Knowledge exploration in cross-border acquisitions: how does absorptive capacity matter?

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Abstract

Purpose – This study aims to explore how the absorptive capacity of emerging market multinationals (EMNEs) facilitates increased acquirer performance in industry exploration and technology exploration cross-border acquisitions (CBAs).

Design/methodology/approach – The research context for this study is Brazilian EMNEs and their CBAs. The final database contains 101 CBAs.

Findings – The authors find that industry exploration strategies negatively affect financial performance, but technology exploration strategies have a positive effect. The acquirer's absorptive capacity can exacerbate the negative effects, except in instances of technology exploration strategies, where there is a demonstrable benefit from the acquirer's absorptive capacity.

Originality/value – The study contributes first by providing a more nuanced understanding of the effects of absorptive capacity on postacquisition performance, depending on the type of knowledge explored. Second, by drawing on EMNE learning perspectives, the authors demonstrate the versatility of absorptive capacity in emerging markets.

Keywords EMNEs, Cross-border acquisition, Absorptive capacity, Knowledge exploration, Post-acquisition performance

Paper type Research paper

1. Introduction

To compete globally, emerging market multinational enterprises (EMNEs) must acquire and leverage knowledge (Luo and Tung, 2007). In many instances, this knowledge is not only external to the firm but also outside of its country of origin, further complicating the ability to

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successfully capture value (Khan *et al.*, 2015; Kotabe *et al.*, 2011). As EMNEs are typically at a relative disadvantage compared to established competitors from developed countries, mitigating the short-term adverse financial effects can shore up the international competitive position of an EMNE. According to the literature, absorptive capacity, defined as "the ability to identify, assimilate, and exploit knowledge from the environment" (Cohen and Levinthal, 1989, p. 589), can facilitate knowledge integration and accelerate value creation in knowledge exploration (Khan *et al.*, 2019; Park and Chung, 2019). However, there are limited studies on how EMNEs can enjoy these benefits in their cross-border acquisitions (CBAs) (Ai and Tan, 2020).

Merely suggesting the positive impact of absorptive capacity may not offer practical implications for EMNEs who are known to have institutional barriers in the development of absorptive capacity (Cuervo-Cazurra and Rui, 2017), consequently opting for different learning strategies (Bilgili *et al.*, 2016). In addition, there are conflicting findings around its optimal levels and dimensions and how they generate (or do not) benefits to firms. While some scholars defend the argument that higher levels of absorptive capacity are advantageous for the firm (Zahra and George, 2002), others argue that the optimal level is not the highest (Srivastava *et al.*, 2015). Rather, its value is especially dependent on its dimensions (Jansen *et al.*, 2005; Kotabe *et al.*, 2011). Moreover, given the home context of EMNEs, different levels of absorptive capacity are cultivated while dealing with resource limitations (Bilgili *et al.*, 2016; Li and Fleury, 2020). Thus, the absorptive capacity's role in different knowledge exploration strategies, especially for EMNEs, demands further research. This study advances the following research question:

RQ1. How does EMNE absorptive capacity facilitate increased acquirer performance in industry-exploration and technology-exploration cross-border acquisitions?

Empirically, we investigate Brazilian CBAs. The number of CBAs performed by Brazilian multinationals systematically increased in the period studied (1995–2015), characterizing asset-seeking movements (Conti *et al.*, 2016). Brazil is a prominent source of outward foreign direct investment (OFDI), ranking as the foremost contributor from Latin America with an investment outflow exceeding $25bn in 2022 and $20bn in 2021 – figures that nearly double those of the region's second-largest source, Mexico (UNCTAD, 2023). The CBAs performed by Brazilian MNEs have resulted in firms like Vale (mining), Ambev (brewing) and JBS (meat processing) becoming leading global players in their industries (Fleury and Fleury, 2011). These firms reflect the trend of Brazilian MNEs to invest in CBAs, seeking new knowledge to leverage their capabilities abroad, given the inefficient home environment (Pinto *et al.*, 2017).

In this context, our findings show that exploration-oriented CBAs in technology sectors can swiftly optimize value creation and mitigate financial risk when aligned with absorptive capacity. But the opposite holds in instances of industry exploration. More specifically, we analyze EMNE global strategies and their outcomes using two different dimensions of absorptive capacity – the ability to value knowledge and the ability to apply it – and in two boundary conditions (technology exploration and industry exploration). We show that the role of absorptive capacity depends on the exploration strategy performed by the EMNE and that the EMNE can differentially tap into these two dimensions of absorptive capacity to increase postacquisition performance.

Our study contributes to the literature in two ways. First, following the call by Li and Fleury (2020), we contribute to international business research on the antecedents of EMNE's postacquisition performance. The link between absorptive capacity and postacquisition performance is not new. Extant studies have tapped into this interplay (Kotabe *et al.*, 2017; Rothaermel and Alexandre, 2009; Wang and Han, 2011). Although several studies have investigated the role of absorptive capacity in the success of CBAs,

there is a dearth of studies on its differential effect in technology exploration and industry exploration. We provide a more nuanced understanding of the effects, depending on the type of knowledge explored.

Second, drawing on the EMNE learning perspectives, we demonstrate the versatility of absorptive capacity under the challenging scenarios of emerging markets. While the extant literature argues that EMNEs have a more contained and limited level of absorptive capacity and benefit more from it when investing in incremental and related innovation (Guo and Clougherty, 2020), we found that in the Brazilian context unrelated tech acquisitions are the ones that benefit from the EMNE absorptive capacity. In explaining how these knowledge structures matter for these firms' internal capabilities, we go beyond by disentangling the effect of two dimensions of absorptive capacity in CBAs.

2. Theory and hypotheses

2.1 Are emerging market multinationals different?

In this study, we draw theoretical insights from organizational learning (Levitt and March, 1988; Schleimer and Pedersen, 2014; Vermeulen and Barkema, 2001) and knowledge-based view literatures (Felin and Hesterly, 2007; Grant, 1996) applied to the EMNE context. EMNEs face numerous domestic market challenges, such as a lack of resources and low national innovation levels (Khan *et al.*, 2019; Luo and Tung, 2018). Consequently, the challenge for EMNEs to be globally competitive is more significant than MNEs from developed economies. To overcome the lack of knowledge resources in home markets, EMNEs seek to explore external resources through CBAs. CBAs are a way of accessing foreign markets that allow more effective exploration of these knowledge-based external resources (Popli *et al.*, 2017), contributing to organizational learning and market competitiveness.

However, when going abroad, EMNEs also carry the weight of their origin and nationality. This means they face more barriers and liabilities than advanced market multinationals (AMNEs) (Carney *et al.*, 2021). Due to this trade-off on the need to go abroad for technology and knowledge exploration and the obstacles encountered, the coping mechanisms – regarding capabilities usage – are not considered the same for EMNEs as for AMNEs. EMNEs routinely operate with comparatively older technologies and weaker human capital development and struggle more in their international learning paths.

Brazilian multinationals evidence this point. Brazil has an emergent institutional environment that has undergone institutional reforms under successive administrations. Industrial policies are inefficient and primarily focus on the domestic market (Pinto *et al.*, 2017). Moreover, corruption levels, social inequality rates and property-related crimes create country of origin liabilities for CBAs (Fiaschi *et al.*, 2017). These institutional conditions have compelled large Brazilian firms to seek competitive advantage overseas (Cuervo-Cazurra and Dau, 2009). As a result, Brazil has become one of the leading sources of overseas foreign direct investment (OFDI) from emerging markets (Conti *et al.*, 2016). However, research remains scarce on how these EMNEs accomplished such high rates of OFDI and external knowledge exploration with limited capabilities (Li and Fleury, 2020).

2.2 Exploration-based acquisitions

The organizational learning view proposed by March (1991) considers the firm part of an adaptive system of constant knowledge development. In this context, CBAs can be a form of international knowledge exploitation or exploration. Exploitation is the related and incremental knowledge the firm has access to in industry-related CBAs (March, 1991; Rabbiosi *et al.*, 2012). In comparison, exploration strategies "includes things captured by terms such as search, variation, risk-taking, experimentation, play, flexibility, discovery,

innovation" (March, 1991 p. 71) and are to be encountered in CBA in unrelated industries (Li and Wang, 2019; Rabbiosi *et al.*, 2012). Thus, international acquisitions based on exploration strategies are typically motivated by a drive to procure technology and innovation, wherein knowledge is a crucial reason for firm internationalization (Kogut and Zander, 1993; Nachum and Zaheer, 2005).

EMNE's acquisitions directed to unrelated industries characterize an industry exploration acquisition (Rabbiosi *et al.*, 2012). When the acquisition involves firms from distinct industries, the knowledge held by the acquired firm is novel to the acquiring firm and more suitable for exploration (De Beule and Sels, 2016). The more unrelated the involved industries are, the less redundant knowledge will be acquired, as firm routines from diverse industries are bound to be different. Hence, acquiring a firm from an industry considerably distant from the EMNE's original industry represents an opportunity for acquiring a large array of novel knowledge, which can later be strategically leveraged by the EMNE.

In the realm of Brazilian EMNEs, exploration-based acquisitions present both unique challenges and opportunities. The Brazilian context is marked by institutional inefficiencies and market imperfections that amplify the risks associated with these acquisitions (Falaster *et al.*, 2021). Moreover, Brazilian firms are often driven to pursue these acquisitions to bridge knowledge gaps and quickly gain scarce domestic capabilities (Pinto *et al.*, 2017). However, the complexities of the Brazilian market can present challenges to the period of postacquisition that make it even more critical than for companies from developed countries. This phenomenon is exacerbated when the industry distance is greater, complicating the integration and adaptation of acquired knowledge (Luo and Tung, 2007) and influencing performance.

Prior viewpoints encompassing CBA in different industries and with variable performance outcomes have predominantly focused on diversification strategies without delving into the intricacies of the knowledge involved (Krug and Falaster, 2022; Sakhartov, 2017). Conceptually, March (1991) describes the short-term performance disadvantages of explorative behavior. However, Stettner and Lavie (2014) found that US firms exploring knowledge by acquisitions or alliances can improve firm performance. However, when considering the context of emerging countries, Zhang *et al.* (2020) uncovered a contrasting scenario. Their research indicates that Chinese firms engaged in CBA within unrelated industries experience a decline in performance compared to those pursuing acquisitions within related industries. This asymmetry in findings underscores the idea that "acquisitions with different motives often have different performance implications" (Zhang *et al.*, 2020, p. 5).

We suggest that when an EMNE performs an industry exploration acquisition, it enters a new industry with new routines, instantly resulting in decreased performance due to time and resource consumption of learning and applying the knowledge in its business. That is until the EMNE can successfully learn the routines and reduce information asymmetries relative to its competitors by understanding how to operate in that industry's environment, the firm will have a decrease in performance due to industry unfamiliarity. Learning how to operate in another industry by performing a CBA is relatively complex, as this type of knowledge is highly experiential and tacit, making it challenging to integrate knowledge swiftly. Industry exploration can, in the first instance, be seen as an activity that has unpredictable returns, increasing costs, uncertainties and time in the financial return of this investment. We expect that firms will have a temporary decrease in performance after an industry exploration CBA, and this decrease will be greater when the difference between industries is greater, which leads us to the study's first hypothesis:

H1. The greater the industry unrelatedness between acquirer and target, the lower the postacquisition financial performance.

Technology exploration, in turn, is closely linked to innovation development and is a strategic activity for the organization (Li and Wang, 2019). This type of exploration focuses on developing new tech knowledge to achieve a competitive advantage (De Beule and Sels, 2016). For EMNEs, technological assets can compensate for the lack of technical accessibility and knowledge in the home country (Luo and Tung, 2007) and keep high-tech assets and capabilities updated, achieving and sustaining competitiveness (Elia and Santangelo, 2017).

Through technology exploration, the firm explores technological knowledge opportunities and incorporates these into its operations (March, 1991). This search for innovative knowledge is critical to building a sustainable competitive advantage (Zahra and George, 2002). EMNEs face institutional inefficiencies that typically limit national innovation capacity and impose challenges for EMNEs seeking to develop exploration activities nationally (Khan *et al.*, 2019). International acquisitions are strategic alternatives for obtaining innovative external knowledge (Zhang *et al.*, 2020).

In the context of Brazilian EMNEs, technology exploration through international acquisitions assumes particular significance given the country's innovation ecosystem, which is often constrained by institutional inefficiencies and limited access to cutting-edge technology. Brazilian firms, therefore, may find technology exploration especially beneficial as a means to overcome domestic limitations and to rapidly advance their technological capabilities (Luo and Tung, 2007). We argue that for Brazilian EMNEs, the acquisition of unrelated technological assets may offer an additional value. This is because related technological assets are more likely to be redundant and add less incremental value to firms that are already at a technological disadvantage (De Beule and Sels, 2016).

Furthermore, time is an important factor when understanding the impact that technological knowledge exploration CBA has on a firm's performance. Prior research has typically considered both short-term and long-term performance outcomes. Long-term performance measures, often assessed one or more years in the postacquisition timeframe, provide a comprehensive overview of CBA integration results (Zollo and Meier, 2008). However, it is essential to recognize that long-term performance figures are a cumulative reflection of various short-term events and are contingent on specific contextual factors (Huang *et al.*, 2017). This underscores the significance of the learning process and the structures of knowledge within CBA for a comprehensive understanding of value creation.

We argue that the nature of tech knowledge evolves at a different speed, requiring the firm to integrate faster to avoid obsolescence (Zhu and Qian, 2015). Hence, the impact on the firm's financial performance is expected to be more immediate when compared to industry exploration. Furthermore, in contrast to the exploration of nontech knowledge, the exploration of tech-related knowledge challenges the notion that acquiring technology in related industries is invariably superior. This distinction is because the more the knowledge is related, the more redundant it is and the less value will be added to EMNEs that already operate at technological innovation disadvantages. Hence, related tech knowledge adds less value to the acquisition (De Beule and Sels, 2016). In this case, unrelated technological knowledge is used to leverage radical innovation and new product development and may occur at an advanced speed when compared to other nontech unrelated acquisitions. Following this logic, we hypothesize:

H2. The greater the technological unrelatedness between acquirer and target, the greater the postacquisition financial performance.

2.3 Absorptive capacity

As already noted, absorptive capacity is the firm's ability to recognize the value of external knowledge, assimilate it and apply it in commercial activities (Cohen and Levinthal, 1990).

The capacity to absorb knowledge enables firms to import external knowledge and transform it into innovation and competitive advantage (Zahra and George, 2002). Absorptive capacity gained relevance in the literature as a precursor to intrafirm and interfirm knowledge transfer (Zhou *et al.*, 2020) and organizational learning (Park and Chung, 2019). As a value-creating capacity, the concept has stood out in numerous studies, especially in international business (George *et al.*, 2001; Kotabe *et al.*, 2011; Schleimer and Pedersen, 2014).

International business research has also reported the moderating role of absorptive capacity in potentiating or diminishing relational effects. For instance, Li *et al.* (2016) found that greater absorptive capacity levels mitigate the negative effect of cultural distance in CBAs. When firms engage in CBAs, the efficient integration of the target and acquiring firms is essential, avoiding internal conflicts and the challenges of knowledge asymmetries with their local competitors. Khan *et al.* (2019) also found evidence that absorptive capacity positively moderates innovation performance.

On the one hand, developing absorptive capacity in international business becomes fundamental to facilitating the two-way transfer of knowledge-based assets (Zhou *et al.*, 2020). This capacity is shown as a powerful capacity for CBAs, shaping the interaction between partners, other firms and the business environment (Apriliyanti and Alon, 2017), ultimately influencing the likelihood of success (Liu and Woywode, 2013). On the other hand, possessing higher levels of absorptive capacity does not mean that all knowledge problems are solved. The concept is considered a bet on science and technology, which does not guarantee successful outcomes (Cohen and Levinthal, 1994). Once absorptive capacity consists of a dynamic learning process, wherein its dimensions are dependent and cumulative, factors such as previous knowledge structure are also important (Cohen and Levinthal, 1990; Song *et al.*, 2018). Moreover, when the capacity levels are too high, this can cause the firm to incorrectly assume that external knowledge is not necessary or is less valuable to the internal array of organizational competencies (Srivastava *et al.*, 2015). To better address these implications, it is reasonable to unpack the concept in its dimensions to avoid theoretical and empirical misalignments (Song *et al.*, 2018).

We follow the seminal concept of absorptive capacity proposed by Cohen and Levinthal (1990) by unpacking the capability in two main dimensions: first, the ability to value and assimilate knowledge; and second, the ability to apply knowledge (George *et al.*, 2001). These dimensions corroborate our understanding of absorptive capacity, its phases and its impact on firm outcomes. In this sense, we propose that the ability to apply knowledge can be fundamental for industry exploration acquisition performance. Although we assume that the absorptive capacity dimensions are dependent, cumulative and equally important, some could be more related to the success or failure of the process. In this case, the ability to apply knowledge, for instance, consists of incorporating the knowledge acquired generating or improving new products, systems, processes and capabilities (George *et al.*, 2001; Jiménez-Barrionuevo *et al.*, 2011). After the firm has valued and assimilated knowledge, the application occurs. This ability corresponds to the final stage of absorptive capacity and is usually translated into acquirer patents (Zahra and George, 2002). That is, firms with a higher number of patents illustrate their ability to combine different knowledge sources and incorporate essential changes in the internal structures of basic knowledge (Zander and Kogut, 1995), corroborating the development of new products. Hence, this application capacity increases the firm's predisposition to deal with knowledge that is nonrelated to its core business.

Firms that effectively deal with nonrelated knowledge can more easily and quickly apply the new knowledge learned through exploration strategies, reducing difficulties related to

incorporating the knowledge acquired in industry exploration and adapting to the new industry. This readiness is because the firm is used to dealing with a certain amount of newness due to past efforts in developing patents (George *et al.*, 2001), which facilitates the more rapid application of nonrelated knowledge. Firms that perform CBAs targeting unrelated industries can benefit from having a higher capacity to apply knowledge to the EMNE's global structure, mitigating the negative effects of industry exploration in postacquisition performance. Thus, we propose our *H3* as follows:

H3a. Absorptive capacity moderates the effects of industry exploration on financial postacquisition performance so that firms with a higher knowledge application capacity will be less impacted by industry unrelatedness.

We argue that technology exploration, in its turn, would benefit from the firm's ability to value knowledge. The value and assimilation of knowledge acquired externally imply the strategic selection of knowledge to apply later. Empirically, this ability can be translated as the acquirer's amount of research and development (R&D) spending (Zahra and George, 2002). More R&D investments equip the firm with a higher ability to learn by selecting the appropriate knowledge for its business. When acquiring high-tech firms, the knowledge pool is bigger than in nontech sectors (Guo and Clougherty, 2020). In this case, a greater acquired knowledge pool requires greater capabilities of identifying what can be transformed and combined with the acquirer firm's proprietary knowledge to create value. Consequently, in high-tech acquisitions, the ability to value knowledge is more crucial in integrating and transferring proper knowledge between acquired and acquirer firms than the application *per se*.

High technology resources demand expertise and research specialization to explore knowledge through international acquisitions (George *et al.*, 2001). In this regard, technology exploration acquisitions can benefit from the ability of the firm to value knowledge, which is necessary to process the high-tech knowledge existing in the target firm. Firms with this superior ability of value can better transform the acquired knowledge into useful knowledge throughout its global structure, increasing the results obtained in technology exploration. This ability can improve financial returns in technological asset exploration. It facilitates the use of acquired knowledge and makes it possible to transform it across various potential uses. Therefore, the following hypothesis was formulated:

H3b. Absorptive capacity moderates the effects of technology exploration on postacquisition financial performance so that firms with a higher knowledge valuation capacity will be more impacted by technology unrelatedness.

Figure 1 shows the conceptual framework proposed.

3. Research methodology

3.1 Data and sample

The international acquisitions data were collected in the Thomson-Reuters (SDC Platinum®) database, supplemented with the accounting data available in Economatica®, open data of R&D investments in B3 S.A, and patent data from the National Institute of Industrial Property (INPI). INPI is an open database from the Brazilian national organization that regulates the registration of patents by firms in the country. We gathered a database containing all international acquisitions performed by Brazilian EMNEs completed between 1995 and 2015 (excluding target countries with favored taxation and privileged tax regimes), resulting in 457 acquisitions performed by 258 firms. Next, we filtered the data by completed

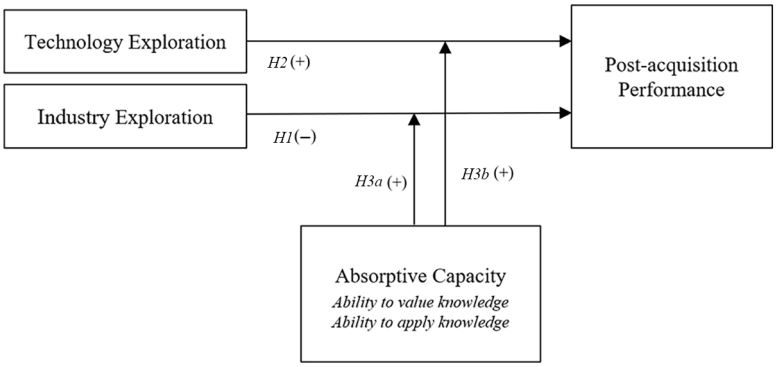


Figure 1.
Conceptual framework

Source: Figure by authors

deals made by publicly listed firms that provide financial performance open reports, diminishing the number of observations to 350 acquisitions from 198 firms. We supplemented data with patents and R&D investments. The final database contains 101 acquisitions from 32 firms with available data. Table 1 illustrates the percentage, per target country, of Brazilian investments. The most significant acquisitions were in Argentina (20.8%), followed by the USA (18.8%) and Mexico (9.9%).

Countries	No. of acquisitions	%
Argentina	21	20.8
USA	19	18.8
Mexico	10	9.9
Chile	6	5.9
Uruguay	6	5.9
Portugal	5	5
Canada	3	3
The Netherlands	3	3
Norway	3	3
Peru	3	3
Turkey	3	3
Colombia	2	2
Guatemala	2	2
Japan	2	2
Spain	2	2
UK	2	2
Venezuela	2	2
Australia	1	1
Ecuador	1	1
France	1	1
Germany	1	1
Italy	1	1
Kuwait	1	1
Qatar	1	1
Total	*101*	*100*

Table 1.
Sample by target countries

Source: Table by authors

The period from 1995 was chosen because it signified the stabilization of the Brazilian economy due to the Real Plan (Lana *et al.*, 2019), thereby reducing the high inflation rates of previous years. The Real Plan was part of a political agenda that objectively stabilized the economy by introducing a new currency, the Brazilian Real (BRL), which gave the plan its name (Rocha, 2000). The final year examined was 2015 due to Brazil's economic recession in 2016, culminating in the president's impeachment (Gratius, 2018).

Brazil was chosen as the context for this analysis for four main reasons. First, Brazil emerges as a pivotal actor in the landscape of outward foreign direct investment (OFDI) among emerging economies, leading the Latin American region with an OFDI volume exceeding $25bn in 2022 (UNCTAD, 2023). Second, a growing number of Brazilian multinationals are prominent in global markets (Fleury and Fleury, 2011). Understanding their strategies could help understand their CBAs and effectiveness in seeking knowledge abroad (Pinto *et al.*, 2017). In this regard, we were also able to capture absorptive capacity measures in relation to this sample that do not exist uniformly in other Latin American countries (e.g. Brazilian patents database). Third, the Brazilian context represents an emerging economy that has, overall, intermediate levels of institutional development: not too weak that companies would not be able to flourish and become multinationals, and not too strong that companies would have little incentive to expand to international markets (Fleury and Fleury, 2011). This is because the Brazilian state promoted a series of policies to increase the international competitiveness of some of its key companies (Musacchio *et al.*, 2022). These policies made it possible for the Brazilian "National Champions" to gain a foothold in developed countries and establish themselves as leading players in other emerging markets. Consequently, Brazilian companies perform acquisitions in developed and emerging host countries, providing a sample with a rich variation of destinations for our investigation. Finally, our decision to focus on Brazil provides a controlled setting, which allows for an in-depth analysis of the strategies of Brazilian multinationals in a homogeneous environment. This single-country approach enhances the clarity of our findings by reducing external variables, such as the home-country effect, and yields results that are not impacted by the statistical errors that arise from using multiple home countries. While this approach narrows the geographical scope, it significantly deepens the analytical depth and improves the model by focusing on the variables of interest.

3.2 Variables

3.2.1 Dependent variable. The dependent variable is the firm's postacquisition financial performance. This performance is measured by the growth in the return on assets (ROA) from the acquirer firm. ROA is often used to evaluate the effects of a firm's strategic actions (Ellis *et al.*, 2011; Rothaermel and Alexandre, 2009). It is commonly associated with the financial performance of international acquisitions (Bortoluzzo *et al.*, 2014; Zollo and Meier, 2008). Following the work of Tanriverdi and Venkatraman (2005) and Ellis *et al.* (2011), we calculated the *Performance* variable by considering the ROA of the year after acquisition ($T+1$) and subtracting it from the ROA of the year before the acquisition ($T-1$). ROA is an indicator directly impacted by international acquisitions and represents the immediate effects of the acquisition on performance (Zollo and Meier, 2008). For our robustness check, we also calculate the acquiring firm's ROA three years after the acquisition in relation to one year before the acquisition (Ellis *et al.*, 2011).

ROA is an important financial metric, particularly relevant for CBAs, as it sheds light on the efficiency with which a company uses its assets to yield profits (Palepu *et al.*, 2020). This metric is derived by dividing net income by total assets. The preference for ROA stems from its superior efficacy when juxtaposed with other metrics. While earnings before interest,

taxes, depreciation and amortization emphasizes operating profitability without accounting for the asset structure, return on equity (ROE) gauges the return on shareholders' equity. Notably, ROE can be skewed by financial leverage, potentially portraying highly leveraged companies as more profitable than they truly are. In contrast, ROA provides a holistic perspective on a company's profitability concerning its entire resource pool. This makes it an invaluable metric for gauging the inherent profitability of a firm, especially in international acquisitions where the efficient utilization and integration of assets are crucial.

3.2.2 Independent and moderator variables. The independent variable *Industry Exploration* is measured based on the acquisition's nature. Once the acquiring and target firms are industry-related, the focus is an incremental expansion of the firm's knowledge. In contrast, unrelated acquisitions express an attitude to incorporate new and different knowledge (Rabbiosi *et al.*, 2012). This nature of knowledge is considered tacit, further complicating the ability of the firm to integrate and assimilate it (Zhang *et al.*, 2020) and corroborating the March (1991) definition of exploration activity. In this way, to classify the intensity of an exploration CBA, we analyzed the four-digit standard industrial classification (SIC) code, which determines firms' industrial sectors. We defined industry exploration as rated "0" for acquisitions of firms in the same industry (same four-digit SIC), rated "1" for acquisitions that share at least the three first digits, rated "2" when the firms involved in the acquisition share two first digits and rated "3" when the acquisition has three or four discordant digits.

We measured *Technology Exploration* by capturing the level at which the parent firm's industry is related to the target firm's industry in high-tech sectors. We followed Aulakh *et al.* (2013) in classifying each industry as high-technology or not. Thus, to capture the representativeness of the technology exploration in our sample, we isolated the effect of nontech CBAs. In this sense, we analyzed the four-digit SIC code. We rated the variable "0" if the acquisition is not in a high-tech sector, "1" if the target firm is in a high-tech industry with up to two divergent last digits and "2" when the acquisition has three or four discordant SIC digits. The high-tech sector of the target firms in our sample are electronic computers and peripheral equipment (SIC 357x), software (SIC 504x) and pharmaceuticals and *in vitro* diagnosis (SIC 283x).

In operationalizing our measurements, both industry and technology exploration use the SIC code system, which may initially suggest an overlap in their definitions. However, while *Industry Exploration* gauges the degree of relatedness between acquiring and target firms, focusing on the nature of knowledge acquisition, *Technology Exploration* is centered on the technological nature of the target firm's sector. Essentially, the former evaluates whether the acquisition is about expanding existing knowledge or incorporating new knowledge through a different industry, whereas the latter discerns the technological differences of the industry in which the acquisition occurs.

The moderator variable *Absorptive Capacity* is a measure that aims to capture the level of absorptive capacity existing in the firm during the acquisition. Following George *et al.* (2001), we operationalized the two dimensions of absorptive capacity: the ability to value knowledge and the ability to apply knowledge. *Ability to value knowledge* is calculated based on the investment in R&D, in millions of BRL, spent in the year of acquisition by the acquirer. The rationale is that higher R&D spending signals a stronger emphasis on exploring new ideas and technologies, which is essential for identifying valuable knowledge. Moreover, substantial investment in R&D typically correlates with a skilled and innovative workforce, which is crucial for assessing the potential of new knowledge (George *et al.*, 2001). By focusing on R&D investment, firms can be evaluated on their tangible commitment to fostering an environment where knowledge is acquired based on its value

for future innovation and growth. In contrast, the *Ability to apply knowledge* is calculated based on the number of the acquirer patents registered up to the year of acquisition, including the focal year. This measure justifies the idea that "for the firm to gain a patent, it has to demonstrate some degree of newness that reflects a change in the firm's basic knowledge structure" (George *et al.*, 2001, p. 216). This metric is advantageous as it quantifies a firm's innovative output and competence in applying new knowledge to create tangible intellectual assets. Thus, we believe that more patents correspond to an enhanced absorptive capacity accounting for successfully assimilating external knowledge and applying it in the firm (Zahra and George, 2002).

3.2.3 Control variables. The effects on the acquiring firm's financial performance were controlled at the industry, firm and country levels. *Industry Average ROA* is a control variable for macroeconomic and sectorial effects on firm performance across industries (Bortoluzzo *et al.*, 2014). This control is important and has been used in other studies that measure postacquisition performance as a dependent variable (Ellis *et al.*, 2011; Tanriverdi and Venkatraman, 2005) because firms in technological sectors often have high-value assets that could lead us to a biased conclusion in comparison to other performance in other industries.

At the firm level, the *Acquisition Size* is controlled by the percentage of shares of the acquisition. Previous studies controlled the percentage of ownership involved in the transaction because of the influence on the number of resources allocated (Buckley *et al.*, 2014). The level of risk tends to increase when the investment is higher. Also, firms can opt for more or fewer shares as a matter of control, and this decision can imply differences in financial performance.

The available *Slack of Resources* is calculated by the ratio between the firm's current assets and current liabilities, measuring the available resources (Chiu and Liaw, 2009). The firm's slack resources provide more investment flexibility and allow risk-taking, impacting performance results (Mousa *et al.*, 2013). Recent research also used slack resources as a control variable over financial performance effects (Munjal *et al.*, 2019). We measure the resource slack of the acquiring firm.

Macroeconomic data, such as *GDP* per capita, may influence the firm's international performance and willingness to invest in another country, given the differences between the respective economies of the parent and subsidiary firms involved in acquisition (Hansen and Gwozdz, 2015). We used GDP per capita data from host countries as controls since we account for only one home country (Brazil).

To control the effects of previous experience in the host country, we add the dummy variable *Firm Experience*. We coded the variable as "1" if the acquirer had any subsidiary in the host country and "0" otherwise. This control is essential because the acquirer firm might have developed local capabilities by having previously established subsidiaries in the host country. The more the firm internationalizes, the more it expands its capabilities to deal with challenges.

Finally, we created year dummies for the *Year* that the acquisition was completed. By doing this, we can control for differences across time periods. Each of the acquisitions happened at a different point in time. This means that changes in the external environment, technology or industry would differ depending on when the acquisition occurred (Lee *et al.*, 2023). Thus, this control helps to capture time heterogeneity among the observations (Feinberg and Gupta, 2009).

4. Results

Table 2 shows the descriptive statistics of the variables, the mean and the standard deviation values.

	N	Minimum	Maximum	Mean	SD
Post acquisition performance ($T+1$)	101	−0.272	0.134	−0.021	0.069
Post acquisition performance ($T+3$)	101	−0.232	0.132	−0.030	0.072
Ability to value knowledge (R&D)	101	1.2 mi	1.7 bi	302 mi	462 mi
Ability to apply knowledge (Patents)	101	0	295	30.4	55.8
Industry exploration	101	0	3	1.23	1.318
Technology exploration	101	0	2	0.118	0.382
Acquisition size	101	12	100	80.01	26.540
Industry average ROA	101	−0.102	0.196	0.065	0.044
Slack of resources	101	0.613	4.879	1.736	0.863
GDP per capita host country	101	2,440.5	14.2 mi	689,334.7	2.2 mi
Firm experience	101	0	1	0.188	0.393

Table 2.
Descriptive statistics

Note: SD = standard deviation
Source: Table by authors

In Table 3, we present the correlation test among the variables. We also tested the assumptions for linear regression (such as linearity, normality and homoscedasticity), allowing the application of the statistical method. Furthermore, F (significant p-value), VIF of variables (lower than 10), and Durbin–Watson values were satisfactory and consistent with the literature (Hair *et al.*, 2009). Therefore, the regression model was adequate to test the formulated hypotheses. Other alternative regressions, such as panel analysis, are unsuitable for our sample due to the unbalanced distribution of cases over the years.

Table 4 presents the results of the ordinary least squares regression and moderation. The dependent variable was the financial performance ($T+1$) of the parent firm. Model 1 shows the regression with control variables. Slack resources offer a consistent effect on the model. This variable is related to the resources of the parent firm in the year of the acquisition.

The results in Model 2 show significant values supporting *H1* (β −0.190, p 0.077). *H1* posited that industry exploration has a negative and significant effect on financial performance. (Zhang *et al.*, 2020) have found similar results in Chinese CBAs based on exploration activities and stock performance impact. According to the authors, the exploration of new knowledge is riskier than exploitation activities, and one way of reducing the risk is by acquiring firms in the same industry. Thus, even though exploring this new knowledge is strategic to the firm, its financial outcomes are affected in the short term. These findings corroborate the extant literature (Zhang *et al.*, 2020).

Model 3 tests the effect of technology exploration on financial postacquisition performance. Technology exploration positively and significantly influences financial performance (β 0.316, p 0.003), confirming *H2*. Interestingly, our results support that Brazilian EMNEs searching for knowledge abroad benefit from new tech knowledge. Despite the lack of innovative resources in the home country, the firm can still offset acquisition costs based on technology exploration, adding financial value with this new knowledge. Enderwick and Buckley (2021) argued that EMNEs have a learning path especially linked to the home country's characteristics. In this sense, we believe that Latin America and Brazil specifically have an institutional environment that promotes innovation and knowledge exploration in a particular manner. Even though the Brazilian Government offers domestic innovation policies to these firms, the search for technology in international markets might be more attractive.

H3a posited that the subsidiary's realized absorptive capacity weakens the interaction between industry exploration and performance, hence improving financial performance.

		ROA ($T+1$)	ROA ($T+3$)	1	2	3	4	5	6	7	8
1	Ability to value knowledge (R&D)	−0.059	−0.062	1							
2	Ability to apply knowledge (Patents)	0.058	0.123	0.237*	1						
3	Industry exploration	−0.127	−0.156	0.141	0.012	1					
4	Technology exploration	0.203*	0.109	−0.135	−0.106	−0.134	1				
5	Acquisition size	−0.040	0.030	−0.064	−0.071	−0.049	0.123	1			
6	Industry average ROA	0.052	0.115	0.050	−0.158	0.041	0.125	−0.010	1		
7	Slack of resources	−0.395**	−0.294**	−0.181	−0.100	−0.205*	−0.046	0.012	−0.211*	1	
8	GDP per capita host country	0.135	0.115	0.072	−0.046	0.016	0.160	−0.017	0.115	−0.080	1
9	Firm experience	0.065	0.030	0.039	0.074	0.071	−0.084	−0.200*	−0.080	0.041	−0.051

Note: Correlations > 0.099 in magnitude are significant at the $p < 0.05$ level of confidence
Source: Table by authors

Table 3.
Correlations

Table 4.
Regression coefficients on financial acquisition performance ($T+1$)

	1	2	3	4	5
Acquisition size	−0.029 (0.792) [0.017]	−0.023 (0.831) [0.017]	−0.094 (0.376) [0.016]	0.017 (0.872) [0.016]	−0.133 (0.271) [0.018]
Industry average ROA	0.016 (0.889) [0.175]	−0.002 (0.982) [0.173]	−0.028 (0.794) [0.168]	−0.019 (0.867) [0.172]	−0.026 (0.842) [0.200]
Slack of resources	−0.366** (0.002) [0.009]	−0.417*** (0.001) [0.009]	−0.339** (0.003) [0.009]	−0.411*** (0.001) [0.009]	−0.303* (0.016) [0.010]
GDP host country	0.031 (0.784) [0.004]	0.073 (0.519) [0.004]	0.009 (0.936) [0.004]	0.110 (0.308) [0.004]	−0.047 (0.711) [0.005]
Firm experience	0.134 (0.232) [0.020]	0.137 (0.215) [0.019]	0.163 (0.126) [0.019]	0.122 (0.243) [0.018]	0.128 (0.275) [0.020]
Year	YES	YES	YES	YES	YES
Industry exploration		−0.190† (0.077) [0.006]		−0.029 (0.798) [0.006]	
Technology exploration			0.316** (0.003) [0.018]		0.459*** (0.001) [0.024]
Absorptive capacity (A.C.) - *Ability to apply knowledge*				−0.479* (0.027) [0.000]	
Absorptive capacity (A.C.) - *Ability to value knowledge*					0.097 (0.489) [0.006]
A.C. * Industry exploration				−0.668* (0.002) [0.000]	
A.C. * Technology exploration					0.222† (0.071) [0.000]
N	101	101	101	101	101
F	1.610*	1.719*	2.106**	2.247**	1.797*
Adj. R^2	0.128	0.152	0.217	0.252	0.198

Notes: †$p < 0.1$, *$p < 0.05$, **$p < 0.01$ and ***$p < 0.001$. p-value shown in parentheses. Standard error presented in square brackets. Dependent variable: ROA ($T+1$)
Source: Table by authors

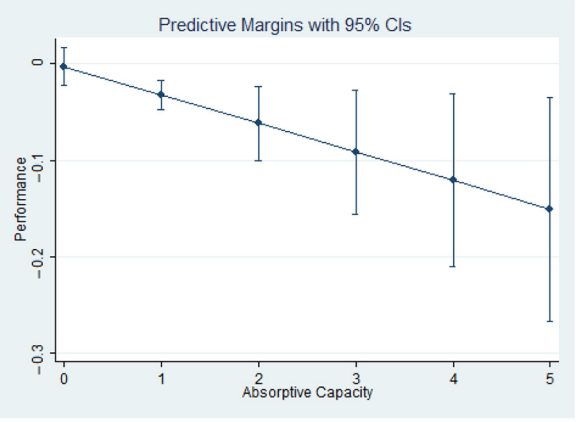
However, in Model 4, the results show that the absorptive capacity moderation effect is negative, aggravating the decrease in financial performance (β −0.668, p 0.000). In testing this hypothesis, the ability to apply knowledge was measured by patents, referring to the firm's ability to successfully exploit new knowledge (Zahra and George, 2002). "Patents also record the firm's evolving or emerging knowledge and therefore represent a milestone in its progress in discovery and innovation" (George *et al.*, 2001, p. 216). Nonetheless, previous patent knowledge is a consolidated ability of the firm, and perhaps it loses its relevance and applicability in the short term. This does not mean that it is ineffective to combine this capacity with industry exploration but, instead, that it takes longer to create financial value for the firm. For this reason, since this combination can be a bet on the unknown (Cohen and Levinthal, 1994), incurring financial shortcomings, we are able to highlight the negative impact of absorptive capacity and the need for a firm's financial resilience when applying this global strategy. Figure 2 presents the marginal effects of the model.

In Model 5, we tested the absorptive capacity (R&D) moderation effects on technology exploration acquisitions proposed in *H3b*. We found consistent results that support our prediction (β 0.222, p 0.071). However, Hayes (2013) proposes that the best interpretation for the moderation test is to investigate the marginal effects. Thus, to provide robustness to the analysis, Figure 3 reassures the positive impact of absorptive capacity over technology exploration. In this case, the process of learning from unrelated high-tech acquisitions received the crucial influence of parent firm R&D investments (Camisón and Forés, 2010; George *et al.*, 2001), providing the firm with the agility required to transform the entirely new knowledge in value creation.

4.1 Robustness checks

We performed additional tests to give the model robustness. In doing so, we performed the same model tests, with an alternative dependent variable, by calculating the growth in performance relating to three years after the acquisition ($T+3$) (Ellis *et al.*, 2011). The tests confirm the previous results, as illustrated in Table 5.

Variations in significance were not observed between the two dependent variables. However, the explanatory strength of the model is more significant in the alternative



Source: Figure by authors

Figure 2.
Effects of industry exploration on performance moderated by absorptive capacity ($T+1$)

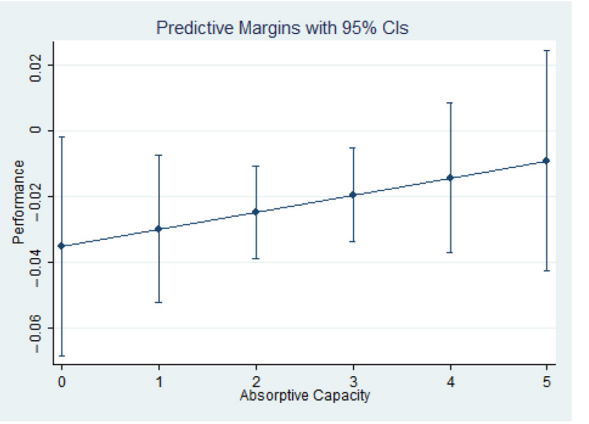


Figure 3.
Effects of technology exploration on performance moderated by absorptive capacity ($T+1$)

Source: Figure by authors

dependent variable measure at $T+3$. The marginal effects graph illustrates the moderation results tested on Models 4 and 5 – Figures 4 and 5 – respectively.

Furthermore, we conducted supplementary tests, incorporating various control variables, including firm size, GDP per capita of the home country, cultural distance, and the classification of the host country as economically developed or not. It is noteworthy that the outcomes consistently align across all models. Nevertheless, we opted to exclude those control variables due to their insignificance.

5. Conclusion

This study analyzed the effects of absorptive capacity on the relationship between knowledge exploration acquisitions and international postacquisition performance. We considered a sample of Brazilian EMNEs CBAs. Our findings show that absorptive capacity moderation can worsen adverse effects in some exploration activities while it can enhance financial outcomes in others. Thus, we discuss how differences in knowledge structures might benefit and sometimes harm a firm's outcomes.

5.1 Theoretical contribution

Our study contributes to the international business strategy literature in two main ways. First, our study explains the impact of different knowledge structures on EMNE's postacquisition performance. We found that industry exploration involves higher risks and costs of adaptation and learning, negatively impacting financial performance. Similar results were found by Zhang *et al.* (2020) in Chinese explorative CBA. They showed that unrelated acquisitions presented lower performance than related ones and proposed ownership structures and amount of resource slack as a response to avoid risks in such investments and overcome short-term decreases in performance. Our findings advance the discussion by showing that EMNEs from Brazil also discern value in pursuing CBAs that seek to explore new knowledge in new industries abroad, even with the odds of decreasing short-term financial performance. This understanding comes from how EMNEs evaluate the knowledge from different industries as an important tool for innovation and competitiveness. In this sense, Frank *et al.* (2016, p. 588) also emphasized that:

	1	2	3	4	5
Acquisition size	0.009 (0.924) [0.016]	0.014 (0.879) [0.015]	−0.031 (0.744) [0.016]	0.039 (0.683) [0.015]	−0.088 (0.396) [0.017]
Industry average ROA	0.047 (0.639) [0.161]	0.030 (0.760) [0.159]	0.019 (0.844) [0.159]	0.029 (0.776) [0.168]	0.031 (0.785) [0.182]
Slack of resources	−0.168† (0.098) [0.008]	−0.215* (0.038) [0.009]	−0.152 (0.128) [0.008]	−0.232* (0.027) [0.009]	−0.098 (0.357) [0.009]
GDP host country	0.002 (0.981) [0.004]	0.041 (0.680) [0.004]	−0.011 (0.906) [0.004]	0.055 (0.574) [0.004]	−0.094 (0.390) [0.004]
Firm experience	0.094 (0.335) [0.018]	0.097 (0.313) [0.018]	0.113 (0.242) [0.018]	0.082 (0.391) [0.018]	0.063 (0.532) [0.019]
Year	YES	YES	YES	YES	YES
Industry exploration		−0.173† (0.066) [0.005]		−0.117 (0.222) [0.005]	
Technology exploration			0.196* (0.037) [0.018]		0.394*** (0.001) [0.022]
Absorptive capacity (A.C.) - *Ability to apply knowledge*				−0.123 (0.319) [0.006]	
Absorptive capacity (A.C.) - *Ability to value knowledge*					0.153 (0.209) [0.006]
A.C. * Industry exploration				−0.230* (0.038) [0.000]	
A.C. * Technology exploration					0.301** (0.005) [0.000]
N	101	101	101	101	101
F	3.052***	3.165***	3.246***	3.192***	3.147***
Adj. R^2	0.330	0.351	0.360	0.372	0.400

Notes: †$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. *p*-value shown in parentheses. Standard error presented in square brackets. Dependent variable: ROA ($T + 3$)
Source: Table by authors

Table 5.
Regression coefficients on financial acquisition performance (T 3)

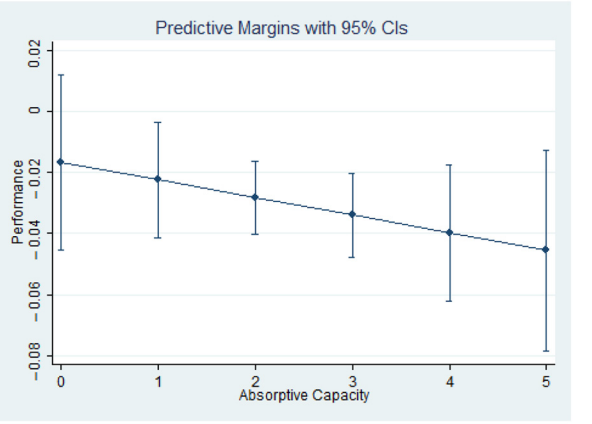


Figure 4.
Effects of industry exploration on performance moderated by absorptive capacity ($T+3$)

Source: Figure by authors

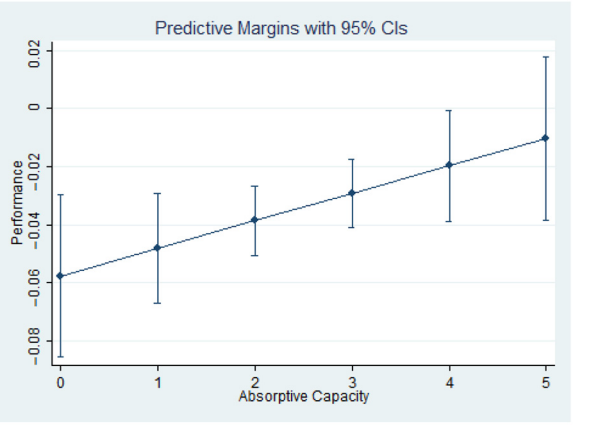


Figure 5.
Effects of technology exploration on performance moderated by absorptive capacity ($T+3$)

Source: Figure by authors

> [. . .] innovation may generate a number of intangible benefits such as improvements in market share position, brand recognition, increased learning, and absorptive capacity, the establishment of critical business relationships and partnerships, all of which may not generate immediate financial gains.

We also analyzed acquisitions based on technology exploration and found that technology exploration acquisitions in unrelated industries positively affect postacquisition performance. The main assumption to explain the result is that the tech knowledge acquired abroad through the subsidiary represents routine improvement, skills development and technology updates, creating value for the CBA (Zhang *et al.*, 2020) even in the short term. However, Frank *et al.* (2016) have found that technology acquisitions performed by Brazilian firms are mostly focused on machinery and have a negative impact on innovation. This could be explained by the internal measure used for the study. We considered a broader

context of technology acquisition that encompasses domestic knowledge and machine exploration, which can evidence the liabilities of the Brazilian EMNEs context. Conversely, our theoretical backdrop allows us to go beyond, posing national home country hindrances as motivators of international exploration strategies and analyzing the resultant knowledge exploration performance effects. Once the EMNE struggles with the scarcity of resources at home, the technology acquired abroad can offer a competitive boost, considering the particular structures of tech knowledge (Zhu and Qian, 2015).

Second, we contribute to the literature by showing that absorptive capacity can be a liability or a promoter in value creation through the knowledge accessed in the EMNE CBA. The ability to apply knowledge (patents) demonstrated that the firm had settled routines to perform the knowledge exploration, especially in new ventures capturing new knowledge and, consequently, creating new competencies (Zahra and George, 2002). Analyzing our sample, for instance, WEG, in the motor and generator industry segment, acquired the Argentine firm Pulverlux SA in 2011, expanding its business into the chemical products industry. The expansion allowed the integration of its production supply chain, applying the paint fabricated in the subsidiary to its actual products. In this case, the target's patents were the primary source of knowledge that supported this industry exploration acquisition. Nonetheless, despite the knowledge of the chemicals being implemented in the production process, it might take longer to outweigh its investments and integrate the acquisition to the extent that it creates financial value for the firm. Similarly, Alpargatas Santista Textil S.A., from the textile industry, acquired the Chilean trousers maker, Machasa, in 1999. Alpagartas performed a product line expansion, adding the segment to their portfolio and applying their current knowledge in textile patents to operate this CBA. In this way, the financial return of industry exploration strategies in CBAs might be considered slow. These findings corroborated the understanding of EMNE performance antecedents in industry exploration by showing that exploration in CBA to different industries requires a firm's financial resilience to cope with the odds of the activity in the short term.

For technological exploration, absorptive capacity shows a positive moderation impact through the ability to value knowledge (R&D). According to our sample, the technology exploration acquisitions were mostly performed in innovative sectors such as electronics and pharmaceuticals. For this reason, the more related the knowledge acquired, the more redundant it could be for the firm's existent knowledge, showing that the investment in absorptive capacity levels could be more valuable when combined with new and unrelated knowledge. Furthermore, by investigating the impact of technology exploration, we propose an interesting observation about the Brazilian context. While previous studies argue that innovation policies are inefficient (Frank *et al.*, 2016) or hinder private R&D investments in Brazil (Rocha, 2015), our results show that this is not entirely true. The technology exploration acquisitions in our sample illustrate that firms that benefited from innovation policies and support from the Brazilian development bank, BNDES (e.g. Eurofarma Laboratorios, Bematech SA and Itautec SA), subsequently acquired international subsidiaries (Arbix and Caseiro, 2012). We found that these firms not only benefited in part from national policies but also combined these resources with internal R&D investments to achieve enhanced financial performance. Consequently, our study reinforces the importance of analyzing absorptive capacity dimensions separately to offer a fined-grained view of value creation in international operations. This ability to process and transform knowledge is specifically helpful for EMNEs to successfully transform acquired knowledge to suit their structure and deploy it as a competitive edge.

5.2 Managerial implications

Our managerial contribution highlights the versatile impact of a firm's absorptive capacity in exploration-based CBA outcomes. EMNEs gain unique benefits from exploring and

developing new resources, which can be essential for competitive advantage and long-term survival (Li and Wang, 2019). However, the firm's ability to absorb new knowledge is more financially relevant when the knowledge being explored is technological. Otherwise, indiscriminately investing in this capacity can bring challenges to managers. Once the manager understands the impact of this ability on the performance of the transactions, it is possible to measure investments and properly distribute resources in line with the firm's strategy. The number of patents registered, combined with industry exploration acquisitions, might offer a greater decrease in performance. On the contrary, the ability of an EMNE to value knowledge, combining existent and new, through its R&D investments, boosts the financial value creation of technological exploration. Assuming that absorptive capacity is a functional construct that can be developed internally (Minbaeva *et al.*, 2014), this ability can be understood and used across international endeavors, as well as on different levels and among different strategies.

5.3 Limitations and future research

As an interdisciplinary approach, absorptive capacity may have different perspectives that need to be analyzed (Apriliyanti and Alon, 2017). First, we investigated the impact of this capacity on exploration strategies and overseas performance. Our gauge for absorptive capacity comes from the number of total patents and the R&D spent in the focus period (Zahra and George, 2002). Future studies may investigate how to build and stimulate this capacity at the firm's microlevels, particularly regarding exploration acquisitions.

Second, the cross-border aspect imposes challenges on institutions. We added controls to our tests, but we did not analyze the specific interaction of the framework with institutions, as this was not the focus of this study. Institutional differences between the home and host countries also represent a lens for analyzing risks and other postacquisition performance predictors. Further research may examine institutional interaction and the consequences for multinational absorptive capacity.

Third, focusing on Brazilian multinationals, our study provides a detailed view of the results within a consistent environment. This concentrated approach highlights specific behaviors in Brazil and reduces statistical error from multiple home-country effects. However, it also implies limited generalizability. Future research could explore these dynamics in other emerging economies for a broader comparative power.

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