

Policies to support the internationalisation of latecomer science-based firms: the experience of Large Brazilian Pharmaceutical Companies

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Abstract

Purpose: the study aims to analyse how different types of public policies have supported the internationalisation of latecomer science-based firms, taking the case of large Brazilian pharmaceutical companies (LBPCs).

Design: the methodology comprises a multiple case study and uses a literature review, fieldwork interviews and document analysis of eight LBPCs, five policymakers and three sector experts.

Findings: direct and indirect policies differ in supporting LBPCs' internationalisation motivation. The indirect policies created the necessary conditions to accumulate knowledge and capacity in the domestic market. LBPCs that adhere more to policies supporting production and technological capabilities development are internationalising as an extension of their innovative efforts. In contrast, LBPCs that have built productive capacities and have not yet reached a minimum level of technological capacity go abroad to exploit their production capabilities with the support of direct policies.

Originality: the study contributes to international business and evolutionary literature, demonstrating the channels through which public policies support latecomer science-based firms. The results show that direct and indirect policies assist firms' internationalisation in different ways, according to actors' perception: providing support to strengthen their domestic capabilities, which have become competitive advantages in the international market, or offering support to external expansion. It emphasises that industrial policies are relevant to support companies in creating the initial conditions (ownership advantages) to internationalise, and direct policies are important to help companies to design international strategies. The study also debates that policies supporting companies' internationalisation depend on their adhesion to programmes and incentives and their routines and capabilities, which are specific to each company and lead to different motivations for international expansion.

Keywords: latecomer firms, science-based sector, public policy; internationalisation; direct policy; indirect policy; pharmaceutical companies; Brazil.

1 Introduction

The science-based sectors have their primary technology sources in R&D activities and their relationship with science institutions. Competitiveness in this sector is related to how quickly companies can introduce an innovative product to the market (Chuma, 2006; Pavitt, 1984). The pharmaceutical industry is an example of a science-based sector. However, when this industry is located in an emerging or developing country, pure science-based sector definitions may not be entirely appropriate. Usually, companies from emerging and developing countries have characteristics of latecomer firms, that is, they have disadvantages related to the distance from technological sources and developed markets and initially limited capabilities for developing innovative activities (Bell and Figueiredo, 2012).

Internationalisation can be pursued by latecomer firms as a catch-up mechanism with world-leading companies to achieve technological capabilities and as a way to connect with the global markets (Mathews, 2006; Pavitt and Patel, 1999). Nevertheless, latecomer science-based firms can face several obstacles in investing abroad due to their technological disadvantages and lack of experience. In this sense, public policies can help internationalisation by minimising the disadvantages and supporting building competitive advantages.

In that context, public policies can support the global reach of latecomer science-based firms by creating programmes and instruments that facilitate and promote their external expansion (UNCTAD, 2006). Home country governments can create a range of national laws, regulations, and policies to back emerging markets multinational enterprises (EMNEs), which include direct policies facilitating, supporting, and promoting internationalisation or indirect policies that provide support and incentives to improve domestic capacity. Recent studies (Cuervo-Cazurra and Ramamurti, 2014; Liu and Giroud, 2015; Luo et al., 2010; Pinto et al., 2017; Sauvant and Mallampally, 2015; Wang et al., 2012) show significant progress in understanding how government back firms' internationalisation. Usually, these studies analyse the direct policies supporting firms to invest abroad and do not consider indirect policies part of the process. The distinction between direct and indirect policies is particularly important because each might support the firm's motivation to internationalise differently. This study takes the large Brazilian pharmaceutical companies (LBPCs) as a case of latecomer science-based firms to answer the following question: what direct and indirect policies are relevant to promote firms' internationalisation in the context of developing countries? We focus on the channels that support firms' motivation to invest abroad, and the relevance is assigned by the actors' perception (firms, policymakers and sector experts) about the implemented policies. This question addresses an important gap, especially regarding indirect policies that are scarce in the literature¹.

To date, few studies have focused on investigating the public policies to support the internationalisation of latecomer and/or science-based firms. In the Brazilian context, the studies on the government backing companies' internationalisation have focused on the general policies and financial support offered by the Brazilian Development Bank (BNDES) (Acioly

¹ This article is not focused on analysing a causal impact of policies on firm's internationalisation performance. We focus on exploring the direct and indirect policy instruments that firms believe were relevant for their process of internationalisation. We assume that the perception of those actors corresponds to the relevance of the policies.

and Schatzmann, 2009; Alem and Cavalcanti, 2005; Finchelstein, 2017; Fleury and Fleury, 2014; Musacchio and Lazzarini, 2014; Pinto et al., 2017; Sennes and Mendes, 2009).

This paper presents a pioneering multiple case study on different policies to support the firms' internationalisation, bringing first-hand evidence of eight LBPCs, who have, on average, acted in the Brazilian market for 40 years, are entirely owned by Brazilian shareholders and family-controlled companies. The LBPCs was selected due to being a case of latecomer science-based sector: i) only 40.6% of pharmaceutical companies made innovation and the expenditure on R&D activities on their net sales revenue (NSR) was 2.6% on average in 2017 (IBGE, 2020), which is relatively low compared with the R&D invested by the world-leading pharmaceutical multinational enterprises (MNEs) (about 20% of NSR) (EvaluatePharma, 2019); ii) LBPCs manufacture primarily low technological-intensity products (generic and branded generic medicines), and the competition with world-leading pharmaceutical MNEs in the local market is increasingly fierce; iii) the pharmaceutical MNEs manufacture or sell imported innovative products in the Brazilian market, keeping their R&D centres at their headquarters in developed countries (Carlsson, 2006); iv) the Brazilian pharmaceutical market is highly dependent on foreign technology to develop innovative medicines and LBPCs are heavily depended on imported inputs – about 90% of the active pharmaceutical ingredients (APIs) used in domestic manufacturing (Mitidieri et al., 2015); v) Brazilian pharmaceutical industry has low, but increasing relationship with science institutions for the development of new products (Paranhos et al., 2019); vi) Brazilian pharmaceutical sector has historically low integration with international market, but the scenario has been changing in the last years with the LBPCs internationalisation (Pimentel et al., 2014); v) the changes in the Brazilian institutional environment over the past 20 years have contributed to strengthening the Brazilian pharmaceutical industry in respect of LBPCs expansion and increased innovation efforts (Hasenclever et al., 2018).

2 Theoretical background

2.1 Latecomer science-based firms

According to Pavitt (1984), chemical industries, such as pharmaceutical, can be classified as science-based sectors in terms of their pattern of technical change. The science-based sectors have i) their primary sources of technology in R&D activities, public science and production engineering departments; ii) successful and innovative firms growing rapidly and little technological diversification outside the core business; iii) substantial technological barriers to firms outside the sectors to enter; and, iv) a mix of methods to innovate, such as patents, natural technical lags, and firms-specific skills (Bell and Pavitt, 1993; Pavitt, 1984). In addition, the science-based sectors have been developed with closer connections to science and science institutions. It means there is a unidirectional flow of knowledge from universities to firms concerning graduates taking up positions in industry and research results, and a bidirectional flow of knowledge between universities and companies concerning technological development (König, 1996). In such sectors, the speed of innovation is extremely fast due to the expansion of R&D activities, the reduction of the time lag between scientific discoveries and their industrial implementation, and the acceleration of time-to-market in the global value chain era (Chuma, 2006).

The attributes mentioned above are characteristics generally applied to science-based sectors in developed countries, while the same level of technological accumulation is not

present in developing countries (Bell and Pavitt, 1993). In order to use this definition for science-based industries in emerging or developing countries, it is also necessary to add the layer of latecomer firms. This implies that, although the Brazilian pharmaceutical sector is defined as a science-based sector, its local attributions prevent it from being inserted in the international competitive dynamics of science-based sectors.

The main characteristic of latecomer firms is to be in disadvantages related to the dislocation from technological sources and developed markets, in the sense that they have initially limited capabilities for pursuing innovative activities (initially imitative firms). Additionally, latecomer firms have initial competitive advantages, such as low costs or economies of scale, their position as later entrants is historically determined rather than strategically chosen, and they intend to catch up (Bell and Figueiredo, 2012; Mathews and Cho, 1999).

Latecomer firms see internationalisation as a way to catch up with the world-leading companies by acquiring technological capabilities and the ability to compete in global markets (Mathews, 2006). Moreover, internationalisation allows science-based firms in developing countries to connect with the global economy and global innovation networks (Pavitt and Patel, 1999). In this sense, the internationalisation motives go in two directions: exploiting firms' existing assets and exploring new resources in the international market. EMNEs with an exploitation motivation adopt market-seeking and resource-seeking strategies in internationalisation. By contrast, EMNEs with exploration motivation adopt strategies related to innovation- or asset-seeking to obtain resources unavailable in the home market (e.g. specific know-how, complex knowledge, and innovative environment) (Cuervo-Cazurra et al., 2015; Dunning, 2006; Luo and Tung, 2018, 2007; Mathews, 2006).

In order to go international, the latecomer science-based firm may face many obstacles, such as inferior technological and marketing capabilities and weak human and entrepreneurial resources (Gaur and Kumar, 2009; Kumar et al., 2013; Peng et al., 2008). So, public policies can minimise the disadvantages and support building competitive advantages.

This article is centrally concerned with public support to latecomer science-based firms at the level of groups of companies. Therefore, we are looking at the macro-dynamics of a systemic approach to internationalisation rather than the micro-dynamics of building technological capabilities in each firm.

2.2 Policies to promote latecomer science-based firms' internationalisation

Prior research has pointed out the relevance of the institutional context in the decision-making of multinational enterprises and, within this, the role of policies in supporting firm internationalisation (Cantwell et al., 2009; Hoskisson et al., 2000; Peng et al., 2008). Several authors focus on home- or host-country policies to stimulate internationalisation or the differences between developed and developing countries (Gaur and Kumar, 2009; Hong et al., 2015; Khanna and Rivkin, 2001; Luo et al., 2010; Peng et al., 2008; Sauvant and Mallampally, 2015; Wang et al., 2012). However, there is less attention to international business and how the different policies support the internationalisation of latecomers and/or science-based firms.

The distinction between direct and indirect policies is particularly important because each might support the firm's motivation to internationalise differently. In developing countries, the role of government tends to be more influential in the decisions of latecomer science-based firms, as they start going abroad while the institutional structure is still immature (Chaminade

et al., 2009; Cuervo-Cazurra and Ramamurti, 2014; Luo et al., 2010). Some authors (Luo and Tung, 2018; Mathews, 2006) find that latecomer firms go abroad to improve their competitive advantages by acquiring resources absent in domestic markets. Policies can compensate for the lack of managerial skills and technological capabilities, moderating the negative influence of institutional distance on the internationalisation process (Gaur and Kumar, 2009; Kumar et al., 2013; Liu and Giroud, 2015; Peng et al., 2008; Pinto et al., 2017; Wang et al., 2012). Moreover, several studies (Cuervo-cazurra et al., 2014; Finchelstein, 2017; Kale, 2007; Musacchio and Lazzarini, 2014; Pradhan, 2004; Sennes and Mendes, 2009) show that government policies may shape the internationalisation strategies to align them with the country's macroeconomic goals. A few studies (Cardoza et al., 2015; Hong et al., 2015) also show that the government may influence motives to internationalise, improving access to new and complementary assets and resources in the home country market, which affects the firms' ability to go abroad.

The home-country measures might address a range of national laws, regulations, and policies that support firms' internationalisation. The United Nations Conference on Trade and Development (UNCTAD) (2006) distinguishes two kinds of home-country measures: i) general policies, covering a wide range of areas that influence the competitiveness of firms, and ii) specific policies toward internationalisation, which reflect a government's overall stance, including instruments to restrict, facilitate or promote investment, as well as to maximise associated benefits. Sauvant and Mallampally (2014) follow the same line when distinguishing between direct and indirect policies. Direct policies facilitate, support and promote internationalisation, while indirect policies expand firms' capacities in the home country's markets.

This paper uses terms of direct and indirect policies for internationalisation based on definitions from UNCTAD (2006) and Sauvant and Mallampally (2014)². In this regard, examples of direct policies are information services, financial aid, fiscal assistance, and political-risk insurance designed to support and promote firms' internationalisation. Indirect policies include a broad category of measures, such as offering loans, subsidies, and grants and assisting firms to adapt to international regulations to support the creation of domestic capacity.

Industrial and science, technology, and innovation (STI) policies can be direct or indirect to support internationalisation, depending on whether they include support for internationalisation purposes. Industrial and STI policies comprise a set of incentives and regulations implemented through programmes that influence the allocation of resources between and within industrial activities, thus impacting the accumulation of technological capabilities of science-based firms (Cimoli et al., 2009). Industrial policies can be horizontal – concerned with supporting selected economic activities, such as innovation and infrastructure, that affect all sectors equally – and vertical – concerned with supporting specific economic sectors, such as science-based (pharmaceutical and health).

Recent studies (Cardoza et al., 2015; Cuervo-cazurra et al., 2014; Finchelstein, 2017; Musacchio and Lazzarini, 2014; Sennes and Mendes, 2009) show significant progress toward understanding how government policies affect internationalisation by firms. However, they do not treat indirect policies as part of the process or do not connect those policies with the motives for internationalisation. These studies offer static analyses of the internationalisation process,

² The direct and indirect policies of this study have an internationalisation perspective, not a sectoral perspective. For example, an industrial policy may be a direct policy to promote a specific sector, and not address any incentives for internationalisation, thus an indirect policy for internationalisation.

bypassing policies that enable latecomer science-based firms to operate in the international market.

The Brazilian government has implemented these two types of policies in recent years. From 2003 to 2016, the government placed three industrial³ and three STI policies on its agenda and, for the first time, set the internationalisation of firms as a horizontal goal for all sectors (Perin and Cario, 2020). Many studies since have analysed the impact of the direct policy on firms' internationalisation (Acioly and Schatzmann, 2009; Alem and Cavalcanti, 2005; Fleury and Fleury, 2014; Musacchio and Lazzarini, 2014; Pinto et al., 2017; Sennes and Mendes, 2009). In addition, industrial and STI policies have prioritised the pharmaceutical and health sector and established it as the target of programmes to promote firms' productive and innovative capabilities. Some studies (Caliari and Ruiz, 2014; Gadelha and Costa, 2012; Hasenclever et al., 2018; Paranhos et al., 2020b, 2022; Tigre et al., 2016) addressed the effects of programmes aimed at the pharmaceutical sector to improve competitiveness and strengthen the technological capabilities of firms. It is possible to infer from these studies that industrial and STI policies may have somehow supported the international expansion of pharmaceutical companies by implementing incentives that improved their competitive advantage.

Different types of support can be implemented within the policy framework to promote the firm's internationalisation. According to Luo et al. (2010), governments from developing countries are able to offer a range of institutional support for local firms to become global. These include (i) financial incentives, e.g., tax breaks and low-interest loans; (ii) political risk insurance; (iii) agencies focused on the international expansion of private companies; (iv) double-taxation avoidance agreements; (v) articulation of bilateral and regional foreign investment protection treaties; (vi) organisation of a bilateral or multilateral framework to liberalise investment conditions in host countries; and (vii) assistance to firms in dealing with governmental or legislative institutions in the host country. These incentives can also be differentiated by their modalities: financial and non-financial support.

Financial support to internationalisation consists of financial contributions that benefit the firm recipient. The government's financial contribution involves the direct transfer of funds (e.g. grants, loans, subsidies, and equity participation) and liabilities (e.g. loan guarantees), fiscal incentives (e.g. tax credits), and the provision of goods or services other than general infrastructure (WTO, 1994). Non-financial support is other incentives for international expansion that do not include a financial contribution to firms (e.g. information and technical assistance services and political risk insurance) and institutional frameworks (e.g. laws, regulations and the involvement of government actors – ministries, agencies and institutions) (Sauvant et al., 2014).

In the cases of latecomer firms, non-financial support is especially critical to reduce the knowledge gap related to the institutional environment by providing information services on available opportunities and privileged access to information on host countries and networks, including foreign public agencies (Hoskisson et al., 2013; Luo et al., 2010; Sauvant and Mallampally, 2015). UNCTAD (2006, 1995) describes providing information and technical assistance as the most straightforward and earliest form of outward FDI promotion in

³ The industrial policies are the Technology and Foreign Trade Policy (PITCE), 2003, Productive Development Policy (PDP), 2008, and Greater Brazil Plan (PBM), 2011. The STI policies are the Science and Technology Growth Acceleration Programme (PAC C&T), 2007, and two editions of the National Strategy for Science, Technology and Innovation (ENCTI), 2012 and 2016.

developing countries, especially for smaller and inexperienced investors. Furthermore, concerning the science-based sector, which is usually also highly regulated with a strong barrier to entry, non-financial support can assist in understanding the host-country regulatory requirements (Cardoza et al., 2015; Rugman and Brain, 2004).

Brazil's institutional environment for the pharmaceutical sector has undergone several changes since the 1990s. Brazil's adherence to the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) following its entry into the WTO in 1994 led to its adopting the Industrial Property Law (No. 9279) in 1996. The early harmonisation process rapidly increased industrial protection and entry barriers for the sector, especially for non-patent-owning domestic firms (Hasenclever et al., 2010).⁴ In terms of regulation, the National Health Surveillance Agency (Anvisa) was created in 1999 (Law No. 9782) to inspect pharmaceutical production plants designed and operated following good manufacturing practice (GMP) standards. Anvisa is internationally recognised, requiring that firms meet high-quality control standards. The Brazilian government implemented the Generics Drugs Law (No. 9787/1999), establishing a new market segment for drugs requiring tests to prove their certification. The production of generic drugs requires significant effort from national pharmaceutical companies to meet bioequivalence and bioavailability requirements. These last two achievements contributed to the growth of Brazilian pharmaceutical companies, which enlarged their production capacity and enhanced their technological capabilities. However, firms that failed to meet the new requirements eventually had to shut down their operations (Caliari and Ruiz, 2014; Gadelha and Costa, 2012; Hasenclever et al., 2018; Paranhos et al., 2020b; Strucker and Cytrynowicz, 2007; Tigre et al., 2016). Two more legal changes impact on Brazilian pharmaceutical sector. The Innovation Law (No. 10973/2004) fostered academia-industry partnerships and authorised public granting to innovative activities, and the Good Law (n° 11.196/2005) granted tax deductions to companies in expenses with R&D of technological innovation.

Based on the theoretical conceptualisation of policies to promote internationalisation and the recent changes in the Brazilian institutional framework, the aim is to investigate their relationship with the internationalisation of latecomer science-based firms, the large Brazilian pharmaceutical companies, which have been progressing in the last 15 years.

3 Methodological procedures

This paper consists of multiple case studies to understand a contemporary phenomenon with a high degree of complexity; that is, it considers policies and supports to promote companies' internationalisation. We use a literature review, data from fieldwork interviews and document analysis through an interpretivism approach. By triangulating the qualitative data, we test the validity of converging information from different sources (Patton, 2015). Although this method deepens the understanding of the phenomenon, it should not be generalised (Yin, 2017).

Fieldwork was carried out to gather first-hand empirical evidence. Adopting this technique facilitates understanding an insufficiently researched phenomenon, evincing details that other means cannot capture, such as aggregated analyses from purely quantitative methods (Miles and Huberman, 1994). We conducted fieldwork through 19 semi-structured and focused

⁴ For further information on the TRIPS agreement and its effects on the Brazilian pharmaceutical industry, see Hasenclever *et al.* (2010) and Urraca-Ruiz and Paranhos (2012).

interviews with 16 actors: eight companies, five public institutions/representative bodies of the sector, and three experts in the Brazilian pharmaceutical sector. The interviews were carried out from July 2017 to February 2018 and were conducted in person (16) and by phone call (3). The fieldwork was carried out in six stages: (i) goal determination; (ii) selection of interviewees; (iii) preparation of reports about the companies; (iv) preparation of the questionnaire; (v) initial contact and interviews; and (vi) transcription, consolidation and data analysis. The topics covered in the interviews refer to the actors' evaluation of policies, the use of instruments by companies, factors that helped the company compete abroad, and the institutional obstacles to internationalising.

The criteria for company selection are that it must (a) belong to the pharmaceutical industry,⁵ thus being in the group targeted by the industrial and STI policies; (b) of a large size (at least 500 employees); (c) with Brazilian controlling capital; and (d) with an internationalisation strategy, previously identified in their annual report and the media. We identified thirteen companies that meet the criteria, and eight agreed to participate in this study (response rate: 62%). These companies are Achè, Biolab, Blanver, Cristália, EMS, Eurofarma, Hebron, and Libbs, which accounted for more than 30%⁶ of the Brazilian pharmaceutical market turnover in 2018. The institutions selected are in charge of policies and instruments to support internationalisation: the Ministry of Economy, responsible for industrial policies; the BNDES, responsible for financial incentives; the Brazilian Pharma Chemicals and Pharmaceuticals Industry Association (Abiquifi) and the Brazilian Agency for Export and Investment Promotion (Apex-Brasil), in charge of non-financial incentives; and Anvisa, which is the responsible regulatory body. The experts were selected based on their work as consultants or representative associations for the pharmaceutical sector.

We analysed the data from interviews and documents using Atlas.ti software. Three rounds of coding were conducted – open, axial, and selective (Gray, 2017). First, we conducted a top-down analysis and then worked on open-coding the data to reduce the amount of information. The data phenomena were named and categorised through close examination. The codes were constantly compared during this process to categorise the phenomena using fitting names. Second, depending on their relatedness, axial coding connected the codes into subcategories (Gray, 2017). Third, the subcategories created during the axial coding were grouped into major categories using selective coding. There were several discussions and subsequent revisions of codes to increase the reliability of the coding (Gray, 2017). The process was complete when data saturation was reached for answering the research questions.

The method we applied allows the compilation of perspectives on policies and the instruments to support the LBPCs' internationalisation. Furthermore, multiple methods (interviews and documental analysis) and the sample diversity (three groups of respondents) sought to broaden the analysis spectrum and identify similarities and differences in understanding each group according to their positions. The following sections analyse the fieldwork results supported by secondary data (reports from companies, institutions, and other academic studies) to understand the research problem.

⁵ Firms classified in Division 21 of the National Classification of Economic Activity (CNAE), the structure of which is based on the International Standard Industrial Classification of All Economic Activities (ISIC) of the United Nations Industrial Development Organization (UNIDO). The manufacture of pharmaceuticals is classified in Section C, Division 21 of ISIC, Rev.4.

⁶ It does not comprise revenue from two of the sample companies because of confidentiality concerns.

4 Policy to support the internationalisation of the LBPCs

One of the transversal goals of the industrial policies during the 2000s was increasing the internationalisation of Brazilian companies. In this sense, the Brazilian government created programmes and instruments to stimulate companies' entry into the international environment, some specific to pharmaceutical companies, by offering financial and non-financial incentives. Table 2 sets out the policies adopted to support the internationalisation of Brazilian pharmaceutical companies, which will be presented in the following sections.

Table 1: Policies and support for the internationalisation of Brazilian pharmaceutical companies

Type of policy	Type of support	Programmes	Validity period	Institution in charge	Support offered
Indirect	Financial	Profarma	2004–2016	BNDES	Loan
		Economic Subvention + Innovates Health (<i>Subvenção Econômica + Inova Saúde</i>)	2006-2018	FINEP	Grant + Loan
	Non-financial	Productive Development Partnerships	2008–now	Ministry of Health	Public Procurement
		Regulatory framework	2016–now	Anvisa	High regulatory standard International harmonisation of regulatory rules
Direct	Financial	BNDES-Exim	1990–now	BNDES	Credit
		Internationalisation Programme	2004–2016	BNDES	Loan + equity participation (BNDES-par)
	Non-financial	Brazilian Pharma Solutions	2008/2011–now	Apex-Brasil + Abiquifi	Buyers' projects; business roundtables; market intelligence; assistance for international technology transfer; forming partnerships for drug co-development; identifying target countries for potential insertion

Source: Own elaboration based on the primary data collected and Paranhos et al. (2020b).

4.1 Indirect policies

Since the 2000s, the Brazilian government has implemented three industrial and STI policies aimed at the pharmaceutical sector, which may have an indirect relationship with the motives for internationalisation – Programme to Support the Development of the Health Industrial Complex (Profarma), Economic Subvention (*Subvenção Econômica*), later changed to Innovates Health (*Inova Saúde*), Productive Development Partnerships. In addition, the regulatory framework changes could contribute to going abroad. (Table 1).

Profarma is a sector-oriented programme launched by BNDES in 2004. Its goal was to promote the drugs and API's manufacturing and innovation efforts by firms. Loans were offered at low-interest rates (1.5% to 4.5% per year) and a high amortisation period (10 years). Profarma had three phases and subprogrammes: production, innovation, exports, and biotech. Therefore, Profarma is assessed (Caliari and Ruiz, 2014; Palmeira Filho et al., 2012; Paranhos et al., 2020b,

2022; Rodrigues et al., 2022; Tigre et al., 2016) as one of the main factors – along with companies' adherence to the program – responsible for the adequacy of Brazilian pharmaceutical companies to the legal requirements imposed by the Generic Law. As a result, companies increased, and some became large companies, developing productive and technological capabilities.

FINEP is the innovation agency in charge of the Economic Subvention programme, implemented between 2007 and 2012, to promote innovation projects by offering grants to firms. In 2013 FINEP launched the Innovates Health programme, which combines grants and loans to develop innovative projects in the health sector. The Economic Subvention was the first programme to offer non-reimbursable financing to firms in Brazil. For this reason, the programmes implemented by FINEP are emerging (Paranhos et al., 2020b, 2022; Pinheiro et al., 2021) as crucial policy vehicles to promote innovation in Brazil.

Seven out of eight LBPCs accessed the Profarma resources between 2004 and 2017. They received 2.6 billion Brazilian Real, representing almost 57% of total Profarma resources, to finance mostly production projects related to modernising and expanding domestic factories. None of the companies in this study had requested funding for the Profarma-exports subprogramme. The same seven LBPCs also accessed FINEP resources amounting to 1.3 billion Brazilian Real, representing 38.2% of the total Economic Subvention and Innovates Health disbursements from 2007 to 2016.

Profarma and Economic Subvention + Innovates Health played an essential role in promoting the growth and capabilities of pharmaceutical companies, thereby making financial resources available to invest in the internationalisation process. It is worth noting that the LBPCs began to invest abroad a few years after implementing these programmes. The capital available to invest abroad was one competitive advantage of companies, as reported by seven LBPCs. Moreover, by promoting productive and technological capacity in the domestic market, these programmes were an indirect policy supporting internationalisation, and probably the reason companies did not need to access the loans from the Internationalisation Programme⁷.

Three LBPCs reported are pursuing internationalisation to explore new resources and capabilities. They are adopting innovation- and asset-seeking strategies (as their principal strategies) to enter niche markets with radical innovation in developed countries and China. Their main goal is to accelerate the innovative capabilities and access resources, such as sophisticated knowledge and technologies that are unavailable in the Brazilian environment, as illustrated in the quote below:

We are internationalising, seeking to improve the company's technological capacity with external partners who are more advanced. We transfer technology not only for production but also for development and regulation. This know-how that we are seeking out there. (LBPC8)

These three LBPCs are installing R&D centres, investing in biotech firms, and acquiring other firms to pursue an innovation-seeking strategy. They started internationalisation with a focus on innovation-seeking only in 2012, after having built a competitive advantage in

⁷ The details about Internationalisation Programme are in the following section.

productive and technological capacities over the last 20 years, and the innovative capabilities, which have been increasing over the years: ‘internationalisation is another important step in our process of building capabilities and the proof that the company has developed advanced technology and management capabilities that guide the company’s growth and becoming a reference in the global market’ (LBPC2). These three companies reported investing about 8% of their net sales revenue (NSR) in R&D activities in 2018, which is relatively higher than the average of the entire Brazilian pharmaceutical sector (2.6%) in 2017 (IBGE, 2020).

The growth of LBPC’s innovative capabilities in the last two decades is also evidenced in Paranhos et al.’s (2020a, 2020b). The same three LBPCs exploring the international market as an internationalisation motivation are those that most accessed FINEP (24%) and Profarma (26%) resources. They have applied these resources in R&D activities, R&D infrastructure and the manufacturing of innovative drugs.

The other five LBPCs reported going to the international market to exploit their advantages. Their main competitive advantages are the portfolio, which includes diverse and good quality medicines, and the size, which allows economies of scale, competitive prices, and financial resources to invest in international projects. Most of their international operations (FDI, licensing, and exports) are in Latin America and Africa, where they have a competitive advantage. There are also a few exports to developed countries (USA, Canada and Europe). The competitive advantages created in the domestic market resulted from its adaptation to new regulations, such as Anvisa's GMP and the Generic Law. These five companies and other studies (Caliari and Ruiz, 2014; Capanema et al., 2008; Palmeira Filho et al., 2012; Paranhos et al., 2022) identified that the Profarma and FINEP programmes were essential to provide resources for the modernisation of factories and regulatory adequacy. These LBPCs accessed fewer resources from FINEP (15%) and Profarma (32%) to invest mainly in production and R&D infrastructure (Paranhos et al., 2020b). The LBPCs seeking to exploit companies’ existing assets have less innovative effort (about 5% of NSR invested in P&D activities) compared to LBPCs exploring the international market.

Furthermore, the eight LBPCs in this study, representing 62% of all internationalised Brazilian pharmaceutical companies (8 out of 13 companies), are in the top 10 pharmaceutical companies that most received public financial resources to invest in domestic factories. This evidence shows a connection between sector-oriented policies and internationalisation, as stated by the institutions’ respondents:

Ten years ago, we argued with companies that they should go abroad because they must increase their competitiveness outside Brazil. It is impossible to do radical innovation by looking exclusively at the Brazilian market. The companies replied that they were not able to internationalise at that time. So, we structure our initiatives in this sense [supporting domestic capacity development]. (INST4a)

According to the respondents of six companies, the Brazilian regulatory framework plays a vital role in the decision of LBPCs to invest abroad. Anvisa imposes a high regulatory standard, including quality and safety requirements for drug registration and industrial operations. Anvisa’s GMP is similar to the European Union's and offers greater security and predictability than Asian competitors. Due to Anvisa’s participation in several international forums, it is recognised as a global reference in pharmaceutical regulation, mainly in Latin America; countries in the region accept the Brazilian regulatory dossiers without many changes

(Pimentel et al., 2014). We identify that Anvisa's rules requiring Brazilian companies to adopt international regulatory standards in the domestic market encouraged internationalisation by making them a competitive advantage: 'Technically, I see it as a greater alignment of our regulatory system with the global regulatory systems. Therefore, companies better prepared to compete internationally will have an open international market' (INST2).

In 2016, Anvisa joined the International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH). The Conference comprises the world's leading regulatory authorities, such as the US Food and Drug Administration (FDA), the European Medicines Agency and the Pharmaceuticals and Medical Devices Agency in Japan. As an ICH member, Anvisa has committed to harmonising its guides with the five ICH guides within five years. Furthermore, Brazilian Pharma Solutions has assisted the standardisation process by promoting discussions among actors and translating the dossiers into analyses. All companies' respondents appreciate standardisation because it can increase access to international markets, as the regulatory requirements usually present a non-tariff barrier in the pharmaceutical sector (Yadav, 2013). The competitive advantage built from adapting to regulatory requirements is especially highlighted by companies motivated to exploit the international market:

The regulatory barriers abroad are very clear. In some countries, we have some advantages in regulatory terms because the Brazilian standard is quite something. However, in some European countries, we do not have these advantages. We are adapting to European requirements, as we want to enter this market. Anvisa, as a signatory of the ICH, will unify the other agencies. So, we realise this advantage will be ours (LBPC7).

Nevertheless, institutions and experts interviewed worry that medium and small-size Brazilian companies will be forced to comply with regulatory standardisation in the domestic market set at the developed country level. Companies' respondents also highlighted other regulatory issues as obstacles to internationalise, including (i) Anvisa's delay in liberalising cargoes at ports and airports led to additional cost and time demands in export than other sectors, impacting the international competitiveness of Brazilian drugs; (ii) Anvisa's delay in drug registration, which decreases the ability to deliver new drugs in the international market,⁸ and (iii) the lack of communication among the actors in the pharmaceutical sector (companies, policymakers, and Anvisa). In addition, all companies' respondents claimed it was difficult to have access to Anvisa to discuss the sector's main issue, the standardisation of international regulation.

Productive Development Partnerships (PDPs) are another example of a programme designed to improve firms' domestic capabilities that can indirectly support internationalising decisions. The Brazilian Ministry of Health implemented a PDP in 2008 to support public-private partnership projects to transfer a range of strategic technology products. The partnerships involve transferring technology from MNEs or Brazilian pharmaceutical

⁸ Anvisa's Resolution No. 27/2008, which deals with products for health (except for drugs) that are manufactured in Brazil and destined exclusively for export, do not need to be registered, unless registration is required by the target country.

companies to public laboratories to reduce the Unified Health System (SUS) vulnerability by developing high-value-added strategic technologies. Sometimes, an MNE transfers technology to a Brazilian pharmaceutical company and then the latter to a public laboratory. Private companies receive institutional support in the technology transfer process and are guaranteed their position as exclusive suppliers (of a given product) to the Ministry of Health during this process (Hasenclever et al., 2018) through public procurement. However, once public laboratories are able to produce that product, companies face losing their exclusivity arrangement with the SUS and a reduction of their share in the home market. PDPs enable Brazilian companies to manufacture drugs with a higher added value, increasing their foreign market competitiveness. One interviewee reported that their company had a PDP contract, and exports were a way to continue manufacturing the product after the loss of their home market share, and this was the company's first step towards internationalisation. The institution in charge of industrial policies noted that the PDP is a programme that aims to reduce the pharmaceutical trade deficit.

4.2 *Direct policies*

The Brazilian government implemented three policies directly addressing firms' internationalisation – BNDES-Exim, Internationalisation Programme, and Brazilian Pharma Solutions (Table 1). Two are financial support offered by the BNDES and not explicitly targeted at pharmaceutical firms (BNDES-Exim and Internationalisation Programme). The BNDES-Exim is a financing modality created in 1990 to support manufacturing goods for export. There are two types of support – pre-shipment and post-shipment credit – preferably made available for products with high added value and at least 60% of manufacturing/inputs made in the domestic market. None of the companies surveyed had requested funding for the BNDES-Exim. From their perspective, 'none was interested in accessing the BNDES-Exim, since they do not need support to manufacture products. The main export obstacle is bureaucratic issues, and the incentives available did not act in this sense' (LBPC1).

In 2004, BNDES created its Internationalisation Programme to promote FDI through loans or companies' minority interests (BNDES-Par). In addition to financing, BNDES also established an international area in which it monitors and offers institutional support to the investments of Brazilian companies abroad, including offices in Montevideo (Uruguay) and Johannesburg (South Africa). The BNDES had plans to set up the London (UK) office to identify potential international funding, mitigating the currency risk embedded in international investment, as reported by one of the BNDES respondents.

Only one company in the survey accessed BNDES loans to invest abroad. This financing represented less than 1% of the Internationalisation Programme's resources. From the perspective of that company's respondent, access to financial support did not affect their decision to expand abroad, as they would have done so even if they had not received the loan. The Internationalisation Programme is committed to financing large projects (US\$50 to 80 million), which excludes small ones, such as creating a distribution centre or office abroad. According to the BNDES' respondent, the financing resources for internationalisation are insufficient to influence outward investment by LBPCs. Seven companies indicated they had the financial resources to start the internationalisation process independently. One company had tried to obtain financing from BNDES to maintain investments abroad that were at risk because of the depreciation of the Brazilian Real. That company failed to get the loan because it did not

meet the BNDES' requirements; this ultimately led the company to go back on the internationalisation process.

The companies had a different response to the government's direct non-financial policies. The Brazilian Pharma Solutions (now, Brazil Pharma & Health) is non-financial support in the form of a specific programme developed for the pharmaceutical sector, launched in 2011 by Apex-Brasil and Abiquifi.⁹ In 2008, Apex-Brazil initiated a sector-wide project to support Brazilian pharmaceutical companies' participation in the CPhI Worldwide, the leading international business forum of the pharmaceutical sector. In 2011, Abiquifi joined the programme as a partner, and they created Brazilian Pharma Solutions to promote the Brazilian pharmaceutical sector abroad. The segments supported by the programme are human and veterinary medicines, APIs, and biotechnology.

The Brazilian Pharma Solutions programme is enthusiastically joined by pharmaceutical companies (seven out of eight companies). It offers many types of support, such as buyers' projects (bringing potential foreign customers to visit Brazilian factories), business roundtables, investment missions, and market intelligence. The programme also offers strategic international business support through international technology transfers, partnerships between Brazilian and international companies for the co-development of drugs, and assists in identifying target countries for potential investment.

Six of the company respondents reported that the most necessary action within the scope of the Brazilian Pharma Solutions programme was the Sanitary Image Project. This project aimed to promote the image of the Brazilian pharmaceutical sector with international regulatory authorities, including by ensuring they are aware of the quality of Brazilian regulations, products and factories. Potential regulatory divergences are the main barrier to internationalisation pointed out by company interviewees. The promotion of Anvisa's technical rigour thus has a positive influence on the decision to invest abroad, as pointed out by one respondent:

The Sanitary Image Project is undoubtedly an incentive from the public sector relevant to the industry. The programme encourages Anvisa's recognition as a legitimate agency, with a requirement level in line with the major international agencies. I think this is one of the great challenges of the sector programme. It was something that we always struggled with along with other firms. I think we have made progress at this point (LBPC4).

The seven LBPCs participating in the Brazilian Pharma Solution programme follow a market-seeking internationalisation strategy as a principal (four) or complementary (three) strategy and a resource-seeking strategy to access APIs and other inputs as a complementary strategy. We identify a relationship between the companies' exploitation motivation to internationalise and direct non-financial policies. Seven companies pursuing a market-seeking internationalisation strategy stated they had the financial resources to start expanding internationally but had no knowledge of international markets. Two companies emphasised the

⁹ The Brazilian Export and Investment Promotion Agency (Apex-Brasil), created in 2003, is an autonomous social service entity under private law. Its mission is to promote exports of products and services from Brazil, contribute to the internationalisation of Brazilian companies and attract foreign investments to the country. The Brazilian Pharmaceutical Industry Association (Abiquifi), founded in 1983, is a class association of the pharmaceutical sector that brings together pharmaceutical companies and producers of pharmaceutical raw materials (e.g. API).

importance of customised assistance to address legal and regulatory issues and the training on internationalisation strategies provided by the Brazilian Pharma Solutions programme. The respondent for one of these companies summed up the programme's contribution to the firm's motivation to internationalise: 'Brazilian Pharma Solutions offers essential tools and resources to take the foreign market's first step. The international expansion would not have been possible without this support (LBPC1). One institutional respondent also reported the programme's positive result: 'Offering different internationalisation support types, Brazilian Pharma Solutions is the most effective programme to reduce the pharmaceutical trade deficit' (INST2). The only LBPC incurred in a de-internationalisation process is the same company that did not participate in the Brazilian Pharma Solution programme. When questioning the reason for not joining the programme, the company's respondent said, 'I thought they would not help, just like when I asked for BNDES support' (LBPC6).

5 Discussion of results

The results achieved in this research show that the Brazilian government has supported the LBPCs in different ways. Since 2000, the Brazilian government has designed and implemented several policies that have directly or indirectly contributed to the internationalisation of the LBPCs. Under the two types of policies, various programmes have offered financial and non-financial support to companies to invest abroad. We found that direct and indirect policies differ in supporting the company's internationalisation motivation. In any case, it is important to clarify that policies are complementary, and it is not possible to isolate their contribution entirely.

The support implemented by the industrial and STI policies created the necessary conditions to accumulate knowledge and capacity in the domestic market before starting internationalisation. Although the policies were available to all companies, some adhered to certain policies more. In this way, those who adhered more to policies supporting the production and technological capacities development are internationalising as an extension of their innovative efforts. In contrast, companies that have built productive capacities and have not yet reached a minimum level of technological capacity go abroad to exploit their productive capacities.

The trajectory followed by five LBPCs with exploitation motivation to internationalise has many convergence points. They all adapted to institutional changes in the 1990s (Generic Law, GMP), and four benefited from industrial and STI policies, such as Profarma and Finep programmes, to update their manufacturing structures in the early 2000s. The capabilities created to survive and compete in the domestic market ended up becoming competitive advantages to internationalise (e.g. economies of scale, increasing market share, availability of financial resources to invest abroad, quality of medicines). Hence, we consider Profarma, Economic Subvention+Innovates Health, regulatory framework, and PDPs indirect policies to support LBPCs internationalisation. These LBPCs owned competitive advantages in terms of production capacity but not in terms of international market knowledge. This is why Brazilian Pharma Solutions was crucial for companies adopting market-seeking strategies. The only company that did not participate in the industrial policies programmes, not even the Brazilian Pharma Solution, is the one that de-internationalises due to lack of production capacity. Therefore, the indirect policies helped companies to build competitive advantages to be exploited in the international market, while direct policies support their strategies by

compensating for the lack of knowledge in the internationalisation process, as was also found in prior EMNEs studies (Liu and Giroud, 2015; Pinto et al., 2017; Wang et al., 2012).

When we conducted the fieldwork for this study, 13 companies were identified as implementing internationalisation strategies. The five other companies not part of this study also had access to industrial policy programmes and Brazilian Pharma Solutions. In addition to these 13 companies, another 100 pharmaceutical companies, mostly medium and small size, received a small share (less than 1% each) of the financial resources (Profarma and Finep). We did not find any relevant internationalisation projects being carried out by these companies. Furthermore, as counterfactual examples, we found three LBPCs – Teuto, Cimed and Legrand – classified among the 20 largest in the Brazilian market that did not access any indirect financial support (Profarma and Finep programmes) and have small and recent international insertion or failed in the process of internationalisation (Legrand Pharma, n.d.; Teuto, n.d.; Valim, 2018).

The institutional context was the same for all companies, policies were available for all companies, and seven out of eight companies adhered to the programmes. Even though three LBPCs followed a different trajectory. They also applied financial resources to update their factories. However, they focused more on innovative capabilities, as evidenced by the more significant R&D investments and innovation projects supported by industrial policies. As Nelson and Winter (1982) noted, firms have individual routines, which lead to different actions and performances, in this case, to different motivations to internationalise. These three LPBCs built productive and technological capacities in the domestic market, which were converted into competitive advantages to explore international markets. This result is aligned with studies that show that latecomer firms build their competitive advantages before internationalisation, even if they are investing abroad to obtain assets that are absent in the domestic market (Aguilera et al., 2017; Bonaglia et al., 2007; Carneiro et al., 2018; Martin and Javalgi, 2016). Moreover, the result also corroborates with Le Bas and Sierra (2002), Cantwell and Santangelo (2000), and Carlsson (2006), who show that science-based firms invest abroad in innovative activities complementary to their domestic activities.

The results contradict the theoretical approaches that assume latecomer firms expand abroad to avoid market and institutional weaknesses in their home country (Guillén and García-Canal, 2009; Luo and Tung, 2018, 2007; Mathews, 2006, 2002). Luo and Tung (2018, 2007) claim that these firms use internationalisation as a springboard to access strategic assets and overcome competitive disadvantages. By taking this position, these studies minimise the importance of ownership advantages. In the case of LBPCs, the international market only became a springboard to acquire new capabilities when companies had already achieved some level of productive and technological capacity obtained with the support of public policies.

In this sense, the results of this study highlighted the importance of building productive and technological capabilities in the domestic market and supporting them through public policies. Both groups of LBPCs motivated to exploit and explore the international market have built competitive advantages in the domestic market supported by public programmes. The results are aligned with studies showing that latecomer and science-based firms follow a particular trajectory influenced by their home countries and the international expansion context (Bell and Pavitt, 1993; Cuervo-Cazurra et al., 2018; Cuervo-Cazurra and Ramamurti, 2017, 2014; Pavitt and Patel, 1999). The home country institutional environment constrains and defines the sort of resources and assets the EMNE owns and provides the initial conditions for its international expansion (Narula, 2012; Narula and Kodiyat, 2016). Adding to the findings of these authors, we argue that the same home country institutional environment influences the

internationalisation motives in different ways, which depend on how firms manage their routines and capabilities.

6 Conclusion

The studies on public support for latecomer and science-based firms' internationalisation are still a developing topic. This study contributes to the literature by distinguishing between direct and indirect policies and financial and non-financial support and how they can support latecomer science-based firms to invest abroad. Doing so contributes to further theoretical development on differentiating state actions to support internationalisation.

This study contributes to international business and evolutionary literature, demonstrating the channels through which public policies support latecomer science-based firms. The results show that direct and indirect policies assist the firms' internationalisation in different ways, according to actors' perception: providing support to strengthen their domestic capabilities, which have become competitive advantages in the international market, or offering support to external expansion. It emphasises that STI and industrial policies are relevant to support companies in creating the initial conditions (ownership advantages) to internationalise, and direct policies are important to help companies to design international strategies. The study also debates that policies supporting companies' motivation to internationalise depend on how companies adhere to incentives and their own routines and capabilities, which are specific to each company and explain the performance differences between companies.

6.1 Policy implications for supporting internationalisation

The results might also point to policy implications for the internationalisation of latecomer science-based firms. First, as we know that different policies support international expansion differently, the government has several tools to design internationalisation policies. In order to expand the market for companies and bring immediate benefits to the country (e.g. growth in exports), policies that support firms' strategies are more appropriate. In comparison, policies that enhance domestic technological capacity can be prioritised to turn internationalisation into a channel for technological catching up (Lee and Lim, 2001; Lee and Malerba, 2017).

Second, it must consider the complementarity of policies and programmes since it is impossible to isolate their influence on companies' motivation fully. So aligning policies for the pharmaceutical industry or other science-based industries – productive, innovation, regulatory and internationalisation – are crucial to implementing a systemic innovation policy (Chaminade et al., 2009). Moreover, the support for internationalisation does not exist in isolation and should be connected to other policy instruments for firm promotion.

Third, the sector-oriented policies demonstrate a positive response from companies. The policies that had more adhesion from companies are sector-oriented to the pharmaceutical industry, whether indirect or direct. The horizontal policies, such as the Internationalisation Programme, had almost null adherence from LBPCs.

Fourth, the financial support for LBPCs' internationalisation demonstrates some limitations, which should be avoided in designing an internationalisation programme. The financial incentives should vary regarding providers and modalities of the loan according to companies' size and internationalisation stages.

Fifth, the regulatory framework has more relevance on companies' internationalisation than could predict from the specialised literature. This could also be true in other science-based industries, such as the energy sector. In this sense, harmonising domestic regulatory requirements with international ones must consider the impact on companies' competitiveness.

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