are functional, or they are harmful to development.

In the context of the international financial crisis, however, policy-makers, academics and opinion leaders are becoming more receptive to policies that, until very recently, were shunned. Industrial policy is gaining priority on the public policy agenda, even if under such guises as innovation, green economy, local development, etc. However, behind most of these policy directions, two elements are always present: promotion of the competitiveness of firms and/or the defence of jobs in national economies.

In this revival of interest in industrial policy, despite the multiple dimensions of the theoretical or policy debate, a broad consensus underpins most justifications and initiatives: innovation-based competitiveness is a determining factor of economic development. That is, development is related to the economic transformation of a country, and economic transformation, in turn, comes out of technological change and from the knowledge content of economic activities, which is necessary to induce as well as to sustain productivity gains (Krugman, 1990; Lin and Monga, 2010; Mazzucato, 2013).

* This article is dedicated to Alice Amsden. She left us too early.

But how is such a machine of growth put into motion? Do Schumpeterian entrepreneurs and market forces suffice? History offers rare cases of countries managing to overcome economic lethargy in the absence of an active State (Gerschenkron, 1962). For the most part, however, as Chang argues:

...developed countries did not get where they are now through the policies and the institutions that they recommend to developing countries today. Most of them actively used “bad” trade and industrial policies, such as infant industry protection and export subsidies (Chang, 2003, p. 2).

In fact, Amsden (2001, p. 185) argues, “[a]s a catch-up strategy, free trade appears to have been limited to Switzerland and Hong Kong”. Evans (2010, p. 37) is even sharper: “History and development theory support the proposition ‘no developmental state, no development’.”

Drawing on the Brazilian experience, this chapter develops a threefold set of arguments: firstly, industrial policies must be put into use to induce economic development; secondly, policy effectiveness depends on the State’s capabilities to support the evolution of the competences of firms; thirdly, a development bank capable of effectively providing long-term financing is a strategic asset of industrial policies.

The next section discusses some of the challenges that any industrial policy faces. Section 10.3 is an account of the recent Brazilian experience. Section 10.4 focuses on long-term financing and the role played by the Brazilian Development Bank (BNDES). The final section summarizes conclusions.

10.2 Persistent challenges of an industrial policy

10.2.1 *Desires versus possibilities*

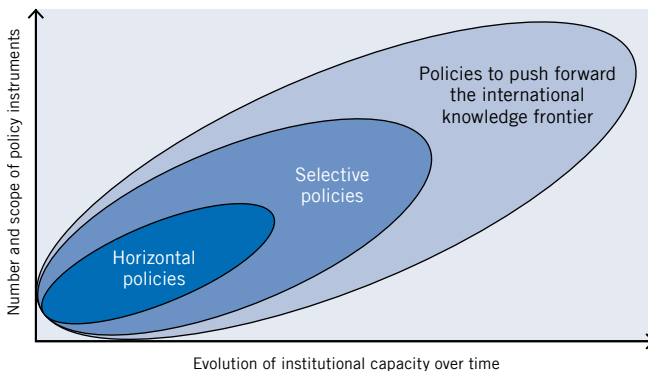
In any policy action, feasible goals based in a deep sense of reality are a necessity. These goals must consider simultaneously the level of development of two related dimensions: institutional capabilities and economic activities. The level of institutional capability – that is, the ability of (mostly) public institutions to deliver a proposed set of actions at a specific time – defines the potential scope of an effective industrial policy. Concurrently, the level of development of economic activities defines the potential capacity of the economic system to advance further.

Evolution of institutional capabilities and economic activities must be embedded in policy design, and policy goals must aim at a feasible transformation process. To a great extent, existing production capabilities at any given time in any country and sector define the possibilities for evolution and transformation. Leap-frogging is possible within the limitations imposed by the existing and potential competences to be explored. In other words, in an effective industrial policy, the boundaries of possibilities must constrain desires.

In this context, Peres and Primi (2009) discuss institutional capacity in relation to three types of policies: horizontal, selective (sectoral) and international competitive frontier, each characterized by different sets of instruments, targeting and institutional arrangements (see figure 10.1). Countries with only the most basic institutional capabilities may be capable of carrying out just simple horizontal policies such as tax deductions. As institutional capacities increase, they may engage in the promotion of selective policies. Eventually, as a set of economic activities of a country is near the international frontier, strong institutional capacities may be required to induce local firms and research institutions to push ahead the international frontier. Such a stylized matching of levels of state capabilities with generic types of industrial policies can make sense only if policies are effective.

In short, industrial policy design must take an evolutionary perspective of goals and ambitions. An industrial policy for economic transformation should be able to discern and act upon the different competitive challenges of various economic sectors, aiming at further progress as defined by the international competitive frontier. At the same time, the level of development of institutional capabilities delineates limitations on policy ambitions. These limitations must not be

Figure 10.1 Industrial policy framework:
Objectives and institutional capacity



Source: Peres and Primi (2009).

taken as absolute and impassable restrictions; that would lead only to limited and defensive industrial policies or none at all. Rather, such limitations must be considered a starting point for designing and implementing industrial policies, with the vision to incorporate, in time, more ambitious goals as countries manage to climb to more advanced levels of capabilities. Along similar lines and focusing on potential transformation, Hausmann and Rodrik (2003) argue that, in order to promote structural change and economic development in the long term, it is necessary to give priority to investments in activities of greater knowledge density, but appropriate to existing levels of capabilities. This proposition finds support in the framework developed by Hidalgo and Hausmann (2009), in which they show that “the level of complexity of a country’s economy predicts the types of products that countries will be able to develop in the future”.

On a different level of discussion, should one type of policy or another be favoured? We argue that, in a context of open economies and a world in crisis, it is a strategic requirement to pursue public policies that make effective and efficient use of all available tools – horizontal, selective and other policy instruments – to induce industrial transformation. Various tools can be devised to help identify what activities might be fostered. Hausmann, Rodrik and Velasco (2008) propose the Growth Diagnostics Framework, an approach based on a decision tree methodology that identifies the most important constraints on growth for a given country and suggests how to isolate them and make them the focus of policy actions. Lin and Monga (2010) offer a model, largely of a macroeconomic nature, as the authors themselves point out, that proposes a step-by-step guide for policy-making based on a country’s productive experience and potential capabilities in producing tradable goods and services.

10.2.2 Capture versus cooperation

Interaction and cooperation between state institutions and economic organizations are required if feasible objectives that find resonance in the real economy are to be put forward. The very notion that industrial policy can be “practised” without such cooperation and interaction is, to say the least, very undemocratic.

Coordination, however, is necessary to avoid capture. One of the most cogent criticisms made of industrial policies is the private sector’s potential to “capture” the State. The easy way out – drawing from East Asian experiences – would be to defend the existence of an insulated bureaucracy in the State, disconnected from political pressures. However, the notion of “insulation” is not applicable to democratic and open societies in the twenty-first century. In this vein, Evans (1995),

Stiglitz (1998) and Devlin and Moguillansky (2009) have emphasized that partnership and public–private alliances – that is, consultation and coordination between public and private institutions, focusing on concrete objectives – are necessary to avoid capture and to put policies on an effective course. At the same time, however, it would be naive to believe that the business sector and workers will not try to defend and lobby for their own interests. How can such a crucial dilemma be handled?

Three requirements may help to mitigate the risk of capture, to help keep the state autonomous, and to maintain relatively stable industrial policies. (State autonomy here is defined as the capacity of a democratically elected administration to pursue the goals and priorities that were sanctioned by its election). First, in each and every stage of a policy process – from diagnosis through design, implementation and assessment – the role of public and private agents must be made explicit, with formal rules that segregate public and private responsibilities and functions. Second, every policy action must state the expected benefits and the obligations of all involved, making clear the implications for each stakeholder and what will be the counterparts to be provided by the beneficiaries of policies. Third, mechanisms of oversight and monitoring should be in place in order to improve transparency and accountability of public actions.

10.2.3 Can industrial policy be effective?

In the academic and public debate over industrial policy, not much is discussed about a central dimension: the determinants and the challenges of policy implementation. The literature consistently underestimates how much the success of an industrial policy depends on implementation rather than on the policy concept.

According to Coutinho et al. (2012), the arsenal of any industrial policy comprises six policy instruments: financing, tax, trade-related measures, public procurement, technical and informational assistance, and regulation. Financing conditions – interest rates, loan duration, the availability of equity and venture capital funds, etc. – determine the cost of capital. The structure of a tax system defines incentives for firms to run a business. Trade-related measures – tariffs and non-tariff measures – define conditions for more or less competition in world trade. Procurement by public authorities may or may not induce the development of local competencies. Technical support may provide information that enables firms to define a business plan in a given direction. Regulations on competition, consumer protection, environment and intellectual property define the rules of the game on a given playing field. Each policy instrument per se or in a package can be

a powerful tool to induce competitiveness, or they can lead to capture, generating undesirable rents for a group of agents to the detriment of a wider constituency.

The usual debate on industrial policy has been, in fact, concentrated on dilemmas of this sort: Which instruments are relevant, and how can the State be more effective? From a pragmatic perspective, it seems unnecessary to circumscribe, a priori, the arsenal of an industrial policy to a limited set of instruments if all or some of them can be means to attaining a policy goal. But, to define which are relevant, it is necessary to bring to bear an analytical perspective drawn from the literature on competition and industrial organization.

Coutinho and Ferraz (1994) and Ferraz, Kupfer and Haguenaer (1996) have demonstrated that the aforementioned set of policy instruments may be more or less relevant depending on the nature of a given economic activity and on the level of development of the firms in specific sectors. For example, patents are crucial in the pharmaceutical industry but less relevant for mining. Environmental regulations are crucial to mining but less so for software development. The argument here is that the essential features of competition and the profile of the industrial organization of an economic activity define, to a great extent, which policy instruments are relevant to induce the development of firms.

Still, even if it is possible to determine theoretically which policy instruments are relevant, if industrial policies should aim at the evolution of productive structures towards higher productivity and knowledge content, then an effective policy framework must, first, design objectives starting with the assets that a given set of firms possesses at a given time. Second, there must be close correspondence between policy objectives and institutional capabilities. Development arises not only from the evolution of the capabilities of firms to innovate, but also from the evolution of the capabilities of policy institutions. From this perspective, policy effectiveness is determined partly by the extent to which policy objectives are, at a given time, within the reach of existing capabilities in policy-making (and implementation). At the same time, policy should incorporate the means to tackle existing shortcomings in policy institutions and advance towards more ambitious goals.

Stiglitz (1998) proposes a “policy prescription” for policy-makers: (i) recognize that “development” presupposes feasible and attainable targets; (ii) make explicit the existing restrictions related to available resources and capabilities for policy-making – or policy implementing; (iii) design policies within the bounds of initial constraints, but establish high-priority targets to gradually overcome institutional bottlenecks; (iv) even if existing limitations must be accepted, institutional shortcomings must not justify the lack of initiatives aimed at building the capabilities required for more complex policy objectives.

10.3 Flexible continuity: An account of the recent Brazilian experience

A development framework has emerged in Brazil since 2004 and is still undergoing consolidation. It is marked by four major features: (i) maintenance and consolidation of a democratic process, with anchor institutions that ensure the respect of contracts and transparency in public dealings; (ii) macroeconomic stability, made up of three components: inflation targeting, flexible exchange rates and fiscal responsibility; (iii) economic and social inclusion, leading to the consolidation of a national mass consumption market; (iv) inducement to invest, especially in areas, such as infrastructure and education, that will systematically increase competitiveness and welfare. In Brazil industrial policy is part of such a development framework.

10.3.1 The period 2004–10

Since 2004 a series of three different industrial policies have been put in place (see table 10.1):

- PITCE – *Política Industrial, Tecnológica e de Comércio Exterior* (2004–07), when the institutional basis was reformed and modernized;
- PDP – *Política de Desenvolvimento Produtivo* (2008–10), aimed at fostering investment (which was quite functional in the face of the international financial crisis; and
- PBM – *Plano Brasil Maior* (2011–14), focused on the aggregation of value through innovation.

Given that the political configuration of two Lula administrations and the 2011–14 Dilma administration is the same, an important question is: Why so many changes? A prompt answer: These three sets of policies were responses to different economic challenges that marked the periods when they were launched.

The PITCE (2004–07) was the initial attempt to bring industry back to the priority policy agenda after many years of absence. It was designed to deal with Brazil's longstanding weaknesses, focusing on activities (innovation) and sectors (capital goods, electronics, pharmaceutical, software) that should be strengthened. Its main contribution was to set up a new institutional framework, including legislation to induce innovation; a high-level tripartite forum to promote consensus on industrial strategies and priorities; and the creation of facilitating agencies to promote industrial development and exports.

Table 10.1 Industrial policies in Brazil, 2004–14

Policy	PITCE (2004–07)	PDP (2008–10)	PBM (2011–14)
Economic conditions	<ul style="list-style-type: none"> – Slow GDP growth (average 1.7% 2001–03) – External account restrictions 	<ul style="list-style-type: none"> – High GDP growth (average 5.1% 2006–08) – Improvements in terms of trade 	<ul style="list-style-type: none"> – Moderate GDP growth (average 3.3% in 2009–11) – Raising industrial imports
Focus, goals and institutional framework	<ul style="list-style-type: none"> – Selected sectors – Creation of an institutional support system 	<ul style="list-style-type: none"> – Large number of sectors – Focus on investment and the management of the international crisis 	<ul style="list-style-type: none"> – Large number of sectors – Defence of the internal market and fostering systemic competitiveness

Source: Authors’ elaboration, based on Kupfer, Ferraz and Marques (2013).

The PDP (2008–10) was put in place in a context of economic growth and an abundance of foreign currency afforded by improvement in terms of trade. The policy focused on fostering investment and sustaining the growth cycle. The policy maintained focus on the sectors promoted through the PITCE, but a wider range of sectors could benefit.¹ Investment in all those sectors was the main focus of the PDP. The institutional set-up was then very instrumental in mobilizing action once the international crisis came.

The PBM (2011–14) phase is marked by the continuation of the international crisis and fierce competition from imports. Emphasis has been placed on the local aggregation of value added, with actions designed to promote the competitive position of local firms and to improve the systemic conditions for competitiveness.

Kupfer, Ferraz and Marques (2013) explain the main features of these policy experiments. For the purpose of this discussion, three attributes are important. First, continuity with flexibility: innovation and competitiveness have been priorities in all three iterations of Brazilian policies. Nevertheless, policy emphasis and organization have been modified to take up unexpected challenges, especially those arriving from the international front. Second, concern and efforts to define explicit goals, to mobilize the relevant policy instruments and to interact with the business sector and workers have increased. Third, industrial policies became increasingly meshed with other development policies such as science and technology, education, environment and infrastructure. They share common goals and implement policy instruments in a concerted manner. This is the case, for

¹ Coutinho et al. (2012) and Ministry of Development (2008) explain the focus and sectoral organization of PDP.

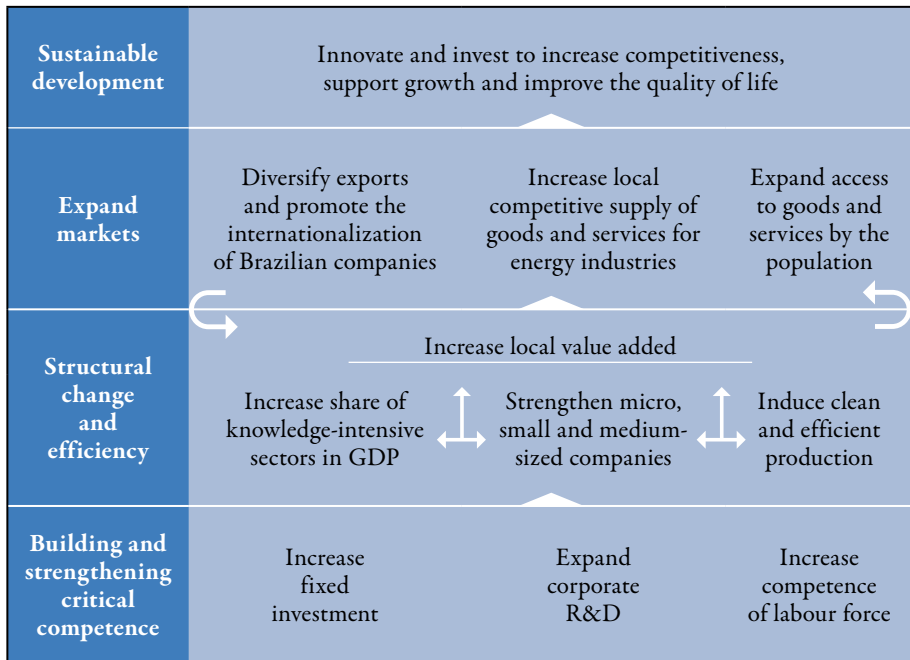
example, with financial instruments to foster low carbon emissions; the design and implementation of innovation programs to support selected policy goals such as second-generation ethanol and the fostering of a local supply industry to serve infrastructure projects.

10.3.2 The current industrial policy: *Plano Brasil Maior (2011–14)*

PBM has ten strategic objectives, which are divided into three dimensions (competences, structural change and efficiency, and market expansion) that contribute to the overall target of sustainable development (figure 10.2) (Ministry of Development, 2011).

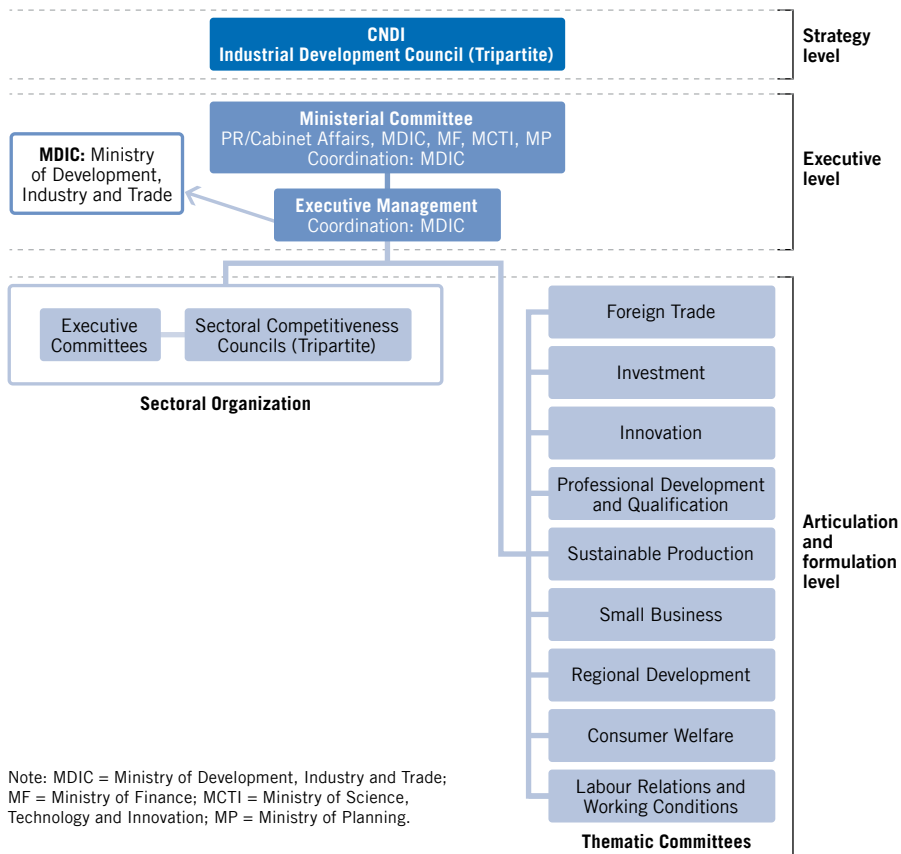
These three dimensions are conceptually linked. The first dimension, *competences*, encompasses objectives related to capacity building. Increased fixed investment, as well as corporate research and development (R&D) and workers' skills, are essential components of competitive competences. Strengthening

Figure 10.2 PBM strategic map



Source: Ministry of Development (2011). Available at: <http://www.brasilmaior.mdic.gov.br/>

Figure 10.3 PBM configuration



Source: Ministry of Development (2011). Available at: <http://www.brasilmaior.mdic.gov.br>

critical competences leads to the second dimension, *structural change and efficiency*, which includes increasing value added, developing knowledge-intensive sectors, strengthening small and medium-sized companies, and supporting clean production. Higher competitiveness should then lead to a concomitant *market expansion* – both domestic expansion, by increasing access to quality goods for the local population, and export diversification and internationalization of firms. The PBM gives special emphasis to energy-related industries. These three dimensions, with their strategic objectives, lead to the ultimate goal of the PBM: “Innovate and invest to increase competitiveness, support growth and improve the quality of life.” The PBM strategic map is used to guide the work programme of state agencies and to organize the debate among stakeholders to develop consensus on priorities.

Interaction among government agencies, the private sector and other stakeholders is essential for the effectiveness of PBM and is reflected in its configuration (figure 10.3). Representatives of the President's Chief of Cabinet, Ministry of Finance, Ministry of Science and Technology, Ministry of Planning and, of course, Ministry of Development, Industry and Trade form PBM's Executive Committee. They are in charge of ensuring the execution of policy directives defined by PBM and confirmed by the National Council for Industrial Development (CNDI). Responsibility for interaction with the business sector and workers is placed in the CNDI, PBM's highest advisory level, and in the 19 Sectoral Competitiveness Councils.²

10.3.3 Quantifying policy implementation

The *Política de Desenvolvimento Produtivo* (PDP), 2008–10, proposed 425 policy measures under its framework. Practically all of them (420) were made fully operational. Only 31 measures were announced when the policy was launched. The other 389 were developed and implemented after launch, up through the end of 2010. To a great extent, PDP's effectiveness can be explained, first, by the political priority given by the Lula Administration to the industrial policy; second, by the commitment to it by relevant ministries, in particular the Ministries of Trade and Industry, Science and Technology and Finance; and, third, by the management system put in place to ensure the implementation of the proposed measures. An online information system, developed by the Brazilian Agency for Industrial Development (ABDI), reported the progress of each measure proposed under PDP.

The current policy, *Plano Brasil Maior* (PBM), was launched with 36 policy measures; 28 are fully operational. By April 2013 another 263 measures had been announced and included in the PBM working plan. Implementation is facilitated by the commitment of public institutions to the policy goals. These alignments can come about when the relevant agencies are part of the policy organization and concur on the diagnoses of the emerging challenges and the possible prescriptions for corrective actions.

² PBM has 19 Sectoral Competitiveness Councils, divided in five groups of productive systems: (i) Knowledge Intensive Systems: Mechanical Engineering, Electro-electronics, Supply Chain for Oil & Gas and Shipbuilding; Health Complex; Automotive; Aeronautics and Defense Industries; Capital Goods; and Information and Communication Technologies – ICT; (ii) Scale-Intensive Systems: Chemical–Petrochemical; Bio-ethanol and Renewable Energies; Personal Grooming and Cosmetics; Mining; Metallurgy; and Pulp and Paper; (iii) Labor-Intensive Systems: Footwear, Textile and Apparel; Furniture; and Civil Construction Complex; (iv) Agribusiness Systems; and (v) Trade, Logistics and Services: Wholesale; Trade Logistics; and Services.

10.4 Development bank: A strategic asset of industrial policies

Long-term financing has strategic importance: it can foster more and better work opportunities, infrastructure, and competitive capabilities. If markets are shallow, incomplete or “fail”, a development bank is an essential instrument to foster sustainability, investment and accumulation of competences. If financial markets are procyclical, development banks can act in times of credit crunch. If investors are always eager to reap quick returns, development banks, in contrast, are patient.³ These are some of the arguments for development banks and for providing them with resources and instruments needed to face the challenges of growth.

The Brazilian Development Bank (BNDES) is the main provider of long-term financing in the country, holding two-thirds of credit with a maturity of over five years. It is a fully state-owned company under private law, with institutional funding⁴ and 2,700 employees.⁵ BNDES is quite efficient and among the world's largest development banks in terms of assets and loan portfolio (table 10.2).

However, more than absolute size, it is the availability of instruments that a development bank operates with that defines its relevance for an industrial policy.⁶ That is, both scale and scope matter. BNDES has an extensive range of financial instruments, offering: (i) direct financing support for large-scale industrial and infrastructure projects (credit and project finance), (ii) commercialization of machinery and equipment through commercial banks, (iii) support for the export of engineering-intensive goods and services, (iv) credit for micro and small companies' finance and guarantee funds, (v) equity and venture capital funds and direct investment in firms, always maintaining a minority stake.

This large scope of products enables BNDES to face Brazil's various industrial challenges. Priority PBM sectors were granted, on average, about 80 per cent of BNDES' disbursements between 2006 and 2012. Knowledge- and engineering-intensive sectors (Mechanical Engineering, Electrical and Electronic and Health Industries⁷) accounted for about 30 per cent of total disbursements (figure 10.4).

³ Ferraz et al. (2013) analyse BNDES' countercyclical role in 2008–09.

⁴ The FAT, the Workers Assistance Fund, is the institutional funding of BNDES. FAT is a fund, established by the government in 1988, based on social tax contribution from the net operating revenues of all Brazilian enterprises. FAT transfer to BNDES is independent of the federal budget and is done at undetermined terms, resulting in a quasi-equity funding mechanism.

⁵ More on BNDES history can be found in BNDES (2013).

⁶ Ferraz et al. (2013) discusses BNDES' role and challenges in financing development.

⁷ The Mechanical Engineering, Electrical and Electronic and Health Industries, because of their knowledge- and engineering-intensive component, have been grouped together in the *Brasil Maior* Plan. They correspond to the following sectors: Oil & Gas and Shipping (supply sector); Health Sector (pharmaceuticals, medicine, medical and hospital equipment as well as health services); Automotive; Aeronautics as well

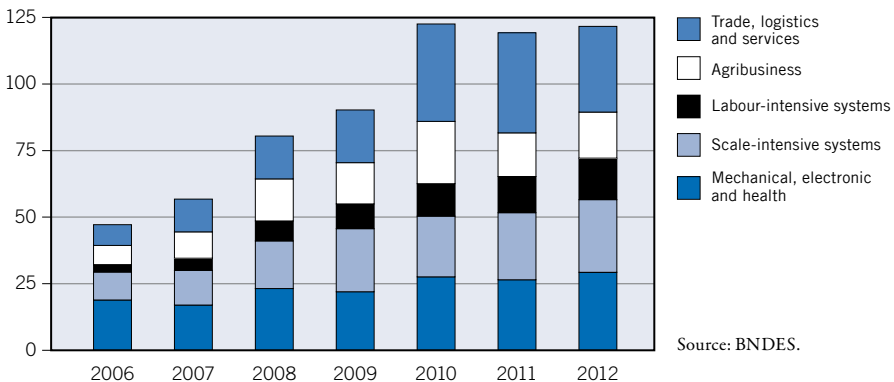
Table 10.2 Statistics of national development banks in four countries, 2012
(in US\$ million*)

	BNDES (Brazil)	KfW (Germany)	CDB (China)	KDB (Rep. of Korea)
Total assets	367 825	657 347	1 191 597	147 067
Loan portfolio	254 019	526 401	1 016 959	85 572
Net income	3 009	3 063	9 995	836
Return on assets (%)	0.90	0.47	0.92	0.50
Non-performing loans (%)	0.06	0.21	0.30	1.60
Date established	1952	1948	1994	1954
Number of employees	2 853	5 190	8 038	n.a.

* At 2012 average exchange rate.

Source: Balance sheets of BNDES, Kreditanstalt für Wiederaufbau (KfW), China Development Bank (CDB) and Korea Development Bank (KDB).

Figure 10.4 BNDES disbursements to PBM's production systems (in R\$ billion)



The effect of the international crisis on BNDES' disbursements to productive sectors was a small reduction related to scale-intensive⁸ and agribusiness industries that are highly exposed to foreign demand. At the same time, with the expansion of the internal market due to the increasing purchasing power of the population, the share of Commerce, Logistics and Services has increased steadily over the years.

Besides allocating financing to priority sectors, BNDES contributes to fostering investments and job creation in Brazil. Recent studies show that firms financed

as Defence and Aerospace Sector; Mechanical engineering capital goods; Electrical and Electronic; and Information and Communication Technologies (ICTs).

⁸ These include Chemicals; Renewable Energy; Personal Hygiene, Perfume and Cosmetics (HPPC); Mining; Metals; and Pulp and Paper.

by BNDES raised investments 10 percentage points higher than unsupported firms with very similar corporate profiles (Coutinho, 2013). A similar effect was found in job creation by small firms: compared with unsupported firms, BNDES-financed firms expanded formal jobs by 10 more percentage points (Machado and Parreiras, 2013).

10.5 Conclusions

From the Brazilian experience, general lessons can be drawn. First, industrial policy is an essential component of a national strategy towards sustainable development, just as policies on infrastructure, education and science and technology are essential. Second, once political priority is placed on industrial policy, full commitment and close cooperation among relevant ministries and agencies are necessary, as is interaction with the private sector, provided that roles, compromises, benefits and counterparts are explicitly agreed and made public. Third, the importance of policy implementation cannot be underestimated: public agencies must have well-defined goals and responsibilities as well as efficient technical competences and negotiating skills. In particular, policy-makers should pay particular attention to the challenges of coordination and information-sharing. Finally, the availability of the necessary instruments to implement policy is of key importance, in particular the presence of an efficient and effective development bank to provide long-term financing for economic transformation.

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