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International expansion, knowledge sourcing and technological upgrading. The experience of multinational enterprises from emerging countries in the last decade.

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# Summary

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The present research project is based on the awareness that in the recent years foreign direct investments (FDI) from emerging economies have significantly grown, from \$11 billion in 1990 to \$454 billion in 2013, representing around the 32% of the world stock today (UNCTAD, 2014). Although advanced economies still remain the main source of outward FDI, emerging market multinationals (EMNEs) have increasingly attracted attention since they have experienced an unusual internationalization path, often becoming global players in relatively short time (Awate et al. 2014; Ramamurti, 2009). Consistent with the *springboard theory*, EMNEs' outward FDI - mainly acquisitions toward advanced markets - are triggered by pull factors, such as brands, technology, design competences, and managerial expertise, in order to acquire strategic assets and resources to compete successfully in the global market (Luo and Tung, 2007; Rui and Yip, 2008).

The foremost motivation of the acquisition of strategic assets is the development of technical and innovative capabilities. As a matter of fact, such capabilities have been traditionally identified as key determinants for firms' competitive advantage (Schumpeter, 1934). Thus, within this context, it is crucial to build an understanding of the knowledge creation and sourcing process that boosts EMNEs' technological upgrading, identified as one of the most powerful enablers of EMNEs' ability to compete internationally.

This work focuses on EMNEs' international expansion and their strategies aimed at accessing new knowledge and valuable technological competences through collaborations with foreign actors, i.e. firms, universities and inventors. So the core research question we seek to address is: *How do EMNEs behave during their technological upgrading process through international expansion and external knowledge sourcing?*

The thesis is a collection of four papers, intended to analyze different but complementary aspects of the abovementioned research question. Specifically, in Chapter 1 we present a critical review of the recent literature about EMNEs and the characteristics of their FDI. Namely, we summarize and discuss some of the issues that have attracted most scholarly debate in the international business domain, such as EMNEs' country- and firm-specific advantages, FDI motivations and modes of entry into foreign markets. We also examine to what extent EMNEs undertake FDI to upgrade their technological capabilities in order to reduce their technological gap with multinationals from advanced markets.

In the next two chapters, we empirically analyze the internationalization strategies of EMNEs when they undertake knowledge-intensive acquisitions in advanced markets. In particular, in Chapter 2 we study the relationship between EMNEs' ownership choices and the main motivation of their international expansion. Our findings suggest that EMNEs prefer to acquire less control and keep the local partner when they invest for seeking knowledge, in order to more easily transfer competences from the target company. In Chapter 3, we focus on the importance of EMNEs' home-country specific characteristics on the ownership choice decisions, presenting a comparative analysis of Chinese and Indian MNEs. We argue that China and India inherent heterogeneity plays a crucial role in differently shaping the MNEs' ownership choice. As a result, we find that Chinese MNEs are less likely to acquire control in the target company, compared to Indian firms. Further, the greater the institutional distance between the home and the host country, the larger the difference between Chinese and Indian firms' decision.

In Chapter 4, we explore the extent to which the integration of emerging countries into the global system of innovation represents a channel for their technological upgrading. Using patent data on the innovative activity in the Chinese pharmaceutical industry, we analyze the geographic dispersion of Chinese inventor networks, as a function of the characteristics of the innovative actors. Our findings point out the critical role that foreign universities and research centers may play in the technological upgrading process of emerging countries.

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# Introduction

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Research on internationalization of multinational enterprises (MNEs) has traditionally focused on firms from Western economies. The rise of emerging market MNEs (EMNEs) in recent years has increasingly attracted considerable research attention, since the phenomenon has important theoretical and empirical implication (e.g. Brennan, 2011; Luo and Tung, 2007; Mathews, 2006; Peng, 2012; Ramamurti, 2009). EMNEs, in fact, have experienced an unusual internationalization path, often becoming global players in relatively short time (Awate et al., 2012). Contrary to MNEs from developed markets and newly industrialized economies (e.g. Honk Kong, Korea, Singapore and Taiwan), EMNEs have leveraged the international experience and sophisticated competences brought at home by inward internationalization. Namely, by cooperating with foreign firms in their own domestic markets EMNEs have accumulated technological and organizational skills, which have allowed them to expand internationally and invest in more advanced countries going against the grain of conventional wisdom (Luo and Tung, 2007; Deng, 2009).

Although advanced economies MNEs (AMNEs) still remain the main source of outward foreign direct investments (FDI), outflows from emerging economies have significantly grown, from \$11 billion in 1990 to \$454 billion in 2013, representing around the 32% of the world stock today (UNCTAD, 2014). EMNEs have been engaged in international growth mainly through mergers and acquisitions, even if the number of greenfield investments is rapidly increasing. In terms of deals' number, in fact, in 2013 mergers and acquisitions from emerging economies represent the 19% of the total number, while greenfield investments around the 17% (UNCTAD, 2014).

As highlighted by the recent statistics, the importance of FDI from emerging economies is strategic for the world economy, and this trend has induced to revise the traditional internationalization theories, in order to better understand and explain what drives their expansion toward foreign, especially advanced, markets.

## **MNEs from emerging economies: the new global players**

It is not easy to provide a comprehensive description of EMNEs, since they are far from homogeneous. However, they share some common characteristics mainly related to their home countries. Emerging economies, in fact, have distinctive specificities, such as weak and instable legal systems, continuous structural changes of the industrial sector, relative infrastructures' backwardness, and significant participation of the state in the corporate governance, that make EMNEs intrinsically different from their counterparts originated in advanced markets (Andreff, 2002; Hoskisson et al., 2013). Unlike traditional MNEs, EMNEs tend to be classified also with respect to the nature of their ownership, i.e. state- or non-state-owned, which can contribute to better address strategies and rationales of their internationalization (Luo and Tung, 2007). For instance, state-owned EMNEs leverage governmental support, also from a financial point of view, and often internationalize their activities to fulfill government mandates and objectives. Consequently, they more likely experience a risk-taking behavior, including also sub-optimal decisions in the international growth (e.g. choice of the foreign location, degree of commitment with the local partner) due to the limited discretionary power, compared to non-state owned MNEs (Cui and Jiang, 2012; Hong et al., 2014; Lu et al., 2014; Wang et al., 2012).

According to the established International Business (IB) literature (e.g. Child and Rodrigues, 2005; Luo and Tung, 2007; Rui and Yip, 2008), EMNEs employ internationalization through FDI to overcome their latecomer disadvantages, in order to access and acquire crucial resources required to compete more successfully with the existing global players. Namely, consistent with the *springboard theory*, EMNEs' outward FDI, mainly acquisitions toward advanced markets, are triggered by pull factors, such as brands, technology, design competences, managerial expertise, so that they need to quickly reduce their competitive disadvantages (Luo and Tung, 2007; Rui and Yip, 2008).

A complementary point of view has suggested that EMNEs leverage ownership advantages that are simply different from the traditional ones possessed by AMNEs in their initial internationalization stage (Dunning, 1993), due to the different home



country-specific characteristics (Narula, 2012). Additionally, as researchers have increasingly probed, in emerging economies market-support institutions dramatically shape the competitive scenario of the business actors due to the markets' inefficiency, and significantly determine the EMNEs' internationalization choices (Peng, 2003; Makino et al., 2004). As a result, institutional theory has been recognized as one the most insightful theory when studying emerging economies and EMNEs, together with transaction cost economics/agency theory, resource-based view and industry-based view (Hoskisson et al., 2000; Peng et al., 2008).

### **International knowledge sourcing: strategies for EMNEs' technological upgrading**

As a matter of fact, technical and innovative capabilities have long been recognized as main drivers for economic growth, and source of competitive advantage for the companies (Schumpeter, 1934). As a result, emerging economies are growing substantially in terms of patenting activity (National Science Board, 2014). However, the characteristics and the dynamic evolution of the knowledge creation process of EMNEs are not fully understood. In particular the lack of firm-level data, together with the novelty of the phenomenon, makes more difficult to build an understanding of the process of knowledge creation and sourcing that boosts the upgrading process of EMNEs. This understanding is important for two reasons. First, because recent insights suggest that the locus of innovation in the global economy is moving from advanced toward emerging countries (Govindarajan and Ramamurti, 2011). Second, because it is by now recognized that the way firms combine geographically and technologically differentiated knowledge sources is crucial for their innovative performance (Phene et al., 2006).

The evidence on the actual path of catch-up across different emerging markets seems to agree on the importance of acquiring technologies from advanced economies (Awate et al., 2014). Thereafter, the evidence indicates multiple paths, with some pointing to the importance of building relationships with advanced economy firms to develop absorptive capacity (Kumaraswamy, et al., 2012), while others suggest the importance of developing capabilities in-house through learning-by-doing (Park and Lee, 2006).

There is some empirical evidence that firms from emerging economies are closing the gap with AMNEs as regards their innovation capability (Awate et al., 2012, 2014). However, through a deliberate and consistent technological effort, firms in emerging economies might be able to go beyond production capability. Tapping into a diverse set of external knowledge abroad, EMNEs could leverage the accumulation of knowledge stores and their recombinative capabilities in order to improve their competitive global position. Since inventors from AMNEs may have more access to pipelines and personal relationships (Lorenzen and Mudambi, 2013), they would have greater potential to engage in international collaboration. Geographically dispersed inventor networks may increase the chance of recognizing knowledge recombination opportunities by allowing collaboration with inventors with different knowledge and perspectives, which in turn influences catch-up ability of firms in emerging economies.

### **Research framework and organization of the work**

The present work focuses on EMNEs' international expansion and their strategies aimed at accessing new knowledge, valuable technological competences and innovative resources. So the core research question that we seek to address is: *How do EMNEs behave during their technological upgrading process through international expansion and external knowledge sourcing?* The thesis is a collection of four papers<sup>1</sup>, one for each chapter that I have coauthored and are intended to analyze different but complementary aspects of the research framework described above. Specifically, to address the main research question the present work is divided into three different parts.

First, in Chapter 1 we critically review the recent literature about EMNEs and the characteristics of their FDI. Namely, we summarize and discuss some of the issues that have attracted most scholarly debate in the IB domain, such as EMNEs' country- and firm-specific advantages, FDI motivation and modes of entry into foreign markets. Further, we also examine to what extent EMNEs undertake FDI to upgrade their

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<sup>1</sup> As indicated in the title page of each chapter, these papers are or are going to be submitted to international peer-reviewed journals (or book), and so the reference style has been adjusted according to the editorial requests.

technological capabilities in order to reduce their technological gap with AMNEs. In the last section, we provide future research questions that IB scholars need to address to deepen the understanding of EMNEs.

In the next two chapters, we empirically analyze the internationalization strategies of EMNEs when they undertake knowledge-intensive acquisitions in advanced markets. Namely, we study EMNEs' ownership choice, since it one of the key strategic decisions during the international expansion and it deeply influences the integration and transfer of knowledge between the acquiring and the target firms.

In Chapter 2 we study the relationship between EMNEs' ownership choices and the main motivation of the international expansion. We distinguish between knowledge-seeking acquisitions and other, i.e. market- and legitimacy-seeking acquisitions. Our findings suggest that EMNEs prefer to acquire less control and keep the local partner when they invest for seeking knowledge. Additionally, EMNEs choose partial acquisitions in case of high dissimilarity in terms of culture, industry and knowledge base.

In Chapter 3, we focus on the importance of the home-country specific characteristics on the ownership choice decisions, presenting a comparative analysis of Chinese and Indian MNEs. We argue that China and India inherent heterogeneity plays a crucial role in differently shaping the MNEs' ownership choice. As a result, we find that Chinese MNEs are less likely to acquire control in the target company, compared to Indian firms. Further, the greater the institutional distance between the home and the host country, the larger the difference between Chinese and Indian firms' decision.

In Chapter 4, we explore the extent to which the integration of emerging countries into the global system of innovation represents a channel for their technological upgrading. Using patent data on the innovative activity in the Chinese pharmaceutical industry, we analyze the geographic dispersion of Chinese inventor networks, as a function of the characteristics of the innovative actors. Our results suggest that – compared to MNEs - universities and research centers spawn more internationally dispersed inventor networks, especially when they are foreign. These findings point out the critical role that foreign universities and research centers may play in the technological upgrading

process of emerging countries. Our results show in fact that these actors may be more beneficial than other institutional types, including foreign MNEs. Single location firms from emerging economies may have a too narrow capability base to develop knowledge linkages with foreign partners, especially from the advanced world.

Finally, we provide conclusions and discuss the contribution of the current research and identify directions for future research.

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# Chapter 1

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Emerging market multinationals: What theories suggest, what evidence shows. A survey of the literature\*

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\* Paper coauthored by Alessia Amighini, Claudio Cozza, Elisa Giuliani and Roberta Rabellotti, submitted to “*Economia e Politica Industriale – Journal of Industrial and Business Economics*” (2° Round R&R)

## **Abstract**

The phenomenon of Emerging Economy Multinational Enterprises (EMNEs) and their internationalization process has sparked debate over the appropriateness of International Business theories to study this phenomenon. The literature has extensively investigated what distinguishes EMNEs from Advanced Country Multinational Enterprises (AMNEs). This literature survey is an attempt to summarize and discuss some of the issues that have attracted the most scholarly debate in this research area. We discuss the specificities of EMNEs how they differ from AMNEs, with respect to three very important (and well studied) topics: first, EMNEs country-specific and firm-specific advantages; second, EMNEs' motivations for investing abroad; and third, their different modes of entry into foreign markets. We conclude that EMNEs do differ from AMNEs, although these differences may be contingent and transitory. We would encourage further research into the impacts of EMNEs on the host and home countries.

**Keywords:** Emerging Economy Multinational Enterprises, Country-Specific Advantages, Firm-Specific Advantages, Foreign Direct Investment Strategies, Modes of Entry

## 1. Introduction

Since the turn of the century, we have witnessed unprecedented international expansion of Emerging Economy Multinational Enterprises (EMNEs).<sup>1</sup> According to UNCTAD (2014), Outward Foreign Direct Investment<sup>2</sup> (OFDI) from developing and transition economies reached the record level of \$460 billion in 2013, corresponding to 39% of global outflows, up from 16% in 2007 before the financial crisis. EMNEs are not a new phenomenon and three distinct waves of FDI from EMNEs can be identified (Dunning et al. 1998; UNCTAD 2005).

The first wave – from the 1960s until the early 1980s – involved mostly firms from Latin America expanding abroad, with investments driven mainly by market- and efficiency-seeking objectives (Andreff 2003). This wave of FDI was directed mostly towards other developing countries, and especially those at a smaller geographical, cultural, ethnic and institutional distance (Barnard 2008; Tolentino 1993). The most active EMNEs were often State-Owned Enterprises (SOEs) (Rasiah and Gammeltoft 2009). During the second wave of investment in the 1980s, OFDI from emerging markets was more strategic and asset-seeking oriented, and was aimed at both developed and developing countries. It was dominated by Asian MNEs, first from South Korea, Taiwan, Hong Kong, Singapore and then from Malaysia, Thailand, China, India and the Philippines. Asian MNEs mostly expanded into fast growing foreign markets, but they also invested to access cheap labour in other developing countries (Lall 1983; UNCTAD 2005).

Since the 1990s, the features of OFDI by emerging countries have been distinctive compared to earlier waves of investment. In particular, the investing EMNEs are often privately owned, and Merger and Acquisition (M&A) activity has increased. Although

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<sup>1</sup> A MNE is an incorporated or unincorporated enterprise comprising a parent company and foreign affiliates. In this paper we focus on MNEs where the parent company is located in an emerging country (various classifications and definitions of emerging countries are available at [http://en.wikipedia.org/wiki/Emerging\\_markets](http://en.wikipedia.org/wiki/Emerging_markets)).

<sup>2</sup> FDI refers to investment made to acquire a lasting interest in enterprises operating outside the investor's economy.

greenfield investment continues to be the dominant mode of entry, investments to acquire technology, brands, marketing and R&D capabilities, distribution networks, managerial and organizational competencies are usually in the form of M&A (Barnard 2008; Cantwell and Barnard 2008; Dunning and Wymbs 1999; Kumar 1998; Rasiah and Gammeltoft 2009; Rugman and Doh 2008).

Due to their increasing importance in the global economic landscape, and to their changing strategies over time, EMNEs have attracted the attention of scholars and policy makers and this phenomenon has sparked lively scholarly debate about whether existing International Business (IB) theories are appropriate to study EMNEs' internationalization processes. Several scholars have extensively investigated the distinctive features of EMNEs, comparing them to the features of Advanced Country Multinational Enterprises (AMNEs), and debate is ongoing as to whether the leading analytical frameworks for interpreting AMNEs' expansion are adequate to study EMNEs (Mathews 2002; Narula 2006; Ramamurti 2012). This paper starts by discussing the significance of this debate (Section 2), which sets the context for the succeeding sections. These aim at providing the reader with a general overview of the main contributions describing EMNEs' characteristics, and their distinctive features with respect to AMNEs.

The extant literature generally studies three dimensions: first, ownership advantages possessed by EMNEs, which comprise Country-Specific Advantages (CSAs), based on the specificities of the EMNE's home economy, and Firm-Specific Advantages (FSA). These are discussed in Section 3. Second, EMNEs' motivations for investing abroad, which tend to differ depending on the host country characteristics, and are discussed in Section 4 which pays particular attention to EMNEs' investments aimed at acquiring technological capabilities. Third, EMNEs' mode of entry into foreign countries is investigated in Section 5. Section 6 concludes the paper. Table 1 provides a list of the contributions reviewed, and classifies them by topic, content (theoretical vs empirical works) and, in the case of empirical works, by their main methodological approach (case study vs econometrics) and unit of analysis (e.g. firm-level, country-level, etc.).

## 2. EMNEs and IB theories: setting the debate

So far, there is no wide agreement among scholars about the applicability of extant IB theories to explain the increasing presence of EMNEs in global FDI flows. There are two clearly opposing views in the literature: “*one is that EMNEs are a new species of MNEs that can be understood only with new theory (Mathews 2002); the other is that existing theory is quite adequate to explain EMNEs (Narula 2006)*” (Ramamurti 2012, pp. 41). Whether the ongoing debate will ever achieve consensus is unclear. According to Ramamurti (2008), comparative case studies of EMNEs from numerous countries suggest that any attempts at generalization will necessarily be misleading since EMNEs are a heterogeneous group in terms of home countries, industries, competitive advantages, targeted markets and internationalization paths: “*The evidence [does] not permit sweeping generalizations about EMNEs nor about how they are different from MNEs that came before, because the latter is also a heterogeneous group*” (Ramamurti 2008, pp. 1).

Therefore, the real challenge is to assess which aspects of the existing theory are applicable and useful to understand EMNE strategies, motivations, advantages and entry modes, and to identify aspects that require a new theoretical lens. The most influential approach that has been applied to study the international activities of MNEs is the ‘*eclectic paradigm*’ proposed by Dunning (1981), according to which the firm’s decision to expand its activities abroad via FDI, depends on three distinct advantages: a) *Ownership - O* advantages, which is the firm’s ownership of firm specific resources that can be exploited externally; b) *Location -L* advantages, which depend on the characteristics of the host country; and c) *Internalization -I* advantages, which depend on the opportunity to internalize firm specific advantages rather than relying on the market through arm’s length transactions. These three advantages constitute the so-called *OLI (Ownership-Location-Internalization)* framework, which, after successive refinements, has become mainstream in internationalization theory.

In subsequent work, Dunning extended this framework to account for the main changes in international markets, for example, the rise of alliance capitalism and the

proliferation of firm networks during the 1990s (Dunning 1995). Thus, influenced by knowledge-based theories and the resource-based view (Barney 1991), the concept of O-advantage has been extended to include the benefits accruing to firms from interacting with and sharing knowledge with other firms. In the context of I-advantages, Dunning suggested that alliances and networks of firms could be considered a distinct organizational mode which complements the hierarchical mode in the internalization view based on transaction cost theories. These proposals were prompted by the growing relevance of strategic asset-seeking motivations for investing abroad (Dunning 1998). In his later works, Dunning (2006) acknowledges the importance of institutions as an essential component in the firm internationalization process, while Dunning and Lundan (2008) proposed a formal distinction in the OLI paradigm between traditional asset advantages and institutional advantages. They claim that institutional advantages exert different influences on “*the ways in which firms create new or utilise more effectively their existing resources, capabilities and markets*” (Dunning and Lundan 2008, pp. 582).

In light of the recent wave of EMNEs internationalization, the OLI framework has been criticized. According to the OLI framework (Dunning 1998), EMNEs *must* possess relevant ownership advantages to offset the disadvantages of competing abroad, whereas it seems that EMNEs are internationalizing to *obtain* the ownership advantages they lack (Mathews 2002). From this perspective, the OLI framework is seen as a static paradigm that takes account only of the pre-existing advantages in the FDI decision, and does not explain the opportunities for the development and evolution of firm capabilities over time, based on the accumulation of experience in international markets. The main criticisms come from the dynamic capabilities (Teece et al. 1997), and the *asset-exploration* approaches, which consider that firms internationalize in order to get access to necessary strategic resources and, thus, are motivated by “*learning objectives that allow these firms to overcome the initial resource hurdles arising due to technological gaps and late mover disadvantages in international markets*” (Aulakh 2007, pp. 237). Moon and Roehl (2001) refer to *unconventional* FDI, that is, strategic investments to develop rather than to exploit the set of resources owned by the firm. In this view, internationalization is a strategy aimed at strengthening the firm through the

accumulation of previously unavailable resources. Thus, EMNEs' FDI should be considered from an evolutionary perspective.

EMNEs investing abroad suffer not only from the liability of foreignness (LOF) - a concept first introduced by Hymer (1976) to describe the disadvantages of foreign firms in the host country, compared to its domestic firms – but also from the *liability of emergingness* (LOE) (Madhok and Keyhani 2012; Ramachandran and Pant 2010), that is, the extra burden that is specific to an emerging economy firm. However, once these initial disadvantages are overcome, EMNEs can leverage considerable advantage from being a *multinational* rather than a *uninational* company (Ietto-Gillies 2012). Accordingly, Deng (2009) argues that EMNEs' investments are aimed at acquiring host-country specific knowledge and resources that allow them to leapfrog to higher value-added activities worldwide.

Mathews (2002) proposed an alternative framework, inspired by observation of a group of dynamic firms originating from the Asia-Pacific region, described collectively as “*Dragon Multinationals*”. Mathews' framework is also called the OLI framework, but O stands for *Outward orientation*, L for *Linkage/Leverage* and I for *Integration*. The main point is that, in most cases, EMNEs (unlike AMNEs) do not possess huge domestic assets that can be exploited abroad and, in embarking on an *Outward orientation* strategy, they form linkages (through joint ventures and other forms of collaboration in global value chains) with foreign companies to secure fast access to lacking resources. These global linkages can then be used to *leverage* the EMNEs' resources and particularly their cost advantages, to learn about new sources of competitive advantages and how to operate internationally. In contrast to the predictions of Dunning's OLI framework, the first phase of EMNs formation is most likely to be spurred by asset-exploring rather than asset-exploiting motives. Also, in the early stages, this process is frequently linked to inward FDI activity in the home market (Li 2007; Luo and Tung 2007), which provides local firms with a unique chance to enter an established foreign production network and enhance their capabilities. In Mathews' framework, entry to networks and alliances is described as *Integration*, which is a distinctive organizational mode that complements the traditional hierarchical model of the internalization view based on transaction-cost theories.

These alternative explanations of EMNE internationalization have also been criticized. For example, Ramamurti (2012) questions whether the search for new strategic resources implies that these companies do not have ownership advantages *ex ante*. He suggests that EMNEs *do* possess ownership advantages, but they are *different in nature* from those commonly considered in the IB literature. His view is consistent with Dunning's evolving concept of ownership advantages, which takes account of the changes occurring in international markets and recognizes the existence of valuable ownership advantages in some EMNEs (Dunning et al. 1998). In the next section, we review the literature on the different types of ownership advantages attributed to EMNEs.

### **3. EMNE advantages**

The literature mostly agrees that there is a significant difference between the sets of competitive advantages possessed by EMNEs and AMNEs. AMNEs are most likely to possess advantages based on ownership of key assets, such as technologies, brands and other intellectual property, while EMNEs rely more on advantages related to their production capabilities, their home country social networks (see the case of *guanxi* networks in China) and the availability of capital (UNCTAD 2006). Ramamurti (2008) suggests that these differences in advantages may be due also to the different stages of their evolution: the advantages enjoyed by AMNEs are stronger because they have had more time to accumulate capabilities, while we can expect EMNEs to augment their ownership advantages over time, thereby reducing the gap with AMNEs (Lessard and Lucea 2009).

In the following sections we review the literature on EMNEs' *country-specific* advantages (CSA), such as natural resources endowments, availability of cheap factors of production, and specific cultural factors, and their valuable and inimitable *firm-specific* advantages (FSA) such as product or process technologies, brands, marketing and commercial skills (Brennan, 2011; Rugman 2007). A list of papers on these topics is provided in Table 1.



Table 1. EMNEs in the literature.

	Advantages		Motivations		Mode of entry
	Firm specific	Country specific	Natural Resources-, Efficiency- and Market-seeking	Strategic-asset- (including Technology-seeking)	
<b>Theoretical works</b>	Andreff 2003; Athreye and Godley 2009; Mathews 2002; Peng et al 2008; Ramamurti, 2012	Andreff and Balcet 2013; Contractor 2014; Hoskisson et al. 2013; Lebedev et al. 2014; Peng, 2010		Kedia et al 2012	Madhok and Keyhani, 2012
<b>Empirical works: Case studies</b>	Collins, 2009; Goldstein 2008; Lessard and Lucea 2009; Pananond 2007; Pradhan 2008	Chaminade and Vang 2008		Child and Rodrigues 2005; Deng 2009 Gattai 2013; Vecchi and Brennan, 2014 Pietrobelli et al, 2011	
• One country				Awate et al. 2014; Giuliani et al, 2014; Losada Otalora and Casanova, 2012	
• Cross country	Duysters et al. 2009	Cuervo-Cazurra 2007	Holtbruegge and Kreppel 2012; Sim and Pandian 2007		
<b>Empirical works: Aggregate descriptive</b>	Buckley et al. 2011; Chittoor and Ray 2007	Aykut and Goldstein 2006; Boston Consulting Group 2006	Ariff and Lopez 2008; Barnard 2008; Cross and Voss 2007; Liu and Tian 2008		
<b>Empirical works: Econometric studies</b>	Buckley et al. 2014; Gaur et al. 2014; Kling and Weitzel 2012; Lu et al. 2010; Yiu et al. 2007	Bertoni et al. 2013; Rabbiosi et al. 2012; Tan and Meyer 2007	Amighini and Franco 2013; Chen and Chen, 1998; Lu et al. 2014; Makino et al. 2002; Quer et al. 2012	Amighini et al. 2013a, 2013b; Cui et al. 2014; Piscitello et al. 2014	Contractor et al. 2014; Meyer at al. 2009
• Firm/deal level					
• One country focus		Buckley et al. 2011	Buckley et al. 2007; Cheng and Ma 2010; Cheung and Qian 2009; Kolstad and Wiig 2012; Ramasamy et al. 2012; Sanfilippo 2010	Rui and Yip 2008	
• Cross country comparison	Bonaglia et al. 2007; Luo and Tung 2007; Ramamurti 2008			Chen et al. 2012	

Note: The table includes only articles and book chapters. Books are not included.

### 3.1 Country-specific advantages (CSA)

A typical home CSA for EMNEs is low cost production factors (Lall 1983). The lower production factor costs enjoyed by emerging and developing economies outweigh labour costs, which are one of the main factors of competitive advantage for countries with a relative abundance of labour. Other factors, such as capital, can also be a source of competitive advantage. EMNEs often operate in imperfect domestic capital markets and are able to rely on easier and cheaper access to capital and, in some cases, cheap access to natural resources (e.g. Brazil and Russia) (Boston Consulting Group 2006).

Strong home CSAs may prevent EMNEs from transferring their (labour-intensive) activities abroad to avoid the undesirable “hollowing-out” effect in the home market. Thus, EMNE internationalization is aimed not at relocating existing activities, but at complementing or extending domestic ones. In this context, Andreff and Balcet (2013) argue that EMNEs investing in advanced markets leverage their lower labour cost advantages, producing semi-finished goods at home and assembling them in developing countries. Andreff and Balcet (2013) revise the traditional factor-endowment-based internationalization theories to explain that this type of FDI is triggered mainly by the lower costs resulting from the production of intermediary goods at home. The driver of these investments is intra-firm transfer of cost-competitive inputs and semi-finished goods produced by EMNEs at home and transferred to their subsidiaries. In a study of 20 Latin American MNEs, Cuervo-Cazurra (2007) finds that firms with strong CSA are most likely to keep their production activities at home and establish marketing subsidiaries abroad. Cuervo-Cazurra refers to both the possession of a cost advantage in some factors of production (natural resources, labour and capital) and the possession of a “*country of origin*” advantage, defined as “...*the advantage that their products are perceived as truly coming from the country of origin*” (Cuervo-Cazurra 2007, pp. 271).

Another relevant source of CSA is represented by the characteristics of the home country market and the relative market power of home market domestic firms. Some emerging markets are among the largest and the fastest growing markets worldwide which provides domestic firms with the opportunity to build competitive advantage by facing international competitors in their home markets (an extensive literature review on

this point is provided in Contractor 2013). In an analysis of OFDI by transition economies, Andreff (2003) finds that the monopolistic or oligopolistic position of firms at home acts as a *springboard* to investment abroad, particularly towards countries at similar stages of development<sup>5</sup>. Andreff suggests that in the case of EMNEs from Russia, the accumulation of financial resources can be used to finance new investment projects abroad. Also, Barnard (2008) shows that EMNEs concentrate their M&A investments in mature, traditional industries, such as cement, steel, chemicals, beverages and processed foods, where they have accumulated capabilities over time and where – compared to AMNEs – they enjoy competitive advantages such as capital-intensive production, scale economies and assembly-based mass production. A large set of CSA, including environmental uncertainty, latecomer disadvantages and national pride, can also be key to understanding the difference between EMNEs and AMNEs (Lebedev et al. 2014).

Finally, a peculiar type of CSA enjoyed by EMNEs and stressed in the literature, is the formal and informal connections they establish with domestic institutions (Goldstein and Pananond 2007; Hoskisson et al. 2013; Peng 2002; Peng et al. 2008; Tan and Meyer 2007). The role played by government is stressed mostly in relation to Chinese MNEs, which are often SOEs supported (together with some selected private firms) by various instruments such as preferential loans, selection of international partners for joint ventures to facilitate technology transfer at home, and favourable tax regimes (Athreye and Kapur 2009; Buckley et al. 2007; Child and Rodrigues 2005). Yiu and colleagues (2007) empirically assess the rise in international venture activities of a sample of Chinese firms, including in their analysis institutional variables such as the linkages to domestic institutions (i.e. central and local government, financial institutions, trade associations, research centres) as well as the participation in business networks. On the basis of their empirical findings, they conclude that the presence of institutional ties represents outstanding ownership advantage for firms originating from countries at an early stage of development, that want to expand internationally. State support and formal and informal institutional network ties also represent a competitive

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<sup>5</sup>Similar considerations can be found in Li (2007) for China, Klein and Wocke (2007) for South Africa and Pananond (2007) for Thailand.

resource for the international activities of domestic companies in a number of other emerging countries. In the Indian pharmaceutical sector, Athreye and Godley (2009), Chittoor and Ray (2007) and Pradhan (2008) stress the relevant role of local government in promoting the establishment of many MNEs through investment efforts and regulatory activities. Similarly, Buckley and colleagues (2012) highlight the important role of home-host country linkages including both trade and non-trade linkages. They find that India's North-South linkages within the G20 and the Commonwealth are significant for explaining foreign acquisitions by Indian MNEs, while South-South linkages are insignificant<sup>6</sup>.

While CSA appear to be crucial for sustaining EMNEs' internationalization, there are two aspects of CSA that need to be considered. First, some CSA, such as those based on low cost factors, may fade over time as emerging economies' production capacity grows and relative factor abundance is increasingly exploited; second, not all home country firms are equally advantaged by CSAs (Ramamurti 2008). In order to fully exploit CSAs, companies need to possess some firm-specific advantages.

### **3.2 Firm-specific advantages (FSA)**

A widely discussed EMNE FSA, which is highlighted in early work on multinationals from developing countries (Lall 1983), is the capacity to develop products suited to the special needs of customers in developing countries: low cost, easy to maintain, multi-purpose, adaptable to poor quality infrastructures (e.g. the Haier washing machine, which is also used to wash vegetables in rural areas of China) (Ramamurti 2008). EMNEs are also superior to AMNEs in their capacity to adapt technologies and processes to contexts characterized by a large pool of low cost labour and limited availability of inputs.

Mathews (2006) points out that the condition of being a latecomer in global markets might represent an advantage for firms engaging in international activities. Some latecomer EMNEs' operations take a global perspective from the start, and are based on

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<sup>6</sup>This result contrasts with the pattern exhibited by Indian outward FDI in the 1960s, when India implemented an import-substituting development strategy that relied mainly on South-South cooperation (Pradhan 2005; Ramamurti and Singh, 2008) and resource-seeking FDI.

rapid catch up with technologies and best practice organizational models. These firms possess advantages in the form of early awareness of global competitive networks when planning their activities, and the ability to build on the resources made available through these linkages (Aykut and Goldstein 2006; OECD 2007). Gaur and colleagues (2014) confirm that EMNEs' international experience combined with some technological and marketing resources can increase the probability of a shift from exports to FDI.

Other important FSAs include participation in global production networks and global value chains (Chen and Chen 1998; Hitt et al. 2000; Makino et al. 2002). Luo and Tung (2007) explain that: “...*emerging countries economy enterprises have tremendously benefited from inward FDI at home by cooperating (via original equipment manufacturing (OEM) and joint venture in particular) with global players who have transferred technological and organisational skills, allowing emerging market enterprises to undertake outward internationalisation later in some unconventional way*” (pp. 481). EMNEs are often able to enter production networks based on their organizational advantages, being able to leverage the resources needed to start a more active internationalization process. More specifically, EMNEs build advantages through the adoption of innovative organizational forms and by exploiting access to the resources of other companies through their international connections (Mathews 2006). Bonaglia and colleagues (2007) describe some of the organizational innovations adopted by three EMNEs in the white goods sector. They note that, rather than adopting a pattern of organic development, these firms focused their efforts on strategic investments such as top-level human resources and research and development (R&D), with the aim of building new competitive advantages that allow entry to strategic partnerships with global players both at home and abroad. Similarly, Duysters and colleagues (2009) study two of the most successful EMNEs - Haier and Tata - underlining that the possession of dynamic capabilities in terms of entrepreneurship, innovative management practices and ability to enter new markets and sectors via strategic partnerships and acquisitions, allowed these companies to become very large and successful. Their experience shows that it is possible to make use of the available pool of capabilities to develop new skills that are important for entering new competitive markets.

#### **4. EMNEs' motivations for investing abroad**

Since 1960 when EMNEs began to expand internationally, it has been evident that investment motivations differ according to the level of development of the recipient economies. Resource-seeking (particularly natural resource-seeking), market-seeking and efficiency-seeking factors are the main reasons for EMNE OFDI to other developing countries, while strategic asset-seeking motivations dominate in relation to investment in developed countries (UNCTAD 2006).

EMNEs' different motivations for investing abroad have received significant attention in the literature, inspired by the fact that their internationalization is a value-creation process "*constrained by, and dependent on, the tangible and intangible assets that they control or lack*" (Losada Otalora and Casanova 2012, pp. 4). These motivations have been analyzed using different methodological approaches (e.g. case study, quantitative analysis) and focusing on how different factor endowments, both at home and abroad, influence foreign investment. In the rest of this section, we discuss the motivations underlying EMNEs' investments abroad and focus on a specific type of strategic asset-seeking OFDI that we describe as technology-driven or TFDI. Our extensive discussion of TFDI is warranted by its representing a major motivation for EMNEs to invest in advanced countries, and because this kind of motivation –compared to others – is relatively novel and requires closer investigation. Table 1 provides a list of the papers that have contributed to this topic.

##### **4.1 Why do EMNEs invest abroad?**

Numerous studies underline the importance of natural resources to EMNEs investing abroad (see Ariff and Lopez 2008; Cuervo-Cazurra 2007; Makino et al. 2002). In the context of China, natural resource abundance in the host economies has always been one of the main motivations for investing (e.g. Ramasamy et al. 2012; Sanfilippo 2010). Using firm- and sector-level data, some recent studies show that resource-seeking motives are a driver of OFDI by EMNEs, not only in resource-related sectors but also in manufacturing and services (Amighini et al. 2013a). Moreover, countries' various

resource-abundance attracts Chinese FDI according to the particular natural resources available. An interesting insight from studies of Chinese natural resources-seeking FDI is that investments are influenced by the institutional quality of the targeted host country (Buckley et al. 2007; Cheng and Ma 2010; Cheung and Qian 2009; Kolstad and Wiig 2012). For example, Chinese firms tend to invest in countries characterized by weak institutions because the economic rents from natural resources are more easily extracted in weak institutional environments, where local authoritarian regimes and *greedy elites* (Collins 2009; Keen 2003; Quer et al. 2012) allow EMNEs to negotiate business opportunities and manipulate the host environment to suit their own ends.

An increasingly important motivation for EMNEs' FDI is the search for strategic assets. Strategic asset seeking was recognized as a motivation for FDI in the context first of Taiwanese firms. Chen and Chen (1998) and Makino and colleagues (2002) highlight the role played by Taiwanese firms' OFDI in establishing linkages with foreign firms and tapping into strategic resources, which are key to their successive strategies of international expansion. In a comparative study of Mexico, Poland and Romania, Hitt and colleagues (2000) conclude that firms from emerging countries are searching for technical capabilities and managerial know-how when signing strategic alliances with firms from developed countries. In particular, several Asian firms have acquired established firms in developed countries to build competitive advantage based on the superior resources and skills located in the host countries which are not available at home (Makino et al. 2002; Mathews 2002). Their interest in acquisitions has grown thanks to the willingness of companies in advanced countries to sell or share their technology, know-how or brands, to address their financial problems or restructuring needs (Deng 2009). The strategic assets acquired via FDI provide the acquiring EMNEs with reputation, and allow them to obtain and control resources and to gain access to local markets (Chung and Alcacer 2002). In addition, acquisitions allow EMNEs to rapidly close their technology gap, facilitating the development of new skills and competences and providing tools for organizational and technological learning (Dierickx and Cool 1989; Vermeulen and Barkema 2001).

Similarly, several recent studies have emphasized the importance of strategic asset seeking for Chinese MNEs, although market-seeking motives are also important (Amighini and Franco 2013; Amighini et al. 2013a, 2013b; Buckley et al. 2007; Cross and Voss 2007; Liu and Tian 2008). Lu and colleagues (2011), using survey data, investigate the motivations for OFDI by private Chinese firms. Starting from the premise that no single theory can explain the pattern of OFDI by EMNEs, they empirically test hypotheses derived from three different theoretical frameworks, namely the resource-based, industry-based and institutional-based views. They find that supportive government policies are important motivators for both strategic asset and market seeking OFDI. Firms' technology-based competitive advantages and high R&D intensity are motives for strategic asset-seeking OFDI, while firms' export experience and high level of domestic industry competition favour market-seeking OFDI.

However, the motives for EMNE OFDI differ among industries and according to R&D intensity: firms in technology-intensive industries are more likely to conduct strategic asset seeking FDI in order to obtain advanced technology, acquire internationally recognized brands, and attract human capital. The importance of internationally recognized brands has been identified as one of the main drivers of the increasing presence of Chinese MNEs in the Made in Italy industry in Italy (Gattai 2013; Pietrobelli et al. 2011; Vecchi and Brennan 2014). Acquisitions of internationally recognized brands allow latecomers to close the gap with leading companies by acquiring strategic assets and resources. In export-intensive sectors, gaining market access and overcoming trade barriers are important motivations for OFDI.

Finally, efficiency seeking investment is rare for EMNEs and only a few studies of Malaysia (Ariff and Lopez 2008), Taiwan (Sim and Pandian 2007) and Thailand (Pananond 2007) suggest that EMNEs may search for lower production costs due to the increasing cost of production factors in their home countries, by investing in neighbouring lower cost countries.



## 4.2 EMNEs and technology-driven FDI

One of the most important recent trends characterizing FDI from emerging markets is the search for technological assets. TFDI is a recent phenomenon, which has no universally agreed definition. However, the literature makes it clear that this concept refers to FDI aimed at accessing advanced knowledge and capabilities, mainly available in developed countries, with the aim of improving the technological and innovative capacities of the investing firm (Chen et al. 2012; Deng 2009; Luo and Tung 2007; Makino et al. 2002; Mathews and Zander 2007; Rui and Yip 2008)<sup>7</sup>. Analyses of TFDI by EMNEs are limited and very recent, and the main issues addressed are specifically why and how EMNEs engage in TFDI, the location factors that attract EMNE TFDI, and EMNEs' modes of R&D internationalization.

### 4.2.1 Why and how do EMNEs engage in TFDI?

Several empirical studies conducted on large samples of firms find that EMNEs invest in developed countries mainly for knowledge-seeking reasons (Bertoni et al. 2013; Buckley et al. 2007). This is confirmed by case studies on well-known companies such as Haier from China and Tata from India (Duysters et al. 2009). While EMNEs traditionally (although not necessarily) have relied on mature technologies licensed from the technology leaders in the advanced economies, a more recent trend is to try to develop *indigenous knowledge* (Aubert 2005) and *indigenous innovation* (Fu et al. 2011). This requires acquisition of financially distressed technologically advanced firms, or the establishment of a foreign subsidiary in an advanced economy to benefit from knowledge spillovers and to access highly trained human capital. Several emerging country governments are encouraging and rewarding indigenous technological efforts, publishing favourable policies such as tax incentives and financial assistance to motivate EMNEs to pursue technological developments both abroad and in their home market (Chaminade and Vang 2008; Peng 2010).

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<sup>7</sup> Note also that any type of FDI – including resource-seeking, market-seeking or efficiency seeking investment, may generate technology transfer from the subsidiary to the parent firm, which makes TFDI difficult to identify a priori based on the main motivation for investing (Chen et al. 2012).

Some recent research has investigated the patterns and evolution of TFDI in some depth. For instance, in the case of the auto components industry in India, Kumaraswamy and colleagues (2012) show the existence of evolving technology-seeking strategies underlying TFDI, and identify three phases in this evolution: a transition phase (through technology licensing/collaborations and joint ventures with MNEs), a consolidation phase (by developing strong customer relationships with downstream firms), and a global integration phase (involving a strategy of knowledge creation during integration in the global value chain of the domestic industry).

Comparing the R&D internationalization strategies of EMNEs and AMNEs, Awate and colleagues (2014) find that EMNEs try to catch-up by accessing knowledge from their subsidiaries in advanced countries. However, they find that the *“innovation catch-up is in general much harder and generally takes much longer than, for example, output or production catch-up”* (Awate et al. 2014, pp. 17). In an analysis of a sample of 154 Chinese firms, Cui et al. (2014, pp. 499) find that *“strategic asset seeking FDI is a critical action accelerating competitive catch-up with global leaders”*. In a study of EMNEs and AMNEs specialized in the machinery industry, investing in Italy and Germany, Giuliani and colleagues (2014) find that more EMNE subsidiaries than AMNEs are seeking to acquire advanced technology by taking over companies in advanced economies, then transferring knowledge to their headquarters without contributing much to innovation in the local economy. Giuliani et al. find also that there are significantly more EMNE than AMNE subsidiaries that are interested in acquiring advanced technology and, at the same time, are actively engaged in local innovation activities and are cooperating with local firms and universities in this activity. These local networks allow mutual learning: on the one hand, local employees, supplier firms and universities are sources of knowledge for the MNE headquarters, and on the other hand, these local actors learn from new perspectives and experience in emerging economy markets, brought by the investors. Hence, this type of cooperation is perceived as a win-win situation for the EMNE and for the local actors, rather than a take-and-run exploitation of local knowledge by the foreign investor.

#### **4.2.2 The location of TFDI**

The complex nature of TFDI is intrinsically linked to the EMNEs' location choice. Although we would expect the majority of TFDI to be directed towards the most technologically advanced countries, this may not always apply. If the technology gap between home and host countries is too high, EMNEs may not have sufficient absorptive capacity to exploit the knowledge available in the host country. In a bid to reduce this gap, EMNEs may prefer TFDI in other emerging economies, and exploit inward FDI from AMNEs in their home countries, as an alternative means to access specific knowledge and competences.

Using longitudinal data on the overseas investment activities of Chinese manufacturing firms, Li and colleagues (2012) suggest that EMNEs invest in advanced countries spurred by a technology-seeking motivation, but also exploit inward FDI in their home markets, which generates knowledge spillovers to relevant industries. They find also that EMNEs' propensity to invest overseas for knowledge seeking motives decreases if there is inward FDI generating technological spillovers in their home countries. Wang and colleagues (2012) show that, since EMNEs are competitive in low-to-medium tech sectors, they are not necessarily attracted by countries at the knowledge frontier and may prefer to locate in countries specialized in middle-end technologies, with medium-tech manufacturers that are not too distant from their own technological capabilities.

Generalizing the results of earlier research, Kedia and colleagues (2012) link the type of knowledge sought by EMNEs to their location choice (as in Kumar 1998; Makino et al. 2002). They provide a conceptual framework based on different functional types of knowledge (technology, R&D, consumer and market expertise, management and operational expertise) and propose testable propositions to predict EMNEs' location choices. In their view, TFDI are part of a wider knowledge-seeking strategy, directed either towards advanced or other emerging countries, that is crucial for explaining their competitiveness at home and abroad.

### 4.2.3 TFDI through R&D internationalization

Most recent work on TFDI by EMNEs focuses on the internationalization of R&D<sup>8</sup>, possibly because R&D laboratories are easily identifiable as TFDI, and EMNEs' global R&D investments are increasing, as shown by their ranking on the EU R&D Scoreboard (European Commission 2013). In the context of this type of TFDI, Di Minin and colleagues (2012) show that Chinese R&D units in Europe do not follow the typical pattern of initial technology exploitation and then technology exploration, but instead are aimed first at exploration then exploitation. The organizational configuration of international R&D investments by Chinese MNEs is also the focus of Zhou's (2011) study, which uses the framework proposed by von Zedtwitz (2004), and proposes three alternative patterns through which TFDI can be organized: ethnocentric centralized R&D, geocentric centralized R&D, and a polycentric decentralized structure<sup>9</sup>. Zhou (2011) suggests that the organizational structure of R&D investments by Chinese MNEs depends on their level of internationalization: the higher the level of internationalization, the more complex their organizational structure. Currently, the most frequent organizational structure is ethnocentric centralized R&D. This is considered an elementary stage in an overseas R&D structure, which concentrates all R&D activities in the home country with foreign R&D activities comprising only technology scanning. In addition, the majority of Chinese MNEs undertake overseas R&D activities by cooperating with local firms, for instance, through the establishment of joint laboratories. Only a small group of Chinese MNEs with solid international experience is managing their overseas R&D centres in more complex ways, via geocentric centralized or polycentric decentralized structures.

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<sup>8</sup>This is in line with the literature on AMNEs' globalization of technology, which started in the late 1970s, and analyses the internationalization of R&D (mostly by US based firms).

<sup>9</sup> In the ethnocentric centralized R&D structure, the peripheral units have responsibility only for scanning new technological knowledge in the host country. Headquarters maintaining strong control over R&D resources, with innovative decisions always centralized, and overseas R&D centers having responsibility for transferring technology from the host country and developing new products for the host markets, characterizes the geocentric R&D organizational model. Finally, the polycentric decentralized structure is characterized by a decentralized organization of R&D sites with no supervising corporate R&D centre. These definitions are based on earlier conceptualizations of MNE activities, which, in turn, were based on the work by Bartlett and Ghoshal (1989), Gassmann and von Zedtwitz (1999), and Perlmutter (1969).

Liu et al. (2010) explore the driving forces and organizational configurations of international R&D in the cases of Huawei and ZTE, two technology-intensive Chinese MNEs in the telecommunications equipment industry. The authors distinguish between tactical R&D (usually for product adaptation and technical support to foreign markets), and strategic R&D (for technology acquisition). Their results suggest that, for these two MNEs, the establishment of strategic R&D sites is the predominant organizational configuration in both developed and other developing countries.

Another strand of research examines the impact of the internalization strategy on EMNEs' R&D intensity. Kumar and Aggarwal (2005) investigate a large panel dataset of Indian enterprises, including both MNEs and local firms, during the 1990s, and find that, starting from a relatively low R&D intensity compared to local firms, MNE affiliates increased their R&D spending rapidly, while local firms' R&D intensity declined. Finally, Liu and Buck (2007) in a panel data analysis, empirically investigate the impact of different channels of international technology spillovers on the innovation performance of Chinese high-tech industries. They find that learning by exporting (and learning by importing) and foreign R&D activities, promote innovation in Chinese indigenous firms.

## **5. EMNEs' modes of entry**

Most traditional OFDI by EMNEs (especially Chinese MNEs) is in the form of greenfield investments. However, EMNEs are increasingly using M&A to expand abroad (Ramamurti 2012); this guarantee investors rapid entry to the foreign country, relatively easy control over specific and strategic assets such as reputable brands, distribution networks, knowledge and technologies of the acquired firm, and access to local markets (Anand and Delios 1997; Chen and Hennart 2002; Chung and Alcacer 2002; Makino et al. 2002; Mathews 2002; Meyer et al. 2009a, 2009b; Phene et al. 2012; Wesson 2004). In addition, acquisitions allow firms to develop new organizational and technological capabilities (Dierickx and Cool 1989; Vermeulen and Barkema 2001) and enable EMNEs to overcome the LOE and to exploit opportunities to learn from the local context and to leverage their existing resources (Madhok and Keyhani 2012).

Through the lens of transaction cost economics (Makino and Neupert 2000; Yiu and Makino 2002; Zhao et al. 2004), acquisitions can involve partial or full ownership, the choice depending on the net benefits of shared equity relative to full ownership. Hennart (1991) argues that partial ownership is preferred if the investing firm needs continuous access to local firms' knowledge resources and know-how (Makino and Neupert 2000). Partial ownership allows existing shareholders and managers (e.g. through stock-options) to continue to provide much needed resources and know-how to the acquiring firm (Chari and Chang 2009), especially if the local knowledge is embodied in human resources (Chen et al. 2012). Contractor and colleagues (2014) explain that the choice between full and partial ownership depends on the institutional, cultural and sectoral distances between the acquirer and target countries. Piscitello and colleagues (2014), analyse the ownership choices of 170 high-tech acquisitions by Chinese and Indian firms in Europe, and confirm EMNEs' preference for partial acquisition if the investment is based on knowledge seeking motives. They find that the host country's different environment, and the EMNE's limited absorptive capacity and lack of reputation increases the latter's need to rely on local employees and managers to ensure smooth and efficient transfer of knowledge from the target to the acquiring company. These results contrast with earlier research suggesting that when a company acquires a subsidiary operating in markedly distant institutional environments, it may find it difficult to transfer intra-organizational practices which may encourage full ownership and greater control by the parent (Kostova and Zaheer 1999; Xu and Shenkar 2002).

Acquirer and target company differences also influence EMNEs acquisition activity and subsequent performance, and constitute a significant obstacle to the acquisition of foreign knowledge via FDI (Al-Laham and Amburgey 2005). Buckley and colleagues (2014) find: "*that not all types of experience are equally beneficial*" and "*some types of experience may even have negative consequences for the performance of target firms*" (pp. 612). Based on a sample of acquisitions in advanced economies undertaken by Brazilian, Chinese, Indian and Russian firms, Rabbiosi and colleagues (2012) show that EMNEs are more willing to engage in what they see as '*related acquisitions*', which are characterized by relatively short technological distance between the acquirer and the

target firm. Related acquisitions give the acquirer more control over the returns from the acquired strategic assets (Athreye and Godley 2009)<sup>10</sup>.

The cultural, linguistic and institutional distance between home and host countries is also critical for M&A success and efficient integration (Stahl and Voigt 2008), especially for EMNEs investing in advanced countries. Spigarelli and colleagues (2013) analyze Chinese acquisitions by an Italian company and highlight the major clashes arising from cultural and management-related differences between the two firms, and consequent difficulties in the post-acquisition phase<sup>11</sup>. Their findings suggest that the integration of intangible assets might be arduous (or even impossible) in a context of high cultural and administrative differences and lack of synergies.

It is interesting that in M&As by EMNEs, failure and abandonment before completion of the deal are frequent. Sun and colleagues (2012) provide evidence that less than half of the cross-border M&As announced by Chinese MNEs are completed. Using a sample of 1,324 announced Chinese cross-border acquisition deals over the 1982-2009 period, Zhang and colleagues (2011) find that the likelihood of success is lower, first, if the target country has worse institutional quality, second, if the target country is sensitive to national security, and third, if the acquiring company is a SOE. The problems caused by national security issues and being an SOE highlight the severe problems experienced by EMNEs investing in different foreign contexts, related to lack of reputation.

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<sup>10</sup>The idea that international acquisitions are more likely to occur between firms that are not too distant from one another in terms of capabilities, is not new (Barkema and Vermeulen 1998; Johanson and Vahlne 1977; Luo and Peng 1999; Thomas et al. 2007). Evidence that distance affects firms' decisions about international acquisitions has been confirmed in the case of European firms entering into alliances with Chinese and Indian firms (Belderbos et al. 2011). In these examples, the European firms extend their alliance portfolios from developed to emerging economies, building on prior international alliance experience. In particular, they are more likely to forge an international alliance with Chinese and Indian firms following prior alliance experience with Japanese firms. This suggests that distance effects apply to cultural as well as technological distance.

<sup>11</sup> The *Financial Times* recently reported on cultural clashes between Volvo's R&D department and the new Chinese owner, Geely. The founder of Geely, in a TV interview, said that Volvo cars were not sufficiently luxurious and looked 'too Scandinavian'. For instance, they do not allow for the fact that Volvo owners in China usually have private chauffeurs, with the result that the rear seats are more important than the front ones (Financial Times, April 23 2013 <http://www.ft.com/intl/cms/s/0/bdb705c6-abcf-11e2-8c63-00144feabdc0.html#axzz3KwZwFYZ1>).

## 6. Conclusions

EMNE outward investment is increasing globally resulting in an urgent need to understand the firms, the drivers of investment and, especially, its consequences. The differences between EMNEs and AMNEs have sparked lively, and ongoing, scholarly debate about whether mainstream IB theories are sufficient to understand EMNEs or whether some additional theoretical thinking is needed.

It is hoped that this literature review provides the interested reader with an updated overview of the main contributions related to EMNEs' specificities, and their differences from AMNEs in terms of advantages, and motivations for and modes of entry related to FDI. We have discussed how EMNEs may differ from AMNEs: for instance, their home CSAs as well as of their FSAs are profoundly different as are EMNEs' internationalization patterns, not least because EMNEs have to overcome a set of liabilities related to their being from an emerging country (i.e. LOE). While these differences are important, our purpose in this paper was not to enter the theoretical debate on the appropriateness of IB theories for explaining EMNEs. We have pointed out that the peculiarities of EMNEs may fade over time and, therefore, the fact of being an EMNE may be a contingency whose interpretation does not require a whole new theoretical apparatus.

However, the review in this paper highlights that most existing research explores the characteristics, drivers of and motivations for OFDI from emerging economies, but almost entirely neglects the *consequences* of such investment. Setting a new research agenda is beyond the objectives of this review; nevertheless, we note that a valuable area for future research would to address this limitation and focus specifically on the repercussions of EMNEs' investments in both the advanced and developing countries. These consequences require investigation on economic as well as socio-environmental grounds. We know very little about the impact of EMNEs on the capabilities of acquired firms, and the productivity and export spillovers they generate in host countries, especially if these are advanced countries (i.e. a South-North perspective). We also do not have a clear understanding of the socio-environmental impacts that these firms might have on different host environments. Having their home in countries with



weak institutional environments might mean that EMNEs run the risk of downgrading the socio-environmental standards in acquired firms in advanced countries, a possibility that should be of concern to policy makers.

With regard to the impact of EMNEs on their home countries there is an urgent need for new empirical research to investigate whether early internationalization is leading to improved performance in the domestic industry and contributing to an upgrading of the productive structure of the home country. EMNEs are engaged in a process of learning from their internationalization activity and are gaining experience by accessing geographic and culturally distant markets. However, it is not clear whether this should be interpreted as an encouraging sign for their home economies and if they can expect large returns from increasing international presence. The impact of EMNEs on the home and the host countries is open to empirical investigation; we anticipate that much research will focus on this area in the near future.

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# Chapter 2

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Chinese and Indian M&As in Europe: The relationship between motive and ownership choice\*

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\* Paper coauthored by Lucia Piscitello and Roberta Rabellotti, forthcoming in A. Risberg, D. King & O. Meglio (Eds), *The Routledge Companion to Mergers and Acquisitions*. London, UK: Routledge.

## Abstract<sup>†</sup>

The present chapter is about the ownership choices by Emerging Market Multinational Enterprises (EMNEs) when they invest in Europe through M&As, and the relationship with the main motivations underlying their international expansion. Namely, we claim that EMNEs prefer to acquire less control and keep the local partner when they invest for seeking knowledge. Additionally, EMNEs choose partial acquisitions in case of high dissimilarity in terms of culture, industry and knowledge base.

Our empirical analysis relies on a dataset of M&As undertaken by Chinese and Indian MNEs in high and medium-high tech sectors, in the period 2003-2011. We use content analysis of public announcements and company reports for classifying the main motivation of the acquisitions, and econometric analysis for testing our hypotheses. Our results confirm the expectations.

**Keywords:** Cross-border M&As, Knowledge-intensive acquisitions, Ownership choice, Foreign direct investment motives, Knowledge seeking, Emerging market firms, China, India, Europe.

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## Introduction

Emerging Country Multinational Enterprises (EMNEs) are increasingly involved in a process of international expansion in Europe through Foreign Direct Investment (FDI), in the form of greenfield investments and mergers and acquisitions (M&As). Although EMNEs suffer latecomer disadvantages and lag behind incumbent Multinational Enterprises (MNEs) (Child and Rodrigues 2005), they become global players within a very short space of time. For example, since the mid 2000s they have been influential actors in the international scenario, challenging advanced country MNEs (AMNEs) in many different industries (Awate *et al.* 2012; Narula 2012; UNCTAD 2012).

This rapid and peculiar evolution has led to a flourishing literature focused on the characteristics and strategies of the EMNE internationalization process (among many others, see Ramamurti 2008, 2012). EMNEs have few accumulated firm-specific advantages and their strengths rely mainly on their specific home country advantages (e.g. low factor costs, state support). Therefore, their expansion abroad, especially in advanced countries, is likely to be driven by the search for technology, management and strategic skills, brands and commercial knowledge, which often are lacking in their home countries (Rugman 2009). In fact, their internationalization can be considered mainly as a strategy aimed at accumulating resources (see among others: Awate *et al.* 2012; Child and Rodrigues 2005; Li *et al.* 2012; Makino *et al.* 2002) and appropriating strategic assets (Dunning 1993). Cross-border acquisition of companies in advanced countries is considered the fastest and most effective means of accessing strategic assets and key capabilities (Chung and Alcacer 2002).

EMNEs investing in more advanced economies face technological and commercial competitive disadvantages (Deng 2009; Gammeltoft *et al.* 2010). In addition, they also suffer from the *liability of emergingness* due to lack of reputation and legitimacy (Madhok and Keyhani 2012; Yildiz 2013), and the disadvantage with respect to advanced country firms of a knowledge gap which may severely limit their absorptive capacity to acquire and incorporate external knowledge (Cohen and Levinthal 1990).

Within this context, a crucial trade-off in EMNEs' acquisition of local companies is the extent of equity ownership, which has major implications for resource commitments, performance and risk (Anderson and Gatignon 1986; De Beule *et al.* 2014). The Resource-based View (RBV) and Transaction Cost Economics (TCE) approaches suggest that complete acquisition of the target company provides access to embedded knowledge and competences and minimizes transaction costs through full control over the foreign activities (Barney 1991; Williamson 1975). However, partial acquisition may be preferable because takeover implies radical organizational change and may result in the dispersion of the core competences developed by local managers and key employees (Cannella and Hambrick 1993). In this case, EMNEs may prefer to maintain a local partner, particularly when if the main motive for investment is acquisition of knowledge and competences.

In this chapter, we develop an empirical analysis of EMNEs' ownership choices in M&As undertaken in Europe, and investigate the relationship with the underlying motives. We investigate the relationship between the ownership choices of EMNEs acquiring firms in advanced countries and the motivation for their investment. The analysis is focused on Chinese and Indian acquisitions in Europe between 2003 and 2011. In particular, we relate ownership choice, that is, the level of commitment of Chinese and Indian MNEs to the target companies, to the motives underlying their investments. Data on M&As come from a newly created database, EMENDATA (Emerging Multinationals Events and Networks DATABASE) that combines data from BvD Zephyr and SDC Platinum. Information on motives is based on companies' public announcements published in Lexis-Nexis. We conduct qualitative content analysis which shows that Chinese and Indian acquisitions in Europe are motivated by the search for knowledge, market and legitimacy. We propose an econometric model to investigate the relationship between motive and ownership choice in order to provide new quantitative evidence on the technological upgrading strategies pursued by EMNEs in Europe.

## **2. Conceptual framework and research hypotheses**

### **2.1 Ownership choices**

A difference between EMNEs' and AMNEs' international expansion is that in the former case it is aimed not at exploiting existing ownership advantages (Dunning 1993), but rather at building sustainable global competitive capacity by from extending their networks of relationships and boosting their home country advantages (Buckley *et al.* 2007; Mathews 2006; Ramamurti 2008; Rugman and Li 2007). EMNE investment in more advanced countries is usually market- and/or strategic asset-seeking FDI (Deng 2009; Luo and Tung 2007). Acquisition is often chosen in order to access technological knowledge and other strategic resources in advanced market companies. It can enable direct access to sophisticated competences and skilled labour, and allow exploitation of local knowledge and development of formal and/or informal collaborations and networks with local actors such as suppliers, customers, universities and research centres (Cantwell and Mudambi 2011; Li *et al.* 2012).

When acquiring a company, a critical consideration is the level of equity ownership in the acquired company. The level of ownership in the target firm represents the level of commitment to the foreign activity (Chari and Chang 2009). Degree of ownership affects several factors such as the effective transfer of tacit and tangible assets, risk sharing between the acquiring and target firms, resource commitment, and control over activities (Anderson and Gatignon 1986; Barkema and Vermeulen 1998; Brouthers and Hennart 2007).

According to the RBV (e.g. Barney 1991), full acquisition of the local target company allows the investing firm to access the knowledge and competences embedded in the company (Barkema and Vermeulen 1998). Similarly, TCE theorizes that a higher level of control is needed to reduce the transaction costs involved (Madhok 1997). Based on these arguments, foreign investors generally should prefer a high level of control to achieve complete access to the knowledge and technological competences rooted in the acquired company.

However, MNEs often choose to low levels of equity ownership and there are theoretical and empirical explanations for shared ownership (Chari and Chang 2009; Mariotti *et al.* 2014). Complete acquisition of the target firm implies radical organizational changes and can disrupt its embedded core competences and result in huge losses for the acquirer (Jemison and Sitkin 1986). In the case of full acquisition, the acquiring firm may find it difficult to motivate the acquired firm's managers and employees, who may underinvest in new competences, behave opportunistically and hold up the transfer of critical tacit assets such as technological knowledge, or even leave their jobs (Chen and Hennart 2004). There is a large literature (e.g. Cannella and Hambrick 1993) showing that turnover rate in acquired top management teams is significantly higher than the normal turnover rate, and that exit of managers after an M&A involves loss of critical knowledge resources, thus, lowering the performance of the target firm. Alternatively, partial ownership gives the acquiring company the opportunity to share investments and risks (Anderson and Gatignon 1986; Kogut and Zander 1993). This is likely to be more relevant in the case of EMNEs investing in advanced countries where *liability of emergingness* represents an additional disadvantage that hinders the acquisition of legitimacy and capabilities (De Beule *et al.* 2014; Madhok and Keyhani 2012). The different host country environment, limited absorptive capacity and lack of reputation increase the EMNEs' need to rely on local employees and managers who embody competences and know-how which may be tacit and difficult to acquire. Hence, our first hypothesis is:

**Hypothesis 1.** EMNEs are more likely to acquire a lower equity share in cross-border M&As motivated by knowledge seeking.

However, the chosen level of ownership in the target company depends also on the characteristics of the target firms. In particular, the degree of uncertainty in cross-border acquisitions may be higher if the dissimilarity (in terms of culture, knowledge base, managerial style and labour skills) among the partners is high. Specifically, the literature highlights three types of dissimilarity between target and acquiring company (Barkema and Vermeulen 1998; Chari and Chang 2009).

The first is cultural distance, and evidence on its relationship with level of ownership commitment in the target company is mixed. On the one hand, a culturally distant environment can hinder the transfer of intra-organizational practices, thus, encouraging full ownership and greater control of the parent company. On the other hand, in unfamiliar environments, MNEs may prefer shared equity with local partners to ease their adaptation to the local context (Barkema and Vermeulen 1998; Hennart and Larimo 1998). In the case of EMNEs acquiring firms in advanced countries facing high uncertainty due to high cultural distance, we expect they will recognize the importance of local resources and choose a lower level of equity ownership to retain the local partner.

The second is dissimilar knowledge bases, which may influence the acquirer's equity ownership decision. It is well known that the transfer of routines and knowledge can be difficult in a new environment (Cohen and Bacdayan 1994), and firms expanding into unrelated businesses may encounter several problems related to absorption of acquired technological capabilities (Harrison *et al.* 1991; Ranft and Lord 2002). The transfer of competences and capabilities may require very close cooperation with the acquired company to achieve learning by the acquiring firm. When EMNEs invest in unrelated sectors, partial ownership may mitigate knowledge transfer problems.

The third type of dissimilarity is related to the external business environment. A turbulent business environment can increase uncertainty and is especially relevant in high tech compared to low tech sectors. Firm acquisitions in high tech industries are more likely to represent opportunities for learning and accessing knowledge-intensive assets such as specialized human resources, innovative technologies and specialized knowledge (Chen and Hennart 2004). The high uncertainty and risk of adverse selection in high tech industries drive the acquiring firm to pursue a lower level of commitment (Reuer *et al.* 2004). Therefore, we expect EMNEs acquiring firms in high tech rather than low-tech industries to pursue a lower level of commitment in the target company. Accordingly, our second set of hypotheses is:

**Hypothesis 2a.** EMNEs equity shareholding will be lower in more culturally distant compared to culturally closer target firms

**Hypothesis 2b.** EMNEs acquire lower equity shares in target firms operating in unrelated sectors.

**Hypothesis 2c.** EMNEs equity shareholding will be lower in acquired high-tech target firms compared to their shareholding in low-tech companies.

## **2.2 Motives and ownership choices**

According to the extant literature, firms' ownership choices may be related to the motive and strategies underlying the acquisition as well as the types of activities, strategies and structures of the firms involved (for a survey, see Brouthers and Hennart 2007). Firms with fewer technological capabilities generally undertake knowledge-seeking investments to fill their technology gap through the acquisition of innovative firms and access to their resources (Wesson 2004). Thus, for EMNEs seeking to acquire superior technological capabilities, the local advanced country partner plays a strategic role. Indeed, cooperation with the foreign target company mitigates problems related to the liability of foreignness and cultural differences, and the knowledge gap between the acquiring and target firms (Chen and Hennart 2004). The tacit nature of the knowledge and the highly sophisticated capabilities required in high tech industries mean that the learning processes of EMNEs need to be supported by the acquired firms. Therefore, if the EMNE's motive for investment is knowledge-seeking we expect the effect of dissimilarity between target and acquiring firm to be stronger since it will hinder the efficient transfer of knowledge. In this case, the EMNE will be likely to rely on the local partner to acquire knowledge and, thus, will prefer a lower level of commitment in the target company. Our third hypothesis is:

**Hypothesis 3.** Hypotheses 2a-2c will be more likely to hold if EMNEs invest for knowledge seeking reasons.



### 3. Data

#### 3.1 Sample

The empirical analysis is based on acquisitions undertaken by Chinese and Indian companies, in high and medium high tech industries in the 27 European countries in 2003-2011. Data on acquisitions are from EMENDATA, which combines BvD Zephyr and SDC Platinum records and provides deal level information (e.g., type, date, value, degree of ownership) and general information on the target and acquiring companies (e.g. country, region and city of origin, activities, sectors). The initial sample includes 230 acquisitions: 76 (33%) from China and 154 (67%) from India.

Previous studies provide empirical evidence that investments for knowledge sourcing reasons are particularly relevant in high tech manufacturing industries (Clodt *et al.* 2006), and especially in the case of EMNEs investing in advanced economies (Awate *et al.* 2012; Govindarajan and Ramamurti 2011). Therefore, we focus on knowledge-intensive manufacturing acquirers in high and medium-high tech sectors, identified on the basis of the Eurostat-OECD (2007) classification (King *et al.* 2008).<sup>1</sup>

The sample excludes: 1) deals undertaken by individual or unknown investors; 2) operations with undisclosed acquirers and/or targets; 3) investments where the acquirer is a sovereign wealth fund (SWF), or the global ultimate owner (GUO) is not from China or India. It also excludes acquisitions for which we have insufficient information to identify the main underlying motive. The final sample includes 170 acquisitions, representing 74% of the initial sample: 53 (31%) undertaken by Chinese firms and 117 (69%) by Indian MNEs. Table 1 presents sample characteristics by year and host country. The acquisitions in the sample involve 18 target European countries, among which the UK, Germany and France are the most popular for Chinese and Indian MNEs.

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<sup>1</sup> The 2-digit manufacturing industries according to the NACE Rev. 2 classification included in the sample are: pharmaceuticals (20), chemicals (21), computer, electronic and optical products (26), electrical equipment and components (27), machinery and other equipment (28), motor vehicles (29) and other transport equipment (30).

Table 1. Distribution of the 170 acquisitions by host country and year of investment (No., %)

<i>Host country</i>	<i>2003-2005</i>		<i>2006-2008</i>		<i>2009-2011</i>		<i>Total</i>	
	<i>China</i>	<i>India</i>	<i>China</i>	<i>India</i>	<i>China</i>	<i>India</i>	<i>China</i>	<i>India</i>
<i>Belgium (No.)</i>	0	3	2	3	0	2	2	8
<i>%</i>	0.00	9.37	9.09	5.45	0.00	6.67	3.77	6.84
<i>France (No.)</i>	1	4	4	3	5	3	10	10
<i>%</i>	16.67	12.50	18.18	5.45	20.00	10.00	18.87	8.55
<i>Germany (No.)</i>	2	5	6	12	5	4	13	21
<i>%</i>	33.33	15.62	27.27	21.82	20.00	13.33	24.53	17.95
<i>Italy (No.)</i>	1	0	2	7	3	4	6	11
<i>%</i>	16.67	0.00	9.09	12.73	12.00	13.33	11.32	9.40
<i>The Netherlands (No.)</i>	1	2	3	3	4	1	8	6
<i>%</i>	16.67	6.25	13.64	5.45	16.00	3.33	15.09	5.13
<i>Spain (No.)</i>	0	3	1	4	0	2	1	9
<i>%</i>	0.00	9.37	4.54	7.27	0.00	6.67	1.89	7.69
<i>Sweden (No.)</i>	0	1	0	2	3	0	3	3
<i>%</i>	0.00	3.12	0.00	3.64	12.00	0.00	5.66	2.56
<i>The UK (No.)</i>	1	10	3	12	0	12	4	34
<i>%</i>	16.67	31.25	13.64	21.82	0.00	40.00	7.55	29.06
<i>Others (No.)</i>	0	4	1	9	5	2	6	15
<i>%</i>	0.00	12.50	4.54	16.36	20.00	6.67	11.32	12.82
<i>Total (No.)</i>	6	32	22	55	25	30	53	117

### 3.2 Motives

To classify the main motive for each acquisition, we perform qualitative content analysis to categorize the textual information provided by companies' public announcements. We rely on a deductive category application (Weber 1990) to analyse the text in these announcements in order to identify the main motive underlying each acquisition.

Based on the main FDI motives suggested by Dunning's (1977, 1993) eclectic paradigm, and using an iterative process (feedback loops), we identified market and strategic-asset-seeking investments, which are the typical types of FDI from emerging to advanced economies (Buckley *et al.* 2007; Ramamurti 2008). We also identified the motive of global-legitimacy seeking, which is a quite relevant motive for EMNEs investing in Europe and in advanced countries more generally (Cui and Jiang 2009). We developed explicit definitions, examples and coding rules (Table 2) for each deductive category in order to determine unequivocally under what circumstances an announcement can be coded to a certain category (Weber 1990). The qualitative analysis consists of reading, analysing and methodologically assigning a unique category to each announcement.

Following the defined coding rules, two trained researchers carefully read each document to identify the main motive for the investment, and hand-code it. The reliability of the codification process was tested by measuring the level of agreement between coders and showed 87% correspondence (Neuendorf 2002).

Table 2. The coding methodology

Category	Definition	Examples	Coding rules
<b>Knowledge-seeking M&amp;A</b>	The acquiring company searches for R&D capacity, innovative products or production processes, design facilities, patent portfolios of local firms, and knowledge spillovers provided by the target firm.	“Complementary capabilities between Mahindra & GRD will enhance the product development capabilities, provide a solid European footprint for M&M to leverage technologies & skillsets by harnessing the talent pool of designers and engineers,” [Mr Pawan Goenka, President of the Automotive Sector of Mahindra Group] (Mahindra & Mahindra Ltd. acquired G.R. Grafica Ricerca Design SRL in 2008). <i>Source: Mahindra &amp; Mahindra Ltd. web site.</i>	If at least one of the aspects cited in the definition of <i>Knowledge-seeking M&amp;A</i> is mentioned as the main or the only motive of the investment.
<b>Market-seeking M&amp;A</b>	The investment is aimed at reaching local or regional markets, often including neighboring countries. Underlying these types of investments there are trade support reasons, e.g. to access distribution facilities, to facilitate exports, to acquire brand names.	"The acquisition of majority stake in MSI provides immense synergy benefits to both RSB and MSI. RSB, which exports substantial heavy fabrications to Europe, can now have a front-end presence in Europe to consolidate and grow its exports. offered by RSB-MSI combine". [Mr. S. K. Behera, Vice Chairman of RSB Trasmissions India Ltd.] (RSB Trasmissions India Ltd. acquired Mechanical Supplies International NV in 2010). <i>Source: LexisNexis.</i>	If at least one of the aspects cited in the definition of <i>Market-seeking M&amp;A</i> is mentioned as the main or the only motive of the investment.
<b>Global-legitimacy-seeking M&amp;A</b>	The MNE’s primary goal in undertaking the acquisition is to become a global player and to gain	“The acquisition will significantly strengthen the company’s position in the global Passenger Car & Chassis Component business and is a step towards attaining global leadership”.	If at least one of the aspects cited in the definition of <i>Global-legitimacy-seeking</i>

	<p>strategic positions in the global value chain, leveraging the international reputation of the target company. These M&amp;As have a global/international strategic orientation rather than a multidomestic/regional one.</p>	<p>[Mr B. N. Kalyani, Chairman and Managing Director of Bharat Forge Ltd.] (Bharat Forge Ltd. acquired CDP Aluminiumtechnik GmbH &amp; Co. in 2004). <i>Source: Bharat Forge Ltd. web site.</i></p>	<p>M&amp;A is mentioned as the main or the only motive of the investment.</p>
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The primary source for public announcements and deal information is LexisNexis, which provides access to billions of searchable documents and records from more than 45,000 legal, news and business sources. We integrated this information with the annual reports and official websites of both acquirer and target firms. Table 3 reports the distribution of acquisitions across the three main investment motives, distinguishing between Chinese and Indian MNEs. Total acquisitions are classified as: knowledge seeking 60 (35.29%), market-seeking 57 (33.53%) and global-legitimacy-seeking 53 (31.18%).

*Table 3. Distribution of the 170 acquisitions by main motive of the investment (No., %)*

<i>Motive</i>	<i>China</i>	<i>India</i>	<i>Total</i>
Knowledge-seeking (No.)	24	36	60
%	45.28	30.77	35.29
Market-seeking (No.)	16	39	57
%	30.19	33.33	33.53
Global-leg.-seeking (No.)	13	42	53
%	24.53	35.90	31.18
Total	53	117	170

The procedure described above is an application of direct content analysis appropriate when ‘*existing theory or prior research about a phenomenon that is incomplete would benefit from further description [...]*’, with the aim ‘*[...] to validate or extend conceptually a theoretical framework or theory*’ (Hsieh and Shannon 2005: 1281). Most studies of cross-border investment motives use approaches developed for AMNE contexts, that is, they use host country characteristics to proxy for FDI motives, and categorize FDI in low cost countries as resource/labour-seeking, and FDI in large markets as market-seeking. However, Wang et al. (2012) point out that these aggregate measures may be inadequate for understanding how acquisition motives differ from firm to firm. Therefore, in the present analysis we introduce complementary definitions of FDI motives, using firm- and deal-level data to combine traditional FDI explanations with the peculiar characteristics of EMNEs.

#### **4. Econometric analysis**

#### 4.1 Dependent variable

The dependent variable is *Share of equity* acquired by the EMNE in the target company. Table 4 presents the minimum, maximum, mean and standard deviation of the dependent variable values, distinguishing between Chinese and Indian acquirers. In Table 4, full acquisitions are represented by *Share of equity* taking the value 1 (100%); if the dependent variable is lower than 1 (i.e. acquisition of less than 100% of the target firm's equity) this is a partial acquisition. The high incidence of complete ownership is consistent with prior research showing Chinese and Indian firms' preferences for full ownership control over foreign operations (De Beule *et al.* 2014; Sun *et al.* 2012).

Table 4. Distribution of the 170 acquisitions by entry mode (No., %) and share of equity

	<i>China</i>	<i>India</i>	<i>Total</i>
<i>Acquisitions</i>			
Full (No.)	31	87	118
%	58.49	74.36	69.41
Partial (No.)	22	30	52
%	41.51	25.64	30.59
Total (No.)	53	117	170
<i>Share of equity</i>			
Mean	0.81	0.89	0.87
Std. Dev.	0.28	0.23	0.25
Min	0.07	0.10	0.07
Max	1	1	1

#### 4.2 Explanatory variables

##### *Knowledge-seeking M&As*

The variable *Knowledge-seeking* is a dummy that takes the value 1 if the principal motive for the acquisition is access to the technology and knowledge embedded in the target company, and 0 otherwise (i.e. if the acquisition is primarily market-seeking or

global-legitimacy-seeking). We showed that 60 out of 170 (35.39%) investments were for knowledge-seeking purposes. Since EMNEs need to cooperate with the local partner to ensure smooth transfer of knowledge and competences, it is likely that they will seek a lower level of commitment in the target company. Therefore, we expect a negative relationship between the dummy *Knowledge-seeking* and our dependent variable.

### ***Cultural distance***

To measure the cultural distance between China/India and each host country we adopt the traditional index of cultural distance<sup>1</sup> based on Kogut and Singh (1988), which includes the four cultural dimensions of power distance, uncertainty avoidance, masculinity/femininity, and individualism, introduced by Hofstede (1980). Thus, cultural distance is defined as:

$$Cultural\ Distance\ (CD)_{jh} = \frac{(I_{ij} - I_{ih})}{V_i}$$

where *Cultural Distance*  $(CD)_{jh}$  is the cultural distance between the home country  $h$  and the host country  $j$ ,  $I_{ij}$  is the cultural distance index  $i$ th for the  $j$ th host country,  $I_{ih}$  is the cultural distance index  $i$ th for  $h$ th home country, and  $V_i$  is the variance of the cultural distance index  $i$ th. The data come from Hofstede Centre ([www.http://geert-hofstede.com/the-hofstede-centre.html](http://geert-hofstede.com/the-hofstede-centre.html)). Given that higher values of the cultural distance index indicate larger differences between China/India and the host country, we expect a negative correlation between the CD index and the dependent variable.

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<sup>1</sup> Note that, since the effect of distance is a central issue in international management and international business, alternative measures have been suggested. However, and despite some critiques (e.g. Shenkar 2001), the Kogut and Singh index has proved the most popular so far (for a recent focus on the issue of distance in international management, see Special Issue of the *Journal of International Management* on “The Concept of Distance in International Management Research” 2014).



### ***Relatedness and dissimilarity***

To account for whether ownership decisions are affected by dissimilarity between the knowledge bases of the acquiring and target firms (Harrison *et al.* 1991), we include a dummy variable, *Target service sector*, which takes the value of 1 if the primary NACE code of the target firm is in a service sector industry (NACE two-digit Rev.2 45-96 inclusive), and 0 otherwise.<sup>2</sup> In our sample, 28 out of 170 (16.47%) are acquisitions of a service sector target firm operating and 142 (83.53%) are manufacturing sector acquisitions. Data on the primary industry of the target company are from BvD Zephyr and SDC Platinum. Since manufacturing MNEs suffer from higher uncertainty (caused by differences in knowledge bases) if the target company is specialized in services, they will likely commit to lower level equity than if the target is a manufacturing company (Barkema and Vermeulen 1998). Therefore, we expect a negative relationship between the dummy *Target service sector* and our dependent variable.

### ***Technological intensity of the target company***

To account for the technological intensity of the target company, we introduce the dummy variable *Target tech industry*, which takes the value 1 if the target company operates in a high or medium-high tech industry according to the Eurostat-OECD (2007) classification, based on data provided in BvD Zephyr and SDC Platinum. Table 5 shows the distribution of the 170 acquisitions between high and non-high tech industries. We expect a negative relationship between the dummy *Target tech industry* and our dependent variable *Share of equity*.

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<sup>2</sup> Note that, although the concept of relatedness refers to the applicability of the resources and capabilities owned by the company to the new business (Piscitello 2004; Robins and Wiersema 2003), it generally is operationalized by proximity within the SIC-defined system. Thus, although our proxy refers to a rather aggregated industrial classification, it is in line with the measures employed in the literature.

Table 5. Distribution of the 170 acquisitions by technology intensity of the target company (No., %)

<i>Target sector</i>	<i>China</i>	<i>India</i>	<i>Total</i>
High tech (No.)	38	95	133
%	71.70	81.20	78.24
Low tech (No.)	15	22	37
%	28.30	18.80	21.76
Total	53	117	170

### 4.3 Control variables

#### *Host-country variables*

To control for market growth in the host country, we introduce the variable *GDP growth*. According to previous empirical analyses (e.g. Barkema and Vermeulen 1998; Gomes-Casseres 1990), host market growth influences the level of ownership commitment; shared ownership is preferred over full acquisition in host countries showing high market growth. We measure host country GDP growth as host country annual GDP growth rate in the year before the acquisition (based on World Bank Development Indicator data).

The variable *Host cross-border M&As* measures the relative attractiveness of the host country with respect to entry by foreign firms. The international business literature has highlighted that rival companies' presence in a host country is based on a strategy of achieving global market presence, especially in markets regarded as attractive (Hamel and Prahalad 1985). Previous studies suggest also that the relative attractiveness of the host country market may affect the level of commitment in cross-border acquisitions (Chari and Chang 2009; Folta 1998). Thus, following Chari and Chang (2009), we measure *Host cross-border M&As* as the percentage of worldwide cross-border M&As in the target country in the year prior to the focal acquisition. Data are from the UNCTAD Cross-Border M&A database.

### ***Industry of the acquiring firm***

In order to control for industry-specific effects that might influence the M&A ownership decision we introduce four sectoral dummies (*Electronics, Machinery, and Transport* with *Chemicals* as the benchmark) based on NACE two-digit Rev. 2 20 and 21. In our sample, 60 acquisitions (35.39%) are in the chemical and pharmaceutical industry, 30 acquisitions (17.65%) in the electronic and electrical manufacturing sector, 31 (18.24%) in the machinery industry, and 49 (28.82%) in the transport industry. Data on the acquirer's primary industry come from BvD Zephyr and SDC Platinum.

### ***Year dummies***

Finally, since we pool data over a 9-year period characterized by strong macroeconomic turbulence, we control for the years of the financial crisis by adding two dummy variables for acquisitions in 2006 or 2007 (*Year t* for  $t = 2006, 2007$ ). In this way, we account for macroeconomic shocks that might affect the cross-border investment activity. During the financial crisis, there is a general tendency for aggressive takeover of foreign firms by EMNEs, that exploit their liquidity advantages and home country government support, and capitalize on the financial exigencies of – especially advanced country - target firms (Peng 2012).

## **4.4 Model and methodology**

To test our hypotheses, we employ the following model:

$$\text{Share of equity}_i = \beta_0 + \beta_1 \text{Tech-seeking}_i + \beta_2 \text{Cultural distance}_i + \beta_3 \text{Target service sector}_i + \beta_4 \text{Target tech industry}_i + \beta_5 \text{Controls} + \varepsilon_i$$

where  $i=1, 2, \dots, 170$  are the acquisition events.

Given that our dependent variable is bounded between 0 and 1, we estimate a Tobit regression model, which accounts for both left-and right censoring of *Share of equity* (Green 1993). Since some of the deals in the sample (53 observations, 31.18% of the whole sample) are acquisitions made by the same firm, we control for lack of independence between observations. Similar to the approach in Chari and Chang (2009)

and Folta and Miller (2002), we use the cluster option which corrects for this problem by computing robust standard errors that account for observations clustered by firms. Table 6 provides the descriptive statistics of the dependent and explanatory variables.

*Table 6. Descriptive statistics*

	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>	<i>Data Source</i>
<i>Share of equity</i>	170	0.87	0.25	0.07	1	BvD Zephyr/SDC
<i>Knowledge-seeking</i>	170	0.35	0.48	0	1	LexisNexis
<i>Cultural distance</i>	170	2.35	1.07	0.84	5.32	Hofstede Centre
<i>Target service sector</i>	170	0.16	0.37	0	1	BvD Zephyr/SDC
<i>Target tech industry</i>	170	0.78	0.41	0	1	BvD Zephyr/SDC
<i>GDP growth</i>	170	1.81	2.75	-6.80	8.40	World Bank
<i>Host cross-border M&amp;As</i>	170	0.06	0.07	0	0.21	UNCATD

Table 7 presents the correlation matrix. Variance inflation factor rules out multicollinearity problems influencing our results.

*Table 6. Correlation matrix*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) <i>Share of equity</i>	1						
(2) <i>Knowledge-seeking</i>	-0.230	1					
(3) <i>Cultural distance</i>	-0.140	0.226	1				
(4) <i>Target service sector</i>	-0.065	0.061	-0.058	1			
(5) <i>Target tech industry</i>	-0.193	0.203	0.093	-0.304	1		
(6) <i>GDP growth</i>	0.170	-0.172	-0.194	0.122	-0.111	1	
(7) <i>Host cross-border M&amp;As</i>	0.068	-0.026	-0.239	-0.097	0.061	0.045	1

Note: Correlations over  $\pm .12$  significant ( $p < .10$ ).

## 5. Results

Table 8 presents the estimated coefficients in our econometric models. Column 1 (Model 1) reports the results of the basic equation model. Note that the variable *Knowledge-seeking* has a negative and significant coefficient (at  $p < .05$ ), showing that

EMNEs prefer a lower equity share when investing to acquire knowledge and competences. This confirms Hypothesis 1.

In relation to the characteristics of investors, we analyse the impact of cultural distance. The coefficient of *Cultural distance* is not significant, which does not support Hypothesis 2a. With respect to the impact of dissimilarities in the knowledge base and the relatedness between the target company and the acquirer, on the dependent variable, *Target service sector* is significant (at  $p < .10$ ) and negatively affects the level of commitment of EMNEs. Thus, according to Hypothesis 2b, dissimilarities in the knowledge base between the acquiring and the target firms lead to a lower level of ownership (Barkema and Vermeulen 1998). For the industry-specific effect, we find that the coefficient of *Target tech industry* is negative and significant (at  $p < .10$ ). This supports Hypothesis 2c that the acquiring firm prefers lower level of ownership if the target firm is specialized in a high tech industry.

In order to test Hypothesis 3, we split the sample of acquisitions into two sub-samples, distinguishing between knowledge-seeking and other investments (Models 2 and 3, respectively). The results show that target firm- and industry-specific variables have different impacts on the dependent variable if the acquisition is aimed at acquiring knowledge. In line with our expectations, we find that the sign on cultural distance differs between the two acquisition sub-samples. The coefficient of *Cultural distance* is negative in Model 2 but in Model 3 turns positive, although not significant at the conventional level. The variables *Target service sector* and *Target tech industry* are negative and significant (at  $p < 0.1$ ) only if the acquisition is aimed at gaining knowledge. In other words, if the EMNE acquisition is to access know-how and technical competences embodied in the target firm, then the presence of a local partner is preferred (i.e. the acquirer has a lower level of commitment to the acquired firm) to maximize the opportunities for learning especially in the case of unrelated knowledge bases.

Among the control variables, the coefficient of *Host cross-border M&As*, that is, the presence of foreign M&As in the host country, is positive and significant ( $p < .05$ ) only

in Model 3, and seem to have no impact on ownership choice for acquisitions aimed at knowledge seeking.

Table 8. Tobit regression analysis (dep. variable = Share of equity)

	Knowledge-seeking M&As		Other M&As	
	Model 1	Model 2	Model 3	
<i>Knowledge-seeking</i>	-0.290 ** (0.113)			
<i>Cultural distance</i>	-0.020 (0.058)	-0.070 (0.083)	0.002 (0.075)	
<i>Target service sector</i>	-0.289 * (0.165)	-0.286 * (0.168)	-0.253 (0.272)	
<i>Target tech industry</i>	-0.233 * (0.140)	-0.318 * (0.190)	-0.155 (0.200)	
<i>GDP growth</i>	0.061 (0.060)	0.067 (0.063)	0.092 (0.087)	
<i>Host cross-border M&amp;As</i>	0.070 (0.065)	-0.088 (0.076)	0.239 ** (0.119)	
<i>Electronics</i>	-0.070 (0.184)	-0.109 (0.223)	-0.045 (0.249)	
<i>Machinery</i>	-0.026 (0.168)	-0.208 (0.206)	0.111 (0.279)	
<i>Transport</i>	-0.009 (0.146)	-0.061 (0.228)	-0.108 (0.211)	
<i>Year</i>	yes	yes	yes	
<i>Cons</i>	1.680 *** (0.182)	1.427 *** (0.250)	1.726 *** (0.262)	
<i>No.</i>	170	60	110	
<i>Pseudo R-sq.</i>	0.094	0.097	0.073	

Note: Variables have been standardized. Standard errors are robust after adjusting for clustering by acquirer. Standard errors in parentheses.

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

As a robustness check, we test our hypotheses using an alternative econometric specification. We categorize the dependent variable *Share of equity* into three ordered categories (100%, equal to or greater than 100% but below 50%, and below 50%)

running a robust Ordered Probit regression. The results show similar behaviour of the explanatory variables, which increases our confidence in the findings.<sup>3</sup>

## 6. Conclusions

Acquisitions of European companies by Chinese and Indian MNEs have increased dramatically in the last decade. The literature emphasizes that this activity is aimed mainly at acquiring strategic assets and competences from more advanced companies. However, MNE acquisitions of firms in foreign markets can be based on different strategies and different levels of commitment; they may involve fully buyout, or partial acquisition of the target company and retention of an important role for the local partner. Research shows that this choice depends on firm-, country- and industry-specific factors. This paper contributes by including the acquisition motives and their influence as a moderating factor in the relationship with ownership choice.

This paper contributes to the literature on entry mode by investigating the level of equity and control in cross border acquisitions, a topic that has been largely neglected so far. We also add to the empirical literature on EMNEs' internationalization strategies and work on acquisitions of advanced country firms (e.g. De Beule *et al.* 2014). Our empirical analysis shows that, Chinese and Indian MNEs prefer less control if the objective of the acquisition is technological competences rather than a customer base or established brand name. We show also that firm-level and industry-level characteristics have different impacts on the ownership decision depending on the reason for the acquisition. To classify deals according to their main aim, we introduced a novel methodology based on content analysis applied to the information provided in public announcements and company reports. We find that when acquiring companies in Europe with the aim of accessing technical competences, EMNEs prefer a low level of commitment because of the prospective partner's dissimilar knowledge and highly specific resources.

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<sup>3</sup> The results of this analysis are available from the authors upon request.

The study has some limitations that point to opportunities for future research. The major one is the limited number of observations, and the availability of information about the deals, included in the empirical analysis. The problems related to obtaining financial and accounting information about target and acquirer firms reduces the ability to account for relevant firm-specific characteristics such as R&D intensity. Also, although the smaller number of observations allowed hand coding, in larger samples, the procedure could be improved by the use of statistical techniques to identify recurring key words. Another possible limitation is the exclusion of managerial motives in the coding. Further research should examine the applicability of managerial motivations for EMNE acquisitions (for an overview, see Trautwein 1990). Our results could be replicated using alternative measures for cultural distance, although the one applied here is the most frequent in the international business and management literature (Ambos and Hakanson 2014). Shenkar (2001) points out that most cultural distance indexes and constructs (e.g. Hofstede 1980; Kogut and Singh 1988) oversimplify the relationship between countries, implicitly assuming lack of corporate culture variance (e.g. Hofstede *et al.* 1990). Traditional measures do not assume heterogeneity among individuals and firms (Zaheer *et al.* 2012), despite empirical results that show that corporate culture can modify the behaviour related to national traditions (Weber *et al.* 1996). This issue is particularly evident in cross-border M&As involving emerging and advanced economies companies. Although we tested the impact of the different motives underlying acquisitions on the ownership decision, future research could investigate other possible moderating effects, which might play a role in the entry mode choice. It would be interesting to study how different ownership strategies affect the innovative performance of the EMNE with respect to initial motive for the investment and the characteristics of the acquiring company. Finally, this empirical exercise could pave the way to future efforts aimed at crafting a conceptual framework within which EMNEs' behaviour and strategies could be better framed and understood.



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# Chapter 3

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Heterogeneity in ownership strategies by Chinese and Indian MNEs  
in knowledge-intensive acquisitions in Europe\*

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\* Paper coauthored by Lucia Piscitello, submitted to “*Asia Pacific Journal of Management*”.

## **Abstract**

Multinational enterprises (MNEs) from emerging economies have extensively employed cross-border acquisitions to augment firms' knowledge base by exploiting capabilities embedded in the target firms. The ownership choice is one of the key strategic decisions, since it deeply influences the integration and transfer of knowledge between the acquiring and the target firms. In this study, we focus on the importance of the home-country specific characteristics on the ownership choice decisions, presenting a comparative analysis of Chinese and Indian MNEs. We argue that China and India inherent heterogeneity plays a crucial role in differently shaping the MNEs' ownership choice.

Using a dataset of acquisitions undertaken by high and medium-high tech Chinese and Indian MNEs in Europe during the period 2003-2011, our findings suggest that Chinese MNEs are less likely to acquire control in the target company, compared to Indian firms. Further, the greater the institutional distance between the home and the host country, the larger the difference between Chinese and Indian firms' decision. However, the positive moderation effect of the host-country experience of the acquiring firm turns out to be relevant only for the Chinese MNEs.

**Keywords** Comparative analysis, Chinese and Indian MNEs, Cross-border acquisitions, Ownership choice, Institutional distance, Host country experience.

## Introduction

In recent years the global economy has witnessed growing flows of foreign direct investments (FDI) from emerging market multinational enterprises (EMNEs). The latest World Investment Report records that FDI flows from developing and transition economies have rapidly increased from \$12 billion in 1990 to nearly \$481 billion in 2012, representing the 34.62% of the world total (UNCTAD, 2013). In this period, both China and India have been involved in a growing process of international expansion through FDI, emerging as leading countries for outward flows of direct investments. Namely, during the period 1990-2012, Chinese outward FDI stock increased from \$ 0.83 billion to \$ 84.22 billion, while Indian outward FDI stock grew from \$ 0.06 billion to \$ 8.58 billion (UNCTAD, 2013).

India and China undoubtedly have some common characteristics related to their outward FDI, such as the influence of the government policy and market-supporting institutions in influencing their international expansion and local innovation, the propensity to undertake FDI in advanced countries in order to seek sophisticated technology and know-how, world-class brands and international legitimacy, or the preference for acquisitions and wholly owned foreign subsidiaries (Awate, Larsen & Mudambi, 2014; Brennan, 2011; Deng, 2009; Narula, 2014; Peng, 2012; Peng, Wang & Jiang, 2008). Yet, a number of considerable differences at firm- and home country-level characterize the two major emerging economies, and we claim that these dissimilarities may influence their international growing strategies. Such heterogeneity has been generally overlooked by the empirical literature, and EMNEs have been often treated as a homogenous cluster (e.g. Contractor, Lahiri, Elango & Kundu, 2014; De Beule & Duanmu, 2012). Indeed, *“as the heterogeneity of developed economies is being increasingly researched (Hall & Soskice, 2001), we need to recognize that ‘emerging economies’ are also not homogeneous. It is time to enrich this single label as these economies diverge”* (Hoskisson, Wright, Filatotchev & Peng, 2012, p. 4).

Within this context one of the most critical issues in cross-border ventures is the degree of the equity ownership in the target company. In fact, it is deeply related to the

resource commitment in the foreign operations and it impacts on the effective access to tacit and intangible assets and on the integration and transfer of knowledge and managerial skills between the acquiring and the target firm (Anderson & Gatignon, 1986; Barkema & Vermeulen, 1998). However, what explains ownership choices in cross border acquisitions is undoubtedly an under-researched question (Contractor et al., 2014).

Here we explicitly focus on knowledge-intensive acquisitions, that are likely to be motivated by the wish to augment firms' knowledge base by exploiting capabilities embedded in the target firm. Cross-border acquisition of companies in advanced countries is considered the fastest and most effective means of accessing strategic assets and key capabilities (Chung & Alcacer 2002). Further, knowledge has been recognized as the main basis for competitive advantage in many technology-intensive sectors, thus representing a primary motive for international expansion (Martin & Salomon, 2003). To quickly reduce their technological gap and successfully compete with firms from advanced economies, EMNEs need to augment their knowledge base through international operations by directly accessing resources that can be transferred to the parent company (Awate et al., 2014; Child & Rodrigues, 2005; Luo & Tung, 2007).

Relying on insights suggested by the institutional-based view (Peng, 2002), the present work specifically aims at understanding how home country-specific (dis)advantages related to heterogeneous degree of development in (i) the infrastructure and technical knowledge and (ii) the institutional system differently influences the ownership choices by Chinese and Indian MNEs investing in knowledge-intensive sectors in Europe. Namely, the heterogeneity at country level implies a different propensity towards control of the target company. Additionally, home-country heterogeneity jointly influences the role of established relationships involving institutional distance and host-country experience in the ownership choice. We provide original empirical evidence based on a comprehensive dataset that collects acquisitions undertaken by high and medium-high tech Chinese and Indian firms in Europe during the period between 2003 and 2011, using deal-level data from Bureau van Dijk Zephyr and SDC Platinum (Thomson Reuters).

Our findings confirm that Chinese and Indian MNEs behave differently when they seek strategic assets and technologies due to their home-country specific (dis)advantages. In particular, even if on average they both prefer to fully possess the target company, Chinese MNEs are less likely to control the target firm compared to their Indian counterparts. We believe this paper offers several contributions to the existing literature. First, integrating an institutional-based view the present work extends extant international business (IB) literature on EMNEs highlighting that emerging economies are not homogeneous and their specific characteristics have a different influence on their MNEs' internationalization behavior (Contractor et al., 2014; Hoskisson et al., 2013; Peng et al., 2008). Second, this paper provides new quantitative comparative evidence based on an empirical study of Chinese and Indian MNEs, complementing the existing literature mainly based on qualitative case studies or aggregated descriptive statistics (e.g. Duysters, Jacob, Lemmens & Jintian, 2009; Sun, Peng, Ren & Yan, 2012). Finally, focusing on emerging economies this work contributes to our understanding of the different value acquired by past host-country experience in mitigating lack of international reputation and institutional distance between home and host countries that increase the perception of uncertainty within foreign environments.

The paper is organized as follows. The next section presents our conceptual framework and the testable hypotheses. The third section presents the empirical setting, including the sample, variables, descriptive statistics, and the econometric model. After the illustration of the results, we conclude discussing our findings and the main contribution of the paper, and finally providing avenues for future research.

## **1. Conceptual framework and hypotheses**

### **1.1 EMNEs' ownership choice in cross border acquisitions**

One of the key characteristics of EMNEs is that their international expansion is generally not aimed at exploiting ownership advantages (Dunning, 1993), as traditionally experienced by advanced market multinational enterprises (AMNEs), but rather at building a sustainable global competitive advantage for leveraging their

network of relationships and their home country advantages (Buckley, Clegg, Cross, Liu, Voss & Zheng, 2007). When investing in high-income countries, EMNEs are usually involved in strategic-asset-seeking FDI (Luo & Tung, 2007) and often choose acquisitions as a mode of entry because it is a fast way to access technological knowledge and other strategic resources (Deng, 2009).

However, when entering advanced countries, besides the *liability of foreignness*, EMNEs often face two additional disadvantages. More specifically, they suffer from (i) the *liability of emergingness*, given their lack of reputation and legitimacy (Madhok & Keyhani, 2012), and (ii) a knowledge gap with respect to firms in advanced markets, that may severely limit their absorptive capacity to acquire and incorporate external knowledge (Cohen & Levinthal, 1990). Within this context, the right ownership strategy plays a crucial role in determining the success of the internationalization strategy, and the ability of the EMNE to learn and transfer knowledge back home (Contractor et al., 2014). Ultimately, the degree of ownership that the MNE acquires in the target company reflects the chosen level of control, and it can imply significant economic benefits thanks to a smooth post-integration and asset synergy (Brown, Dev & Zhou, 2003). On the contrary, when the ownership acquired is incorrect, there could be a mismatch between resource commitment and risk, and inefficient integration.

The IB and strategic management literature has traditionally explained factors that might drive ownership choices in cross border acquisitions (e.g. Barkema & Vermeulen, 1998; Chen & Hennart, 2004) mainly relying on Internalization theory (Buckley & Casson, 1976; Hennart, 1982) and Resource-based view (Barney, 1991; Teece, Pisano & Shuen, 1997). Theoretical arguments are based on the fact that MNEs venture in dissimilar environments encounter severe information asymmetries and perceived risks that need to be taken into consideration (Zaheer, 1995). This is particularly true in the recurrent scenario of EMNEs investing in more advanced countries, as they enter culturally, technologically and geographically distant locations in Western economies. Therefore, they have to deal with considerable information asymmetries and substantial risks.

From a complementary point of view, the IB literature has more recently extensively analyzed the strategic behavior of MNEs from emerging and transition economies

emphasizing the role of institutions and adopting an institutional perspective to better describe forces that shape their firms' internationalization strategies (Peng, 2012; Peng et al., 2008; Wright, Filatotchev, Hoskisson & Peng, 2005). In the context of emerging economies, the role of the institutional environment becomes particularly important, considering that market-supporting institutions - either directly or indirectly - influence the growing strategy of firms (McMillan, 2007). Institutions, in fact, provide the formal and informal competitive scenario in which the economic activities take place, framing firms' economic behavior, allowed moves and the way they interact (Peng et al., 2008). Foreign companies define their strategic choices in order to obtain institutional legitimacy in the host country, finding the optimal balance between the external institutional environment and the internal corporate organization (Cui & Jiang, 2010).

Accordingly, institutional theory has been widely used in the literature also to explain the ownership choices in cross-border acquisitions (e.g. Hennart & Larimo, 1998; Xu & Shenkar, 2002).

## **1.2 Chinese and Indian MNEs' dissimilarities: the influence on ownership choices**

Although China and India are both relatively disadvantaged with respect to more advanced economies, they show a different degree of development in infrastructures and in the technical knowledge base, that implies a different position in the global value chain (Sun et al., 2012), as well as in the degree of development of their institutional systems (Hoskisson et al., 2013).

Namely, due to comparatively developed infrastructure, China has more advantages in international trade compared to India, especially in labor-intensive activities such as assembly line production and global manufacturing. On the other hand, Chinese MNEs possess a less developed technical knowledge base and lower level of absorptive capacity, thus lagging behind their Indian counterparts in capital-intensive activities (Sun et al., 2012). Indian companies are global players in the internationalization of R&D, product design, marketing and engineering services (Athreye & Kapur, 2008), thus showing a relative leadership and a comparative advantage in the activities of the right side of the smiling curve (Mudambi, 2008; Sun et al., 2012).

Accordingly, Indian companies are more likely to be able to access and transfer knowledge, resources and capabilities from external sources, as those that are embedded in target firms located in developed countries. On the contrary, Chinese MNEs investing in knowledge-intensive sectors are more likely to need the support of a local partner in their learning process, especially considering the tacit nature of high-tech knowledge (Piscitello, Rabellotti & Scalera, 2014).

Additionally, in order to learn from the partner, the acquiring firm needs to develop trust and relational capital, and encourage people to collaborate and accept different style and behavior (Schreiner, Kale & Corsten, 2009). The cooperation with the local partner may be the key for mitigating problems arising from the cultural clashes and knowledge gap between the acquiring and the target firms (Chen & Hennart, 2004). Thus, leaving control in the target company might be particularly strategic in the case of Chinese MNEs, as they greatly suffer from severe reputation problem and lack in managerial skills (Rossele-McCauley, 2009; Spigarelli, Alon & Mucelli, 2013; Vecchi & Brennan, 2014). Ultimately, the collaboration with the local partner may mitigate Chinese MNEs' knowledge weaknesses, as well as the critical issues related to the relationships with skeptical regulators, unions and other stakeholders in the host country before, during, and after the deals (Hirt & Orr, 2006).

Furthermore, compared to India, China experiences a relatively poorer institutional development and an idiosyncratic institutional framework largely influenced by the government (Singh & Gaur, 2009; Verma and Brennan, 2011). Thus, Chinese acquisitions in developed countries tend to be conducted by firms owned by the government and frequently prevented in order to protect the national security (Hoskisson et al., 2012). The state ownership of many Chinese MNEs may represent an additional barrier in many advanced economies, as some host countries perceive these FDI as driven by political goals rather than strategic and business ones. Thus, Chinese MNEs encounter higher suspicion in developed economies compared to Indian firms (Globerman & Shapiro, 2009; Quer, Claver & Rienda, 2012). On the contrary, Indian acquisitions in developed markets are mainly undertaken by private firms and business groups, which leverage more legitimacy and support in host countries, as these investments are perceived to be long-term oriented (Gaur, Kumar & Singh, 2014).



Following the previous arguments, we claim that:

**Hypothesis 1 (H1)** In knowledge-intensive acquisitions towards advanced countries, Chinese MNEs are less likely (than their Indian counterparts) to acquire control in the target company.

### **1.3 Joint effect of home-country comparative (dis)advantages and institutional distance**

Although several studies have empirically examined the influence of the institutional differences<sup>1</sup> between home and host countries (Dikova et al., 2010) on the MNEs' ownership choice in foreign countries (e.g. Contractor et al., 2014; Morschett, Schramm-Klein & Swoboda, 2010), there is no consensus yet. On the one hand, some studies show a negative relationship between institutional distance and control (Hennart & Larimo, 1998; Xu, Pan & Beamish, 2004; Xu & Shenkar, 2002). Namely, if home and host country institutional environments are similar, MNEs will acquire higher control over the target company feeling a sense of familiarity and perceiving less uncertainty. On the other hand, other empirical findings show that institutional distance may be positively correlated with the level of control in foreign activities. For example, Kostova and Zaheer (1999) find that distant institutional environments encourage full ownership, as larger distances might represent a barrier to transfer organizational practices from the parent to the foreign subsidiary (Kostova, 1999).

Reviewing the previous research on the impact of institutional distance on ownership choice, De Beule, Elia and Piscitello (2014) point out that traditional measures only consider the magnitude of distance and are usually applied to AMNEs investing in emerging or less developed countries (e.g. Contractor et al., 2014). Analyzing the opposite situation, i.e. EMNEs investing in relatively advanced countries, the authors find that EMNEs do not need to rely on the local partner to reduce uncertainty, as a

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<sup>1</sup> Following Contractor et al. (2014) and Peng et al. (2008), we distinguish between formal and informal institutions. In particular, we call simply institutions the former, which relate to rules, law and practices, while informal institutions refer to values, norms and traditions of culture, language and society (North, 1973; Redding, 2005).

distant institutional environment normally constitutes a more advanced institutional context, i.e. a much more stable and less risky surrounding environment, compared to the home country. Thus, EMNEs investing in more advanced countries do not need to share equity to reduce the uncertainty. Therefore, and they are likely to acquire control in the target company when the home-host institutional distance is higher (De Beule et al., 2014).

Within this context, we claim that the mentioned inherent differences between China and India at home-country level do impact the role of institutional difference quite substantially. Namely, we expect that the less developed Chinese institutional context and the related institutionally comparative disadvantage will lead Chinese MNEs to maintain the local partner not only to acquire knowledge and competences, but also to mitigate the institutional barrier faced in the relatively developed foreign country. In other words, Chinese MNEs will be less inclined (than their Indian counterparts) to acquire the control in the target company, because they are likely to perceive acquisitions in Europe more uncertain and risky.

Thus, our second hypothesis states as follow:

**Hypothesis 2 (H2)** In knowledge-intensive acquisitions towards advanced countries, the positive relationship between institutional distance and control in the target company is weaker for Chinese MNEs (compared to their Indian counterparts).

#### **1.4 The different role of host-country experience**

The literature on MNE's entry mode has already widely shown that the previous experience in the host country is likely to lower the risk and agency costs associated with the cross-border investments and reduce the perceived distance between the local partner and the acquiring firm (Guillen, 2003; Kim & Hwang, 1992), also in the case of EMNEs (Filatotchev, Strange, Piesse & Lien, 2007). Indeed, the prior presence in the local environment could be useful to create formal and informal network and to share information that would seem important factors in foreign investments (Gao, 2003). Additionally, experience within the same host country is likely to mitigate those issues

arising from cultural and knowledge distance and reduce information asymmetries providing access to context-specific knowledge. In addition, in line with the internationalization process model (Johanson & Vahlne, 1977), Powell and Rhee (2013) find that prior host-country experience increases confidence in the face of institutional difference and enhances the propensity of the use of majority-owned structures in the foreign subsidiary. The authors show that experience in institutionally different contexts leads to a deep understanding of the way to act and do business within these environments, and reduces the need to rely on the local partner for legitimacy and network. Specifically, for MNEs operating in foreign countries with institutionally distant regulatory environments the value of experience can be enhanced (Eriksson, Johanson, Majkgard & Sharma, 1997), i.e. the positive relationship between institutional distance and control acquired by EMNEs in the target company is stronger under previous host-country experience.

In the specific case of Chinese and Indian MNEs, the perceived institutional distance towards European countries is likely to be different due to the value acquired by prior experience. In fact, Indian firms have a longer European history than Chinese companies. Namely, India has historical, cultural and economic linkages with the UK, which is one of the top recipients of FDI towards Europe (Zhang, Yang & van den Bulcke, 2012). Further, according to Yiu and Makino (2002), Chinese firms are less experienced compared to Indian MNEs, in entering Europe with acquisitions. On the contrary, they prefer to set up new subsidiaries through greenfield investments (Amighini, Cozza, Rabellotti & Sanfilippo, 2014). So, Chinese MNEs are less confident to invest in European countries compared to Indian firms, especially through acquisitions, since the former have accumulated less host country-specific experience in foreign markets, which are also more institutionally and technologically distant from the home country. For Chinese MNEs, this suggests that uncertainty from entering institutionally distant contexts can enhance the value of firm's prior host-country experience (Powell & Rhee, 2013).

In this framework, we expect that the previous host-country experience is more relevant in the case of China rather than in the case of India, and thus it differently influences Chinese and Indian ownership choice. In fact, under higher institutional distance we

claim that prior host-country experience is more valuable for Chinese MNEs rather than Indian.

Specifically, our Hypothesis 3 is as follows:

**Hypothesis 3 (H3)** In knowledge-intensive acquisitions towards advanced countries, the moderation effect of previous host-country experience on the positive relationship between institutional distance and control in the target company is stronger for Chinese MNEs (than for Indian MNEs).

## 2. Methodology

### 2.1 Data and sample

The empirical analysis is based on acquisitions undertaken by high and medium-high tech Chinese and Indian companies in the 27 European countries, throughout the period 2003-2011<sup>2</sup>. Data on acquisition deals come from Bureau van Dijk Zephyr and SDC Platinum (Thomson Reuters) databases. These two databases provide information at the level of the deal (e.g., the type of deal, date, value, acquired equity share in the target company) as well as general information about the target and acquiring companies (e.g. country, region and city of origin, industrial sectors). These databases have been widely used in empirical studies relating to acquisitions (e.g. Aybar & Ficici, 2009; Erel, Jang & Weisbach, 2014; Yang, Sun, Lin & Peng, 2011). The final sample is the result of a careful screening conducted by the authors on the initial population of deals. To be specific, we excluded<sup>3</sup> (1) the transactions not completed, (2) the deals undertaken by individual or unknown investors, (3) the operations with undisclosed acquirer and/or target, (4) the investments in which the acquirer is a sovereign wealth fund (SWF) or the global ultimate owner (GUO) is not from China or India.

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<sup>2</sup> The dataset employed in this paper is an authors' elaboration of EMENDATA, a proprietary database collecting FDI undertaken by MNEs from Brazil, China and India in the 27 European countries during the period 2003-2011 (for a detailed description of the EMENDATA database refer to Amighini et al. (2014)).

<sup>3</sup> An acquirer could have enhanced ownership of the target company over the years, starting from a partial acquisition and subsequent moving to a full one. We included in our sample on the first transaction, avoiding any potential issue.

The focus of the empirical analysis is on knowledge-intensive manufacturing acquisitions. In fact, previous studies have empirically highlighted that investments for knowledge sourcing are particularly relevant in high tech manufacturing industries (Cloudt, Hagedoorn & van Kranenburg, 2006), especially in the case of EMNEs investing in advanced economies (Awate, Larsen & Mudambi, 2012). Therefore, we have identified high and medium-high tech acquiring firms relying on the Eurostat-OECD (2007) classification. Specifically, we have included in our sample those investing companies operating in the following two-digit manufacturing industries according to the NACE Rev. 2 classification: pharmaceuticals (20), chemicals (21), computer, electronic and optical products (26), electrical equipment and components (27), machinery and other equipment (28), motor vehicles (29) and other transport equipment (30). After deleting for missing values, our final sample includes 206 acquisitions: 67 (32%) undertaken by Chinese firms and 139 (68%) by Indian MNEs. Table 1 shows the general descriptive information of the sampled acquisitions. Deals included in our sample involve 22 target European countries with the UK and Germany representing the most favorite locations for Indian and Chinese companies, respectively. In order to avoid heterogeneity in firm-level data, the latter were obtained only from BvD Orbis matching the name of the acquirer and the target firms provided by BvD Zephyr and SDC Platinum. Data for other variables were gathered from different sources as reported below.

*Table 1. Distribution of the 206 acquisitions by investing companies' home country and main industrial sector (No., %)*

Main industrial sector	Home country				Total	
	China		India			
	No.	%	No.	%	No.	%
Pharmaceuticals	10	15%	23	17%	33	16%
Chemicals	4	6%	36	26%	40	19%
Computer and electronic products	16	24%	7	5%	23	11%
Electrical equipment	4	6%	10	7%	14	7%
Machinery	18	27%	16	12%	34	17%
Motor vehicles	12	18%	44	32%	56	27%
Other transport equipment	3	4%	3	2%	6	3%
Total	67	100%	139	100%	206	100%

## **2.2 Variables**

### *Dependent variable*

We distinguished between majority and minority control in the target company based on the percentage of equity held by the acquiring firms after the deal. Our approach is in line with other studies that employed binary variables (e.g. Gatignon & Anderson, 1988; Gomes-Casseres, 1989; Powell & Rhee, 2013). Specifically, the dependent variable *Control* is a dummy variable, which takes the value of 1 when the investing company acquires more than 50% of the equity of the target company, and 0 when the investing company buys 50% or less of the target firm's equity.

### *Independent variables*

The first independent variable is the dummy *Chinese*, which is equal to 1 if the acquiring company is an MNE headquartered in China, and 0 otherwise (i.e. India).

To test for the interaction effect proposed in Hypothesis 2, we needed a measure of *Institutional distance* between the home and the host countries. *Institutional distance* (for the year previous to the deal) was computed by focusing on the market-related dimension of institutions, which is likely to be the most relevant institutional aspect taken into consideration by a foreign firm interested in doing business in a foreign country. In particular, following De Beule and colleagues (2014), we rely on the 9 items of the *Economic Freedom Index*<sup>4</sup> developed by the Heritage Foundation in partnership with the Wall Street Journal (Kane, Holmes & O’Grady, 2007). Specifically, we considered the following items: *business freedom*, *trade freedom*, *fiscal freedom*, *government spending*, *monetary freedom*, *investment freedom*, *financial freedom*, *proprietary rights* and *freedom from corruption*. A score ranging between 0 and 100 is associated with each item for the 24 countries, i.e. 22 host countries and 2 home countries, included in our dataset from 2002 to 2010. The distance between China (or India) and each European host country was computed by using a procedure similar to Kogut and Singh (1988), according to the following formula:

$$Institutional\ distance_{hj} = \sum_{i=1}^9 \frac{\{I_{ih}-I_{ij}\}^2/V_i}{9},$$

where  $I_{ih}$  stands for the Heritage score of the  $i$ th institutional item and the  $h$ th home country (i.e. China or India),  $I_{ij}$  stands for the Heritage score of the  $i$ th institutional item and the  $j$ th host country, and  $V_i$  is the variance of the Heritage score of the  $i$ th dimension.

Next, in order to test the interaction effect in Hypothesis 3, we introduced the variable *Host country experience*, which refers to the local experience of the Chinese and Indian MNEs in the host-country context. Following previous studies (e.g. Chari & Chang, 2009), it was measured through the dummy variable *Host country experience*, that takes the value of 1 if the company has already undertaken at least another FDI in the same host country in the previous 10 years, and 0 otherwise.

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<sup>4</sup> The items of the Economics Freedom Index are actually 10, but the tenth, i.e. labor freedom, is not employed as it has been made available only since 2005, while the deals included in our sample range from 2003 to 2011.

### *Control variables*

We controlled for several characteristics that have been included in similar studies on ownership choices in cross-border acquisitions (e.g Powell & Rhee, 2014).

Since the study utilizes a multi-host, multi-home sample, we considered several measures of informal institutional distance between the home and the host country to account for the different dimensions of psychic distance stimuli, some of them particularly relevant in the case of knowledge-intensive FDI (Dow & Karunaratna, 2006; Dow & Larimo, 2009). In fact, informal institutional differences may affect the nature and degree of interaction between individuals, and the extent to which working routines and competences can be transferred from one country to another (Hofstede, 1980). *Uncertainty avoidance distance* was employed as measure of cultural distance following prior research (e.g. Chari & Chang, 2009; Contractor et al., 2014; Kogut & Singh, 1988). It refers to the distance between uncertainty avoidance levels of the acquirer and the target country, measuring the cultural attitudes toward uncertainty over organizations. The measure was computed by using a procedure similar to Kogut and Singh (1988) for each cross-border acquisition. The uncertainty avoidance indices were obtained from Hofstede Centre ([www.http://geert-hofstede.com/the-hofstede-centre.html](http://www.http://geert-hofstede.com/the-hofstede-centre.html))<sup>5</sup>. *Education distance* and *Language distance* were calculated and employed according to the approach of Dow and Karunaratna (2006) and Dow and Larimo (2009)<sup>6</sup>, measuring the difference between the home and the host country for each scale. Language has been recognized as a key component of psychic distance and one of the dimensions influencing international expansion patterns (Welch, Welch & Marschan-Piekkari, 2001). Education is another factor that arguably needs to be considered as empirical evidences has shown its impact on the manner in which people communicate and interpret information (e.g. Kobrin, 1976). The data come from Douglas Dow's website (<https://sites.google.com/site/ddowresearch/home/scales>). At country level we also controlled for the host-market wealth introducing *GDP pp*, which

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<sup>5</sup> In case the index of host country was not available, we assigned these countries the score of others supposed to have similar institutional environment (for similar approach see Erramilli, 1991 and Quer et al., 2012).

<sup>6</sup> We included in our model on 2 out of 5 dimensions of psychic distance stimuli proposed by Dow and Karunaratna (2006) in order to avoid multicollinearity problems associated with the independent variables.



represents the (logarithm of) gross domestic product per capita of the target country. The log transformation was used due to the skewed distribution of the variable. Data were obtained from the World Bank Development Indicators database.

For firm-level controls, we employed several measures following the existing IB literature on entry mode. Namely, we used *SOE* that is a dummy variable that takes the value of 1 if the acquiring company is state-owned, and 0 otherwise (Cui & Jiang, 2009). We also included *Size*, representing the logarithm of the assets value of the acquiring company as at the previous year of the deal (Powel & Rhee, 2013). Again, we used a log transformation to correct skewedness in the data. Following Chari and Chang (2009), we also included *Target manufacturing*, which is a dummy variable taking the value of 1 when the target company operates in a manufacturing sector (2-digit NACE Rev. 2 codes between 10 and 33) and 0 when it is in a service sector (2-digit NACE Rev. 2 codes greater than 33). For industry-specific effects, we introduced four sectoral dummies (*Electronics*, *Machinery*, and *Transport* with *Chemicals* as the benchmark) based on the acquirer's 2-digit NACE Rev. 2 codes. All firm-level data were obtained only from BvD Orbis.

Finally, we control for the years of the financial crisis by adding two dummy variables for acquisitions in 2006 or 2007 (*Year t* for  $t = 2006, 2007$ ).

### **2.3 Estimation strategy**

A probit econometric model was employed to test our hypotheses using as dependent variable *Control*, where 1 indicates that the investing firm acquired more than 50% of the target firm's equity and 0 indicates that the investing company acquired a minority share, i.e. 50% or less. Furthermore, for all the models we relaxed the usual requirement that the observations in the sample, i.e. deals, need to be independent. We assumed that observations are independent across acquiring firms but not necessarily within acquiring firms. Following this approach, we allowed for intra-group correlation of standard errors, which affects the standard errors and variance-covariance matrix of the estimators, but not the estimated coefficients. Finally, to facilitate the interpretation of the results, we standardized all the continuous predictor variables before entering them into the regression models (Aiken & West, 1991).

### 3. Results

Table 2 reports descriptive statistics and correlations of the study variables. The table shows a number of correlations at levels high enough to raise questions about multicollinearity. To assess the potential threat of collinearity, we estimated the variance inflation factors (VIF). As a result, no VIF is greater than 4.15, which is significantly lower the commonly used maximum VIF thresholds of 10 (O'Brien, 2007; Xu et al., 2004).

Table 3 reports the results of the three models used to test our hypotheses. The three models produced statistically significant results ( $\chi^2 = 46.24$  and  $p < .0$  in Model 1,  $\chi^2 = 46.35$  and  $p < .0$  in Model 2,  $\chi^2 = 53.85$  and  $p < .0$  in Model 3).

Table 2. Descriptive statistics and correlation matrix of the variables employed in the analysis

	1	2	3	4	5	6	7	8	9	10	11
1. <i>Control</i>	1										
2. <i>Uncertainty avoidance distance</i>	-0.11	1									
3. <i>Language distance</i>	-0.09	0.43	1								
4. <i>Education distance</i>	0.04	0.10	-0.00	1							
5. <i>GDP pp</i>	0.06	-0.41	-0.18	0.18	1						
6. <i>SOE</i>	0.12	0.09	0.22	-0.20	0.13	1					
7. <i>Size</i>	-0.13	0.09	-0.06	-0.07	0.00	0.03	1				
8. <i>Target manufacturing</i>	0.18	0.01	0.02	-0.04	-0.07	0.01	-0.07	1			
9. <i>Institutional distance (ID)</i>	0.14	-0.64	0.53	-0.23	0.46	0.02	-0.03	-0.03	1		
10. <i>Host country experience (HD_EXP)</i>	0.16	-0.20	-0.18	0.01	0.08	0.02	0.21	0.02	0.20	1	
11. <i>Chinese</i>	-0.12	0.18	0.44	-0.39	0.20	0.42	0.11	-0.03	-0.01	-0.070	1
No. of Obs.	206	206	206	206	206	206	206	206	206	206	206
Mean	0.64	2.12	-0.38	1.49	10.38	0.11	12.53	0.81	2.91	0.22	0.32
Std. Dev.	0.45	2.21	1.18	0.29	0.47	0.31	1.92	0.40	1.86	0.41	0.47
Min	0	0.00	-2.43	0.65	8.17	0	2.4169	0	0.018	0	0
Max	1	13.36	0.53	2.24	10.94	1	18.68	1	7.28	1	1

Correlations above |0.18| are significant at the 0.01 level.

Table 3. Probit regression results

	Model 1	Model 2	Model 3
<i>Uncertainty avoidance distance</i>	0.14 (0.16)	0.09 (0.17)	0.09 (0.17)
<i>Language distance</i>	0.53* (0.21)	0.78* (0.33)	0.77* (0.34)
<i>Education distance</i>	-0.14 (0.14)	-0.17 (0.15)	-0.16 (0.15)
<i>GDP pp</i>	0.12 (0.15)	0.10 (0.15)	0.10 (0.15)
<i>SOE</i>	1.27** (0.39)	1.30*** (0.39)	1.38*** (0.41)
<i>Size</i>	-0.23* (0.10)	-0.23* (0.10)	-0.24* (0.10)
<i>Target manufacturing</i>	0.57* (0.24)	0.54* (0.25)	0.56* (0.25)
<i>Institutional distance (ID)</i>	0.50* (0.22)	0.73* (0.31)	0.77* (0.32)
<i>Host country experience (HC_EXP)</i>	0.72** (0.28)	0.75** (0.28)	0.57 <sup>†</sup> (0.31)
<b>Chinese (H1)</b>	-1.52*** (0.43)	-1.85*** (0.55)	-1.97*** (0.57)
<b>ID x Chinese (H2)</b>		-0.43 (0.38)	-0.51 (0.40)
<b>ID x HC_EXP</b>			-0.16 (0.26)
<b>Chinese x HC_EXP</b>			0.90 (0.71)
<b>ID x Chinese x HC_EXP (H3)</b>			0.49 (0.40)
<i>Sectorial dummies</i>	Yes	Yes	Yes
<i>Year dummies</i>	Yes	Yes	Yes
<i>Constant</i>	0.47 (0.39)	0.6 (0.42)	0.58 (0.42)
<i>N</i>	206	206	206
$\chi^2$	46.24***	46.35***	53.85***
$\Delta\chi^2$		0.11	7.61
<i>Cox R<sup>2</sup></i>	0.18	0.19	0.20
<i>Nagelkerke R<sup>2</sup></i>	0.26	0.27	0.28
<i>% of obs. correctly classified</i>	71.36	72.82	74.27

Dependent variable: (1) Investing company acquires 50% or more of the target company's equity, (0) otherwise. Variables have been standardized. Standard errors in parentheses.

<sup>†</sup>p<0.1, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001.

Model 1 includes all the control variables and the explanatory variables, i.e. *Chinese*, *Institutional distance* and *Host country experience*. The estimated coefficient for *Chinese* is significant ( $p < 0.001$ ) and negative, suggesting that Chinese firms are less likely to acquire control in the target company, compared to their Indian counterparts. Calculating the marginal effects of *Chinese*, we find that the mean predicted probability of acquiring control in the target company by Chinese companies is 0.35 ( $p < 0.001$ ), while it increases to 0.80 ( $p < 0.001$ ) for Indian companies. Thus, our Hypothesis 1 is supported. The other two explanatory variables, i.e. *Institutional distance* and *Host country experience*, were included in Model 2 and 3 to study our hypothesized interaction terms. The coefficients for these variables are both significant ( $p < 0.05$  and  $p < 0.01$ , respectively) and positive, supporting previous findings that firms more likely hold control when acquiring foreign firms located in countries with greater institutional distance and where they have already invested.

To test Hypothesis 2, Model 2 includes our first hypothesized interaction term, i.e. the interaction term for *Chinese* and *Institutional distance*. Its coefficient turns out to be not statistically significant. However, in non-linear models such as our probit model, the relation of the interaction term with the dependent variable may be more or less pronounced at varying levels of the interacted variables, and a marginal effect only refers to the average values (Hoetker, 2007). Thus, the probability of an outcome cannot be directly discerned from the variable's coefficient. Further, in our case one of the interaction terms is a dummy variable, i.e. *Chinese*, and it can never assume an intermediate value ranging between 0 and 1. Therefore, we calculate the marginal effects and present a graphical analysis as suggested by Hoetker (2007) and Green (2010), reviewing different alternative values of the interacted variables in order to obtain a richer and more informative interpretation of the results.

Figure 1 illustrates the interaction effect related to Hypothesis 2 by depicting how being from China decreases the probability to acquire control in the target company for different values of institutional distance, compared to India. In particular, Indian MNEs are on average more likely to acquire control than Chinese MNEs. However, the greater the institutional distance, the larger the difference between Chinese and Indian firms in the probability to acquire control in the target company. In particular, calculating the marginal effects of the variable *Chinese* at different levels of *Institutional distance*, we

found that at the minimum level of institutional distance the difference in the probabilities to acquire control in the target company between Chinese and Indian firms is -0.40, and is statistically significant ( $p < 0.05$ ). On the other hand, at the maximum level of institutional distance the same difference is -0.51, and is statistically significant ( $p < 0.1$ ). Therefore, these findings offer support to our Hypothesis 2.

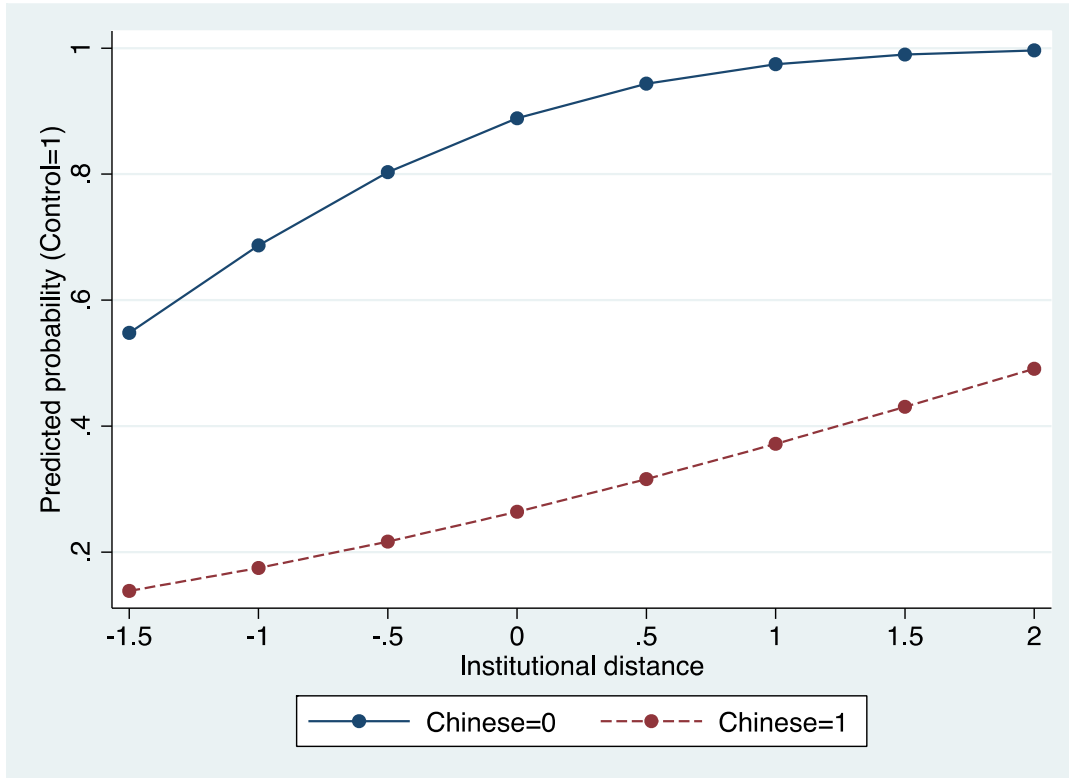


Figure 1. Interaction plot, Hypothesis 2

Model 3 includes the three-way interaction term between *Chinese*, *Institutional distance* and *Host country experience* to test our Hypothesis 3. The coefficient of the three-way interaction term turns out to be not significant at the standard levels. So, following the same operationalization employed for Hypothesis 2, we graphed out the interaction effect in Figure 2, which shows how the relationship between the country of origin (China vs. India) and the probability of an MNE to acquire control in the target company changes at various levels of both institutional distance and previous host country experience. Consistent with Hypothesis 1, Chinese MNEs on average prefer less likely to acquire control in the target company, compared to their Indian

counterparts. Further, previous host country experience of the investing firm increases the likelihood to acquire control in the target company both in the Chinese and Indian case. However, the effect of host country experience is more pronounced for Chinese firms than in the Indian one. Calculating the marginal effects of the variable *Chinese* at different levels of *Institutional distance* and *Host country experience*, we can offer a more informative interpretation based on the findings reported in Table 4. At the minimum level of institutional distance the difference in the probabilities of acquiring control in the target company with and without host country experience ranges between 0.17 and 0.14 (both not statistically significant) for Chinese and Indian MNEs, respectively. On the other hand, at the maximum level of institutional distance the same difference is 0.51 ( $p < 0.05$ ) for Chinese MNEs, and 0 for Indian MNEs. These results suggest that institutional distance and host country experience work together to enhance the likelihood that Chinese firms will acquire control in the target company, while the same combined effect doesn't seem to significantly influence Indian firms' propensity for control. Therefore, the findings in Model 3 support our Hypothesis 3.

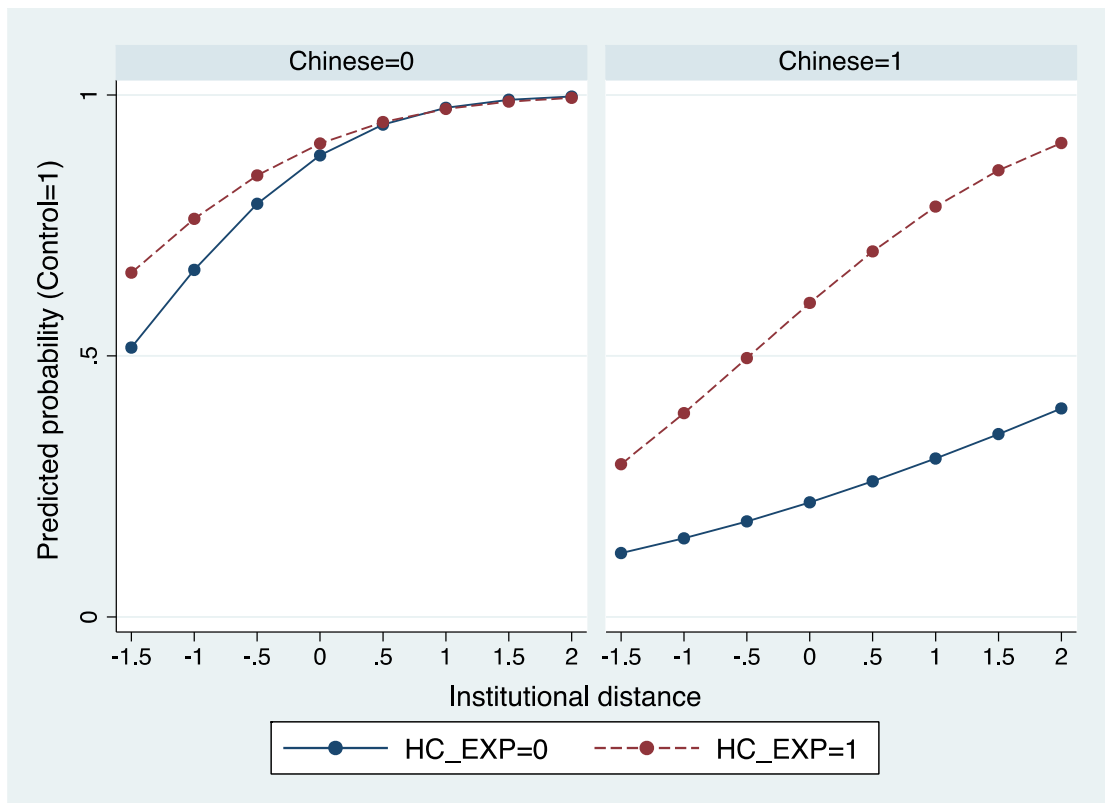


Figure 2. Interaction plot, Hypothesis 3

Table 4. Difference between  $Pr(\text{Control}=1 | \text{HC\_EXP}=1)$  and  $Pr(\text{Control}=1 | \text{HC\_EXP}=0)$  at low and high level of institutional distance between home and host country for Indian and Chinese MNEs.

Institutional distance	Indian MNEs	Chinese MNEs
	<i>Low</i>	0.14 (0.20)
<i>High</i>	0.00 (0.01)	0.51* (0.25)

Differences made using marginal effects of Chinese in Model 3 (data available upon request from the authors). Standard errors in parentheses.

\*  $p < 0.05$ .

With respect to control variables, the coefficient for *Language distance* is significant ( $p < 0.05$ ) and positive, indicating that acquiring firms are more likely to acquire control when investing in countries with greater language distance from the home country. *SOE* presents a significant ( $p < 0.01$  in Model 1 and  $p < 0.001$  in Model 2 and 3) and positive coefficient, meaning that state-owned MNEs are also more likely to acquire control in the foreign target company. The coefficient for *Size* is significant ( $p < 0.05$ ) and negative, indicating that larger firms seek lower control in the target company. The coefficient for *Target manufacturing* is significant ( $p < 0.05$ ) and positive, providing evidence that EMNEs seek control when acquiring foreign firms operating in manufacturing sectors. In all the models the coefficient for *Uncertainty avoidance distance*, *Education distance*, and *GDP pp* do not come out significant.

#### 4. Discussion and conclusion

In this work we presented a comparative analysis of Chinese and Indian ownership choices in knowledge-intensive acquisitions towards Europe. EMNEs undertake international operations to directly access resources that can be transferred to the parent company, ultimately aiming at reducing their technological gap and augmenting their knowledge base (Child & Rodrigues, 2005; Luo & Tung, 2007). Therefore, their expansion abroad, especially in advanced countries, is likely to be driven by the search



for technology, management and strategic skills, brands and commercial knowledge (Rugman, 2009; Yang, Yang Chen & Allen, 2014).

In this context, the focus of our analysis was to understand how home-country specific (dis)advantages impact Chinese and Indian MNEs' decisions. In fact, although China and India are the two main emerging economies and are also geographically proximate, they present inherent heterogeneities that need to be taken into consideration when studying the internationalization strategies of their MNEs (Hoskisson et al., 2013). Ultimately, we argued that the substantial dissimilarities related to Chinese and Indian home-country (dis)advantages play an important role in differently shaping the ownership choice decisions in strategic-asset seeking acquisitions of MNEs originating from these contexts.

We found that, even if both Chinese and Indian MNEs prefer to fully acquire the foreign target company, Chinese MNEs are more likely to rely on the local partner, compared to Indian companies. Specifically, Chinese companies suffer from greater comparative disadvantages in value-added and knowledge-intensive activities, which more likely drive them to leave some control of the foreign activities to the local partners because of their embedded valuable knowledge and competences. Further, Chinese managers often experience reputation problems for handling good and durable relationships with local employees and unions during and after the acquisition. So, in order to reduce the risk of a possible *hollowing out* of the target firms, which may be caused by the departure of key local managers and technicians (Cannella & Hambrick, 1993), Chinese acquires avoid acquiring the control of the target company. In our second hypothesis, we confirmed the positive relationship between control in the target company and institutional distance between the home and the host countries in the case EMNEs' acquisitions (De Beule et al., 2014). However, relying on our H1 we pointed out the different behavior of Chinese and Indian MNEs, and we found that Indian firms more likely tend to acquire control in target companies located in more distant host countries, compared to their Chinese counterparts. Finally, we analyzed the role of experience, finding support to its effect of reducing the perceived distance between home and host country (Powell & Rhee, 2013). In particular, the positive relationship between institutional distance and control is strengthened when the acquiring company

has previous host-market experience, but this moderating effect of experience is stronger in the case of Indian companies than Chinese ones.

Our findings add to the existing literature about EMNEs' internationalization strategies and knowledge-sourcing cross-border acquisitions. Namely, we offer a contribution to a better understanding of the differences between Chinese and Indian MNEs in their internationalization and knowledge-sourcing strategies, complementing other studies on EMNEs that generally consider them as a homogenous category (e.g. Buckley et al., 2007; Filatotchev et al., 2007). In fact, as highlighted by existing literature (Athreye & Kapur, 2009; Sun et al., 2012), India and China have some common characteristics related to their outward FDI, but also a number of considerable differences at firm- and home country-level that may have different impact on their international growing strategies. We have highlighted that in the realm of knowledge-intensive cross-border acquisitions, Chinese and Indian MNEs differ in their ownership choices, considering home-country comparative disadvantages, institutional distance and previous host-country experience, adding original empirical evidence on entry modes decisions, including insights from institutional-based view as suggested by Peng et al. (2008).

#### **4.1 Limitations and future research directions**

As usual, the current study has a number of limitations that must be acknowledged. The first limitation is the paucity of firm-level data about the target companies. In fact, it is difficult to obtain financial information about the target firm after the acquisition because it is often incorporated or it changes the name, limiting its traceability over time. In addition, the cross-section nature of our study makes not feasible to understand the possible evolution of the hypothesized relationships over time. Namely, Chinese and Indian home-country specific characteristics are expected to evolve dynamically, together with their institutional attributes. Therefore, we suggest that future studies engage in longitudinal research design, since it would be interesting to compare results across different time frames. Furthermore, although we have considered Chinese and Indian MNEs' acquisitions in Europe as strategic-asset seeking, we are aware that there may be other additional motivations underlying these investments, e.g. market- or

resource-seeking (Buckley et al., 2007). As such, future research needs to disentangle the effect of different FDI motivations, and try to include this additional heterogeneity within the present research design.

Finally, an interesting research question to be further explored should deal with the impact of the ownership choice on the subsequent technological performance of the EMNE. As these acquisitions should lead to an improvement of the knowledge base of the acquiring company, future research direction need to shed light on whether and how Chinese and Indian MNEs' inherent differences influence their ability to learn from international knowledge-sourcing.

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# Chapter 4

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Exploring the international connectivity of Chinese inventors in the pharmaceutical industry\*

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## Abstract

This paper explores the integration of emerging countries into the global system of innovation, as a channel for their technological catch-up. Using data on the innovative activity in the Chinese pharmaceutical industry, we analyze the geographic dispersion of inventor networks linked to China, as a function of the characteristics of the innovative actors that coordinate their inventive work. More specifically, we explore the role of the geographic origin and the institutional type of the innovative actors involved in the Chinese pharmaceutical industry. In order to account for different institutional types of innovative actors, we distinguish between universities and research centers, multinational enterprises (MNEs) and single location firms. Based on a dataset of USPTO pharmaceutical patents granted between 1975 and 2010 and reporting at least one Chinese inventor, we find that foreign innovative actors represent a stronger driver of connectivity compared to domestic innovative actors. Our results suggest that – compared to MNEs - universities and research centers spawn more internationally dispersed inventor networks, especially when they are foreign, while single location firms generate less dispersed inventor networks, especially when they are domestic. These findings point out the critical role that foreign universities and research centers may play in the catch-up process of emerging countries. Our results show in fact that these actors may be more beneficial than other institutional types, including foreign MNEs. Moreover, the superior ability of foreign single-location firms (compared to their domestic peers) to connect the local context with the global innovation system indicates that the phenomenon of highly innovative international ventures is more likely to happen in the context of developed countries. Smaller, single location firms from emerging economies may have a too narrow capability base to develop knowledge linkages with foreign partners, especially from the advanced world.

**Keywords** Global pharmaceutical industry, China, inventor networks, international connectivity, innovation



## Introduction

Recent insights suggest that the locus of innovation in the global economy is moving from advanced toward emerging countries (Govindarajan and Ramamurti, 2011). Accordingly, emerging countries are growing substantially in terms of patenting activity (National Science Board, 2014). In spite of this evidence, recent research has shown that emerging country firms are quick in catching up on output capabilities, but not as quick in terms of innovative capabilities (Awate et al., 2012).

Although in recent years scholars have shown renewed interest in the technological development of emerging economies (e.g. Cuervo-Cazurra and Genc, 2008; Hobday, 2010; Kafouros and Wang, 2014; Kumaraswamy, et al. 2012), the catch-up process that allows emerging countries to upgrade their technological capabilities is not yet fully understood. This study aims at shedding light on this subject by studying innovation in the Chinese pharmaceutical industry. More specifically, we look at the international connectivity (Lorenzen and Mudambi, 2013) of Chinese inventors in this sector, defined as the extent to which Chinese inventors collaborate with peers located in foreign countries. If knowledge flows more effectively through direct interaction and personal contacts (Saxenian, 1994), emerging country inventors collaborating with international teams should act as a channel for the acquisition of advanced technology and knowledge creation practices, thus ultimately fostering the development of superior innovation capabilities.

Inventors' scientific work is usually coordinated by organizations such as private companies, state-owned firms, universities and research labs, originating from both local (Chinese) and foreign geographic contexts. Because organizations differ in terms of their objectives and incentives, their willingness to foster the international connectivity of their research teams can vary. In order to explore this phenomenon, in this study we ask the following research question: *How do the geographic origin and institutional type of innovative actors affect the international connectivity of inventor networks in the Chinese pharmaceutical industry?*

To answer this question, we collected the population of pharmaceutical patents issued by the USPTO between 1975 and 2010 and granted to both Chinese and foreign assignees utilizing the scientific work of Chinese inventors. We analyze the geographic dispersion of the inventor networks and classified patent assignees based on their geographic origin, as well as on a comprehensive taxonomy of assignee types.

We believe the empirical setting of our research is appropriate for several reasons. First, the pharmaceutical industry one of the most technology intensive sector, but simultaneously displays a significant gap, in terms of knowledge-based activities, between advanced and emerging countries (National Science Board, 2014), thus representing an interesting field for exploring catch-up strategies of emerging countries. Second, agents affiliated to this industry extensively use patents as a way to protect their innovation output and intellectual property (IP), thus making patent information a reliable and rather comprehensive data source. Finally, due to both the increasing interest of foreign multinational firms and the manifold reforms that have occurred in the industry in the last decades, the Chinese pharmaceutical sector is populated by various types of actors – both domestic and foreign – that actively participate in the innovation process (Thomson Reuters, 2010). This provides us with the opportunity to investigate the role that different organizational, institutional and geographic characteristics of the innovative agents may play in a country's catch-up process.

Our paper contributes to the literature on the technological catch up of emerging countries by investigating the channel of inventors' international connectivity. Previous research has already highlighted that internationalization is critical for the upgrade of emerging countries (Chittoor et al., 2009). Following this insight, we specifically focus on the internationalization of inventors' collaborative activities. Specifically, we analyze the geographic reach of collaboration behaviors in emerging countries, under different organizational arrangements. We also add to the research stream on the networking behavior of inventors (Balconi et al. 2004), by simultaneously accounting for the role of the geographic origin and institutional type of innovative actors in a previously unexplored economic context, i.e. the emerging country context. We discuss both institutional and managerial implications of our study.

## **1. Knowledge networks and international connectivity**

The concept of connectivity is rooted in the idea of linkages. Linkages can be defined as channels that allow for the exchange of different types of resources (Lorenzen and Mudambi, 2013). Because technological advances have fostered the disaggregation of value chains into specialized activities (Mudambi and Venzin, 2010), linkages have become increasingly global over time. This has generated prominent opportunities to participate to global value chains for emerging countries (Meyer et al., 2011). Entering global value chains helps emerging economies to get “closer” to the developed world. On one hand, emerging country actors become more familiar with the context of advanced economies, and may more easily consider investing in these locations in order to gain access to cutting-edge technologies and business practices. On the other hand, developed world organizations increasingly recognize the role that emerging countries play in the international organization of economic activities, thereby seeking to exploit potential business opportunities related to these contexts. These bi-directional mechanisms generate higher awareness and mutual interdependence, which in turn reinforce the process of interaction and linkages creation between emerging countries and the rest of world. This dynamic is crucial for the catch-up process of emerging countries, as linkages frequently carry knowledge.

Knowledge plays a critical role in countries’ innovativeness and economic growth, but it is often difficult to acquire from a distance (Singh, 2005), because its diffusion process tends to be geographically localized (Jaffe et al., 1993). However, literature shows that the complexity of knowledge acquisition can be overcome through personal interaction between those who are willing to learn and those who have generated or master the knowledge to be transmitted (Breschi and Lissoni, 2001). Geographically dispersed inventor networks, through which scientist from different countries interact and share pieces of their own knowledge, may thus offset distances and foster the effective transmission of technology, thereby allowing Chinese inventors to learn and ultimately catch-up.

## 2. Theory and hypotheses

### 2.1 Geographic origin: Chinese vs. foreign institutions

In the context of the Chinese pharmaceutical industry, the dynamics of interaction and mutual recognition involving local and foreign actors have been particularly evident, thereby giving rise to an increasing number of collaborations, business opportunities as well as to a relevant flow of inward and outward investment. This has fostered the development of knowledge linkages with innovative actors located abroad, thus connecting the country to the rest of the world. On the whole, it appears that there are two drivers of connectivity: local innovative actors reaching out, and foreign innovative actors reaching in. *Local innovative actors* are Chinese-based organizations that are able to reach out and develop connections with foreign inventors, in order to use their scientific work to innovate. This can be obtained, for instance, by means of knowledge-intensive FDI in advanced countries (Piscitello et al. 2014). Many Chinese pharmaceutical companies are increasingly investing overseas not only for seeking knowledge and technology, but also for building brand awareness and global legitimacy in order to increase their market share and compete more effectively with advanced MNEs (KPMG, 2011). Although obtaining drug certification from the European or US market is a major challenge, Chinese companies strive to achieve this objective as it also encompasses a series of positive outcomes on both the home-market and other foreign markets, such as promoting reputation and brand image as signaling drug quality. Knowledge-based FDI helps emerging country organizations to develop collaborations with local investors, thus accessing to diverse pools of knowledge.

The second source of connectivity is represented by *foreign innovative actors*. *Foreign innovative actors* are foreign-based institutions that reach in, and involve local inventors in the organization of their research activities. Typically, this happens through the offshoring of innovation and knowledge-intensive activities to emerging countries (Lewin et al., 2009). In the case of China, the *Open Door Policy* has of course played a role in the activation of a substantial flow of direct investment from advanced economies. Specifically, foreign organizations have by now realized the importance of

being involved in the Chinese pharmaceutical industry, not only for the size of the market, but also in the light of its innovative potential.

While both foreign and domestic innovative actors may drive connectivity, we are interested in understanding whether systematic differences in their ability to spawn geographically dispersed inventor networks exist. Because of the increased globalization of human capital (Florida, 2005), developed world actors are starting to face a global race for talent (The Economist, 2006), which drives them to source knowledge and high value-added resources worldwide, in order to exploit the best available opportunities and increase efficiency. Asian countries, such as China, offer a substantial pool of qualified workers and expertise at a competitive cost, to which firms from other countries are increasingly willing to access (Lewin et al., 2009). At least 80000 Chinese PhDs from Western institutions have return to China to work in industry or in academic institutions, posing China as a leader in the knowledge-intensive outsourcing industry (KPMG, 2011). Accordingly, an increasing number of Chinese drug companies are turning to contract research organizations (CROs), and their market is expected to growth annually by 33% (KPMG, 2011). Chinese CROs offer research services at significantly lower costs and are increasingly able to meet Western standards (KPMG, 2011).

Under these conditions, foreign organizations are likely to develop frequent linkages with Chinese inventors. Conversely, due to their *liability of emergingness* (Madhok and Keyhani, 2012), Chinese actors are likely to face barriers when attempting to connect to foreign inventors. In spite of the increasing international openness of the Chinese pharmaceutical industry, cultural, institutional and technological distances may hinder Chinese-based organizations' ability to develop collaborations with foreign inventors thereby limiting the geographic dispersion of their inventor network.

We therefore expect that:

**Hypothesis 1 (HP1)** In emerging markets, domestic innovative actors spawn less internationally dispersed inventor networks than foreign innovative actors

## **2.2 Institutional type of innovative actors**

The geographic origin of innovative actors is not the only variable that may influence the geographic dispersion of inventor networks. Organizations that involve in innovative activities are heterogeneous in terms of their institutional types. Since different types of institutions are driven by heterogeneous objectives, their incentive to stimulate the international collaboration of their research teams may vary. In order to explore this issue, we distinguish between MNEs, single-location firms and university and research centers, and elaborate on their ability to drive connectivity. More specifically, assuming MNEs as the benchmark to which comparing the other institution types, we develop hypotheses on universities and research centers and single-location firms.

Compared to MNEs, universities and research centers are characterized by an “open” approach to science and technology (Balconi et al. 2004). While MNEs have a strong incentive to protect the outcomes of their innovation, as they represent a source of rents, inventors operating in universities and research centers pursue research with the goal of advancing the knowledge frontier, and are often driven by their individual motivation (Kaforuos et al., 2014). Moreover, the social and professional environment to which they belong stimulates their willingness to share the results of their innovative processes, as this increases their reputation. Universities and research centers are not interested in the commercialization of their ideas, as this falls beyond the scope of their activity. Therefore they have no need to keep them secret. It follows that the community of scientists tends to be highly connected in spite of geographic distance, which stimulates the collaboration among inventors located worldwide.

Single-location firms have limited opportunities in terms of resource access. While MNEs have a network of subsidiaries established worldwide, and may therefore access to pools of localized knowledge and resources in different host-regions (Almeida and Phene, 2004), single-location firms can only acquire resources available in their own locality. Access to resource is not the only aspect on which single-location firms are constrained. Compared to MNEs, which can exploit firm-internal networks and develop

substantial internal linkages (Alcacer and Zhao, 2012; Meyer et al., 2011), single plant firms tend to rely more on their local cluster for linkages creation, thus being isolated from international networks (Henderson, 2003).

We therefore expect that:

**Hypothesis 2a (HP2a)** Compared to MNEs, universities and research centers spawn more internationally dispersed inventor networks

**Hypothesis 2b (HP2b)** Compared to other innovative actors, single location firms spawn less internationally dispersed inventor networks

### **2.3 Combining the geographic origin and institutional type of innovative actors**

In order to fully appreciate the impact of the geographic origin of innovative actors and their institutional type, it is important to consider these factors jointly. In fact, the effects predicted in HP2a and HP2b could behave differently in the case of domestic innovative actors.

On one hand, in spite of the idea of the academic community as a small world characterized by high interconnectedness, not all actors belonging to this world are likely to be equally central or to share the same privileged position within the network (Newman, 2000; 2001). Compared to their foreign peers, universities and research centers from emerging countries are likely to be marginalized, peripheral components of the scientific community, thus being less able to connect to the global academic network. On the other hand, compared to foreign single location firms, those located in emerging countries tend to be endowed with a narrower capability base, which decreases their already low ability to connect to the rest of the world. The relative backwardness and peripheral position of their locality also plays a role in reducing the opportunities for the creation of knowledge linkages with partners from more technologically advanced regions. Compared to their foreign peers, they should therefore drive a lower degree of connectivity.

Based on this reasoning, we expect that:

**Hypothesis 3a (HP3a)** The higher connectivity of universities and research centers compared to MNEs is less accentuated in the case of domestic innovative actors than in the case of foreign innovative actors

**Hypothesis 3b (HP3b)** The lower connectivity of single location firms compared to MNEs is more accentuated in the case of domestic innovative actors than in the case of foreign innovative actors

### **3. Empirical setting**

#### **3.1 The global pharmaceutical industry and the rising role of emerging markets**

The global pharmaceutical industry has long proved to be an extremely profitable context (Ghemawat, 2010). For years, countries like North America, Europe and Japan have governed the marketplace, explaining more than 80% of the world pharmaceutical sales. However, in current times, several challenges are altering the competitive scenario in which pharmaceutical companies operate. First, while originally big pharmaceutical firms could rely on “blockbuster” drugs’ profits, the odds of discovering new breakthrough, high-potential molecules decrease over time, as those “*easy targets are being steadily exhausted*” (Bruche, 2012, p. 5). Second, starting from the 1980s, the progress in biotechnology and genetics led to the entry of new, specialist biotech organizations in the industry, and demanded established companies to develop new capabilities in terms of “rational drug design”, thus making the exploitation of external technology sources compelling (Cockburn, 2004). Finally, the approval of the Hatch-Waxman Act - in the US first, and in many other countries subsequently - allowed companies pursuing imitation strategies to file “Abbreviated New Drug Applications” even before the patent expiration date, by simply demonstrating that the new drug was “bioequivalent” to the original patented one, thus skipping many costly and time-consuming clinical trials. This led to the rapid development of a “generic drugs market segment”, populated by firms engaged in the mere production of imitator drugs (Bruche, 2012).



Faced with the abovementioned competitive challenges, big pharmaceutical companies had to significantly amend their business model over time. One opportunity for managing these challenges arise from emerging countries, whose enormous populations, growing awareness of the importance of healthcare, and increasing GDP have readily attracted companies by then used to deal with mature and stagnant markets. While emerging countries were originally considered as mere final markets where Western pharmaceutical firms could sell their products, in recent years this view started to be challenged as it appears that these contexts can host not only manufacturing sites but also R&D facilities. Accordingly, one major trend among big pharmaceutical companies is the increasing recourse to low-cost but qualified locations to outsource production and to locate or contract research and development activities (Bruche, 2012). Among these locations, emerging markets like India and China take the lead. Initially, outsourcing and contract R&D was limited to standardized activities, such as compounds synthesis and preclinical test (Friedman, 2010). However, as the level of pharmaceutical innovation in emerging countries improves, the volume and value of the activities performed in these contexts could also increase.

The pharmaceutical industry in emerging economies tends to be a turbulent and discontinuous environment. In these contexts, the effects of the economic liberalization process and IP reforms combine with the specificities of a highly regulated industrial setting. Internal heterogeneity is also a major issue in these countries, as there are profound gaps in terms of access to healthcare services among rural and more central geographic areas.

### **3.2 The specificities of the industry in China**

The Chinese pharmaceutical industry is highly fragmented and characterized mainly by domestic companies (Yuanjia et al., 2007). Domestic pharmaceutical firms, around 5000 companies, lack administrative and research sophistication and their strength lies in manufacturing generics and active pharmaceutical ingredients (API) for export (KPMG, 2011). The 90% of the Chinese drug manufacturers are small or medium-sized enterprises, and the top domestic players are mainly state-owned enterprises (SOE), often overwhelmed by overproduction and financial losses. The Chinese pharmaceutical

market is yet to mature and characterized by a complex system of regional markets dominated by non-branded generics and over the counter drugs (OTC). In particular, by the end of 2009, the value of generic drug sector was USD 29.3 million, representing 63% of the total pharmaceutical market (KPMG, 2011).

The main problems related to the inefficiency of the domestic industry are the lack of (1) IP rights protection, (2) visibility on the drug approval procedures, (3) effective governmental incentives, and (4) homogeneous policies for local and foreign companies (Deloitte, 2011). These issues also weaken the international competitiveness of the country and the ability to attract foreign investments. The industry is small-scale and inefficiencies arise from the difficulty to exploit advantage of economies of scale because R&D and manufacturing activities are geographically widespread throughout the country and scattered across several (especially domestic) manufacturers, which lack competences and financial resources to develop their own brand and leverage economies of scales. Most local manufactures are engaged in repetitive production of low value-added drugs and imitation of existing products.

In 2009, the Chinese government has begun to reorganize the industry by upgrading the existing innovation system and infrastructures, favoring the integration of local companies with foreign MNEs, enlarging insurance coverage and reducing the costs of medical services (Rein, 2009; Spigarelli and Wei, 2012). In addition, China entry in the World Trade Organization (WTO) in December 2001 has positively influenced the domestic pharmaceutical market and fostered the integration of the county into the global economy. An array of improvements has been introduced, such as a stronger patent system, a more diffused medical insurance system, and more transparent and reliable commercial legal procedures. China's WTO commitments include the strengthening of IP regulations, tariff concessions, and market access of non-domestic distributors of pharmaceutical products. Further improvements have been introduced in full compliance with the requirements of the TRIPS.

As a result, pharmaceutical MNEs from US and Europe have been increasingly investing in China as they recognize the growing potential of the Chinese market. However, foreign companies still face numerous challenges arising primarily from the stark competition of the local drug-makers, which have a deep knowledge of the

complex and heterogenous domestic market and impressive distribution networks. Moreover, the strong regulatory regime and the price controls by the central government make the foreign entry into the Chinese market more difficult. Yet, compared to their local counterparts, foreign companies can leverage brand awareness, trusted image, and more sophisticated technologies and knowledge base, because Chinese consumers tend to trust foreign brands more (Yuanjia et al., 2007).

## **4. Data and methodology**

### **4.1 Sample**

In order to study inventors' collaborations and the relative geographical distribution, we employed patent data. Patent co-inventorship has been previously employed to study the collaboration patterns of inventors (e.g. Breschi and Lissoni, 2009; Cano-Kollman et al., 2013; Ejermo and Karlsson, 2006). We decided to focus on United States Patent and Trademark Office (USPTO) data considering that it represents the most reliable and used foreign patent office, so this should be the best way to capture collaboration of Chinese inventors with foreign inventors. The choice of the only use of USPTO data is also related to the well-known issues arising from the lack of consistent quality across national patent systems and homogeneity in approval procedures and time. Further, inventions patented in foreign patent offices are in general more valuable, especially in the case of USPTO (Archibugi and Coco, 2005).

In order to build our sample, we selected all USPTO patents that: (1) have at least one Chinese inventor; (2) were granted between 1975 and 2010; (3) are representative of the pharmaceutical industry, referring to the Drug and Medical technological fields defined by Hall et al., 2001<sup>1</sup>. USPTO design patents mentioning the technological class "Pharmaceutical Devices" (D24) were also included. The sample thus generated consists of 1251 patents. We excluded from the initial sample patents that were

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<sup>1</sup> The Drug and Medical category as defined by Hall et al. (2001) includes four sub-categories: Drugs (sub-category code 31); Surgery and Medical Instruments (32); Biotechnology (33); and Miscellaneous – Drugs and Medicine (39).

unassigned or assigned to individuals (255 patents, 20.38% of the initial sample). Hence, our final sample accounts for 996 patents.

For information about inventors (i.e. name and address), we complemented our dataset merging the disambiguated inventors and co-authorship data provided by the Harvard Dataverse database (Li et al., 2014), which contains information on the USPTO patents granted between 1975 and 2010.

## 4.2 Variable definitions

### *Dependent variable*

The dependent variable, *Geo\_disp*, is the geographical dispersion of the network of inventors measured following the approach of Cano-Kollmann and colleagues (2013). The construction of *Geo\_disp* is based on the Herfindahl index, also known as Herfindahl–Hirschman Index, which is commonly used in industrial organization to measure of concentration of an industry (e.g., Tallman and Li, 1996). Since we are interested in the dispersion (and not in the concentration) of the inventor network at patent level, the *Geo\_disp<sub>i</sub>* for patent *i* is constructed as follows:

$$Geo\_disp_i = 1 - \sum_{n=1}^N (Inv_{i,n}/Inv_i)^2$$

where *Inv<sub>i,n</sub>* is the number of inventors of patent *i* located in country *n* (*N* is the total number of inventors' locations mentioned in patent *i*), *Inv<sub>i</sub>* is the total number of inventors of patent *i*.

As a result, we obtained a censored dependent variable, which takes the minimum value of 1 when all inventors are located in the same country (i.e. China in our analysis), and an upper limit asymptotically approaching 1 as the inventors network becomes more dispersed across different countries.

### *Independent variables*

In order to test our first hypothesis, we built the independent variable *Domestic\_innovative\_actor*, which is a dummy variable equal to 1 if the assignee is

domestic, i.e. Chinese, and 0 otherwise<sup>2</sup>. Since we are interested in the home-country of the innovative actors included in our sample, if the assignee was an MNE's foreign subsidiary, we built the variable using the location of its headquarters (Almeida and Phene, 2004; Phene and Almeida, 2008). In doing so, we used BvD Orbis and rely on the information on firms' global ultimate owners.

The second set of independent variables is related to the institutional type of the assignee. We distinguished between universities and research centers, MNEs and single-location firms. For each assignee mentioned in the patent document, we analyzed first the institutional typology, and then, in the case of firms, the ownership structure, using information from BvD Orbis and companies' websites. We defined as MNE any firm that has at least one subsidiary located abroad; otherwise firms were categorized as single-location. The categorization of the assignee type is time variant<sup>3</sup> in order to take into account changes in the firm ownership structure (e.g. merge and acquisitions), which are very frequent especially in the pharmaceutical industry. After the assignees' categorization, for each patent we created three dummy variables: *University*, if the patent's assignee is a university or a research center, *MNE*, in case the patent has been assigned to an MNE or one of its subsidiaries, and *Single\_location*, otherwise. For the analysis we used *MNE* as the benchmark. In case of co-assigned patents, we take into consideration the categories of all the co-assignees. For instance if a patent has been assigned to a university and an MNE, both *University* and *MNE* take the value of 1.

#### *Control variables*

In order to control for the possibility that the most innovative actors generate the most dispersed inventor network, we included a dummy variable, *Leader*, which takes the value of 1 for assignees in the upper quartile of the global pharmaceutical industry in terms of patent production in the year previous to the patent application ( $t-1$ ). We measured patent production as the natural logarithm of the cumulative number of

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<sup>2</sup>Our sample includes 12 patents co-assigned by a Chinese and one or more foreign institution. In these cases the variable Insider take the value of 1, because we applied an inclusive criterion as at least one of the assignees is domestic.

<sup>3</sup> We checked the status of each assignee in correspondence to the year of the patent application.

USPTO pharmaceutical patents<sup>4</sup> issued by each assignee in the period 1975 -  $t-1$ . Data come from Harvard Dataverse database (Li et al., 2014). If the company is part of a group or is the subsidiary of an MNE, we used the pharmaceutical patent stock of its global ultimate owner to calculate the variable. In case of co-assigned patent, *Leader* takes the value of 1, if at least one of the co-assignees is in the upper quartile.

Innovative actors from wealthier countries may have more resources to spawn globally dispersed inventors network. To control for this effect, we included the variable *GDP pp*, measured as the average of the natural logarithm of GDP per capita of the countries of all the assignees the focal patent in year  $t-1$ . GDP per capita data was obtained from the World Bank database. If the company is an MNE's foreign subsidiary, we used the GDP per capita of the country of the global ultimate owner.

We also controlled for the number of inventors for each patent, as captured by the variable *Team\_size*.

Moreover, we introduced the variable *Design*, a dummy that takes the value of 1, if the patent is classified by the USPTO as a design patent, and 0 in case it is a utility patent. Relying on the USPTO definition, “[...] “*utility patent*” protects the way an article is used and works, while a “*design patent*” protects the way an article looks. The ornamental appearance for an article includes its shape/configuration or surface ornamentation applied to the article, or both” (<http://www.uspto.gov/>).

We also accounted for the technological characteristics of patents. *Pharma* is a dummy variable equal to 1 if the first technological class of the focal patent is included in the pharmaceutical category, as defined in section 4.1; otherwise it takes the value of 0.

Moreover, we built the variable *Tech composition* adapting the Cubbin-Leech index (Cubbin and Leech, 1983) to the case of the patents' technological composition<sup>5</sup>. First we computed the Herfindal index of the patent technological concentration (*H\_tech*), using the three digit technological classes to which the USPTO has assigned the patent:

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<sup>4</sup> Defined as describes in Section 4.1.

<sup>5</sup> For a different approach measuring the ownership concentration shares in a firm, see Mudambi and Nicosia (1998).

$$H\_tech_i = \sum_{m=1}^M (Tech\_class_{i,m})^2$$

where  $Tech\_class_{i,m}$  is the percentage of the technological class  $m$  represented in patent  $i$  on the total number of technological classes mentioned in patent  $i$  (i.e.  $M$ ).  $Tech\_composition$  is defined as follows:

$$Tech\_composition_i = F[(Tech\_class_{i,l}) / (H\_tech_i - Tech\_class_{i,l}^2)^{1/2}]$$

where  $F[.]$  is the standard normal distribution function and  $Tech\_class_{i,l}$  is the percentage of the technological class most representative in patent  $i$ <sup>6</sup>.

In order to measure the amount of knowledge sources used to generate the patented innovation, we introduce the variable  $Know\_source$ , which was calculated as the natural logarithm of the count of the patents that were cited by the focal one.

Since we pool patent data over a 30-year period characterized by strong regulatory turbulence in Chinese IP regime, we control for the years of the discontinuity adding 2 dummy variables in 2002 and 2005 ( $Year\ t$  for  $t = 2002, 2005$ ). These years represent two main changes in the Chinese institutional and international landscape: the ratification by the Chinese government of WTO entry and full compliance with the requirements of the TRIPS agreement, respectively.

### 4.3 Model and methodology

Given that our dependent variable is censored, taking a minimum value of and an upper limit asymptotically approaching 1, we adopted a robust Tobit regression model, which allows controlling for heteroskedasticity of the sample. To facilitate the interpretation of the results, we standardized all the continuous predictor variables before entering them in the different regression models (Aikne and West, 1991).

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<sup>6</sup> For patent with only one technological class, so with highest level of technological concentration, we proxy the limit case for which it is possible to calculate a compute value of  $Tech\_composition$ , i.e.  $Tech\_class_{i,l} = 90\%$ .

In order to test our first hypothesis we started from the following basic equation model 1 (*Model 2*):

$$(1) \quad \begin{aligned} \text{Geo\_disp}_i & \\ &= \beta_0 + \beta_1 \text{Domestic\_innovator\_actor}_i + \beta_2 \text{Controls}_i \\ &+ \varepsilon_i \end{aligned}$$

where  $i=1,2, 3, \dots, 996$  are the Chinese pharmaceutical patents included in our sample; *Geo\_disp* is the dependent variable, which represents the geographical dispersion of the inventor team of patent  $i$ ; *Domestic\_innovative\_actor* is the dummy variable taking the value of 1 if the assignee is domestic (i.e. Chinese); *Controls* are the control variables described above, and  $\varepsilon$  is the error term.

To test our HP2a and HP2b, we employed equation model 2 (*Model 3*):

$$(2) \quad \begin{aligned} \text{Geo\_disp}_i & \\ &= \beta_0 + \beta_1 \text{Domestic\_innovator\_actor}_i + \beta_2 \text{University}_i \\ &+ \beta_3 \text{Single\_location}_i + \beta_4 \text{Controls}_i \\ &+ \varepsilon_i \end{aligned}$$

where we added to equation model 1 the dummy variables *University* and *Single\_location*, which are equal to 1 if the assignee is a university or research center, or a single location firm, respectively.

Finally, to test the third set of hypotheses (HP3a and HP3b), we interacted the dummy *Domestic\_innovative\_actor* with the variables *University* and *Single\_location*, i.e. *Model 4 and 5*. In order to isolate the two different interaction effects, we introduced the interactions in separated equations (*equation model 3 and 4*), as it is shown in the following:



$$\begin{aligned}
(3) \quad & \text{Geo\_disp}_i \\
& = \beta_0 + \beta_1 \text{Domestic\_innovator\_actor}_i + \beta_2 \text{University}_i \\
& + \beta_3 \text{Single\_location}_i + \beta_4 \text{University}_i \\
& * \text{Domestic\_innovator\_actor}_i + \beta_5 \text{Controls}_i + \varepsilon_i
\end{aligned}$$

$$\begin{aligned}
(3) \quad & \text{Geo\_disp}_i \\
& = \beta_0 + \beta_1 \text{Domestic\_innovator\_actor}_i + \beta_2 \text{University}_i \\
& + \beta_3 \text{Single\_location}_i + \beta_4 \text{Single\_location}_i \\
& * \text{Domestic\_innovator\_actor}_i + \beta_5 \text{Controls}_i + \varepsilon_i
\end{aligned}$$

Table 1 reports the descriptive statistics and correlations of the analyzed variables. The table shows that the control variable *GDP pp* is strongly correlated (-0.9355) with the independent variable *Domestic\_innovator\_actor*. The high correlation is due to the propensity of Chinese institutions to collaborate internationally with innovative actors located in high-income countries. Hence, in order to avoid multicollinearity issues, we decided to exclude the control variable from our models.

Table 1. Descriptive statistics and correlation matrix of the variables employed in the analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) <i>Geo_disp</i>	1											
(2) <i>Single_location</i>	-0.2519	1										
(3) <i>University</i>	-0.0451	-0.4387	1									
(4) <i>MNE</i>	0.2743	-0.4908	-0.4313	1								
(5) <i>Domestic_inn_actor</i>	-0.6602	0.1578	0.2598	-0.3452	1							
(6) <i>Leader</i>	0.4673	-0.4288	-0.0482	0.4989	-0.4623	1						
(7) <i>GDP pp</i>	0.6629	-0.1611	-0.275	0.3975	-0.9355	0.5152	1					
(8) <i>Team_Size</i>	0.1381	-0.1066	0.0723	0.1361	-0.0788	0.1322	0.0973	1				
(9) <i>Design</i>	-0.1165	0.2157	-0.2313	-0.0284	0.0632	-0.1306	0.0057	-0.2206	1			
(10) <i>Pharma</i>	-0.0497	0.161	-0.0984	-0.0291	0.0159	-0.0302	0.0065	0.0567	0.1696	1		
(11) <i>Tech_composition</i>	-0.1046	0.0204	-0.0157	0.0043	0.0891	-0.0818	-0.0863	-0.1243	0.1564	0.042	1	
(12) <i>Know_Sources</i>	0.1212	0.0434	-0.2158	0.1873	-0.2015	0.0669	0.21	-0.0412	0.1495	-0.0205	0.0338	1
Mean	0.204	0.37	0.361	0.334	0.456	0.327	8.902	3.885	0.0863	0.686	0.939	1.547
Std. Dev.	0.236	0.483	0.481	0.472	0.498	0.469	1.716	3.099	0.281	0.464	0.075	1.134
Min	0	0	0	0	0	0	5.206	1	0	0	0.673	0
Max	0.82	1	1	1	1	1	11.135	31	1	1	1	6.196
N. Obs	996	996	996	996	996	996	996	996	996	996	996	996

## 5. Results

Table 2 shows the estimated coefficients of the robust Tobit models applied to the equation models described above.

All models produced statistically significant results (LR  $\chi^2=285.92$  and  $p<.0$  in Model 1, LR  $\chi^2=703.93$  and  $p<.0$  in Model 2, LR  $\chi^2=727.38$  and  $p<.0$  in Model 3, LR  $\chi^2=728.18$  and  $p<.0$  in Model 4, LR  $\chi^2=733.16$  and  $p<.0$  in Model 5).

We employed Model 1 as baseline that includes all our controls. In order to test our HP1, we ran Model 2 and we found confirmation of our first hypothesis. As predicted, the dummy variable *Domestic\_innovative\_actor* exhibits a positive and significant coefficient ( $p<.001$  also in Model 3, 4 and 5), thus showing that domestic innovative actors spawn less internationally dispersed inventor networks compared to foreign innovative actors.

Table 2. Robust Tobit Regressions (dependent variable = *Geo\_disp*)

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Leader</i>	0.428*** (0.0307)	0.150*** (0.0256)	0.112*** (0.0282)	0.105*** (0.0292)	0.100*** (0.0286)
<i>Team_Size</i>	0.0530*** (0.0144)	0.0413*** (0.0118)	0.0420*** (0.0116)	0.0436*** (0.0118)	0.0409*** (0.0115)
<i>Design</i>	-0.118* (0.0597)	-0.119* (0.0511)	-0.0909† (0.0517)	-0.0918† (0.0513)	-0.0976† (0.0507)
<i>Pharma</i>	-0.0381 (0.0308)	-0.0415† (0.0251)	-0.0283 (0.0249)	-0.0271 (0.0249)	-0.0271 (0.0248)
<i>Tech_composition</i>	-0.0292* (0.0142)	-0.0119 (0.0116)	-0.0144 (0.0115)	-0.0143 (0.0114)	-0.0146 (0.0114)
<i>Know_Sources</i>	0.0641*** (0.0141)	0.0141† (0.0115)	0.0217† (0.0114)	0.0215† (0.0114)	0.0230* (0.0113)
<i>Domestic_inn_actor</i>		-0.597*** (0.0326)	-0.628*** (0.0341)	-0.602*** (0.0438)	-0.682*** (0.0418)
<i>University</i>			0.0978*** (0.0284)	0.111*** (0.0319)	0.107*** (0.0285)
<i>Single_location</i>			-0.0574† (0.0306)	-0.0638* (0.0314)	-0.0956** (0.0343)
<i>University* Domestic_inn_actor</i>				-0.0536 (0.0598)	
<i>Single_location *Domestic_inn_actor</i>					0.140* (0.0576)
<i>Year dummies</i>	Yes	Yes	Yes	Yes	Yes
<i>_cons</i>	-0.090** (0.0311)	0.264*** (0.0269)	0.264*** (0.0318)	0.265*** (0.0318)	0.278*** (0.0320)
<i>N</i>	996	996	996	996	996
<i>LR chi<sup>2</sup></i>	285.92	703.93	727.38	728.18	733.16
<i>p</i>	0.00	0.00	0.00	0.00	0.00
<i>Pseudo R<sup>2</sup></i>	0.2127	0.5236	0.5411	0.5417	0.5454

Note: Variables have been standardized. Standard errors in parentheses.

† p, <. 1, \* p<.05, \*\* p<.01, \*\*\* p<.001.

In order to test our second set of hypotheses, we employed Model 3 which shows positive and significant coefficient (p<.001 in Model 3, 4 and 5) for the dummy variable

*University*, and negative and significant loading ( $p < .1$  in Model 3,  $p < .05$  in Model 4,  $p < .01$  in Model 5) for the dummy variable *Single\_location*. These two results support our HP2a and HP2b. They suggest that compared to MNEs, universities and research centers establish more internationally dispersed investor networks; on the contrary, single location firms present less internationally connected networks with respect to MNEs.

As regards our H3a and H3b, Model 4 and 5 include, respectively, the interaction terms that reflect our theoretical argumentations, i.e. *University\*Domestic\_innovative\_actor* and *SingleLocation\*Domestic\_innovative\_actor*. We calculated the marginal effects shown in Table 3 and we also present a graphical analysis (Figure 1 and 2) as suggested by Hoetker (2007). In fact, in non-linear models, the relation of the interaction term with the dependent variable may be more or less pronounced at varying level of the interacted variables, and the overall effect only refers to the average values. Therefore, the probability of an outcome cannot be directly discerned from the variable's coefficient (Hoetker, 2007). In our specific case, in Model 4 the coefficient of the interaction between *University* and *Domestic\_innovative\_actor* seems to be not statistically significant. On the other hand, the interaction between *Single\_location* and *Domestic\_innovative\_actors* turns out to be significant ( $p < .05$ ) in Model 5. Therefore, we review the marginal effects of the interaction terms and the interaction plots in order to obtain a richer and more informative interpretation of the results.

Table 3 exhibits that all the marginal effects are statistically significant ( $p < 0.001$ ), and they are positive only when the variable *Domestic\_innovative\_actor* is equal to 0, and negative otherwise.

Table 3. Marginal effects of the interactions (Model 4 and 5)

	<i>Domestic_inn_actor=0</i>	<i>Domestic_inn_actor=1</i>
<i>University</i>	0.3902*** (0.0271)	-0.3438*** (0.0367)
<i>Single_location</i>	0.2399*** (0.0276)	-0.3423*** (0.0416)

†  $p < .1$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Further, Figures 1 and 2 show the different impact of *Domestic\_innovative\_actor* on the dependent variable *Geo\_disp* when innovative actors are universities and research centers and single location firms, respectively. In both cases (universities and single location firms), the connectedness turns out to be higher when the innovative actors are foreign, and lower when they are domestic. These results provide support for our HP3a and HP3b.

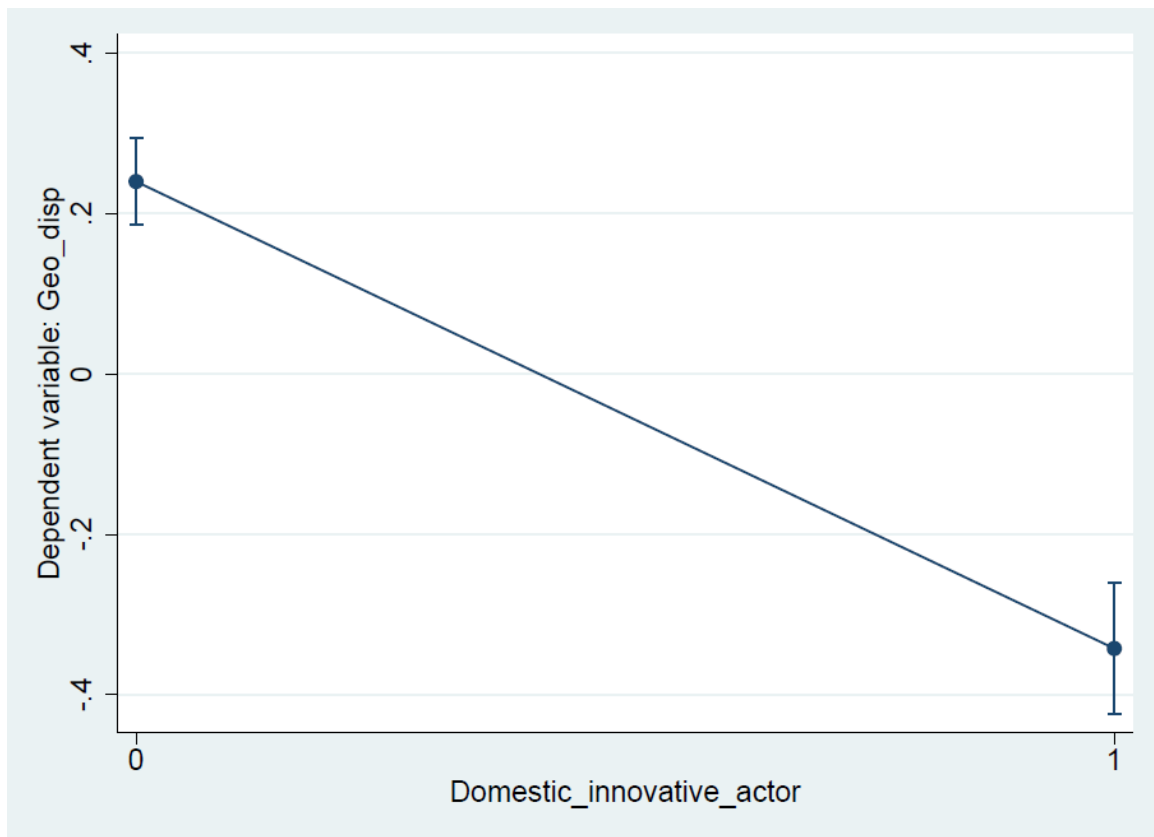


Figure 1. Interaction plot: *University\* Domestic\_inn\_actor (University=1)*

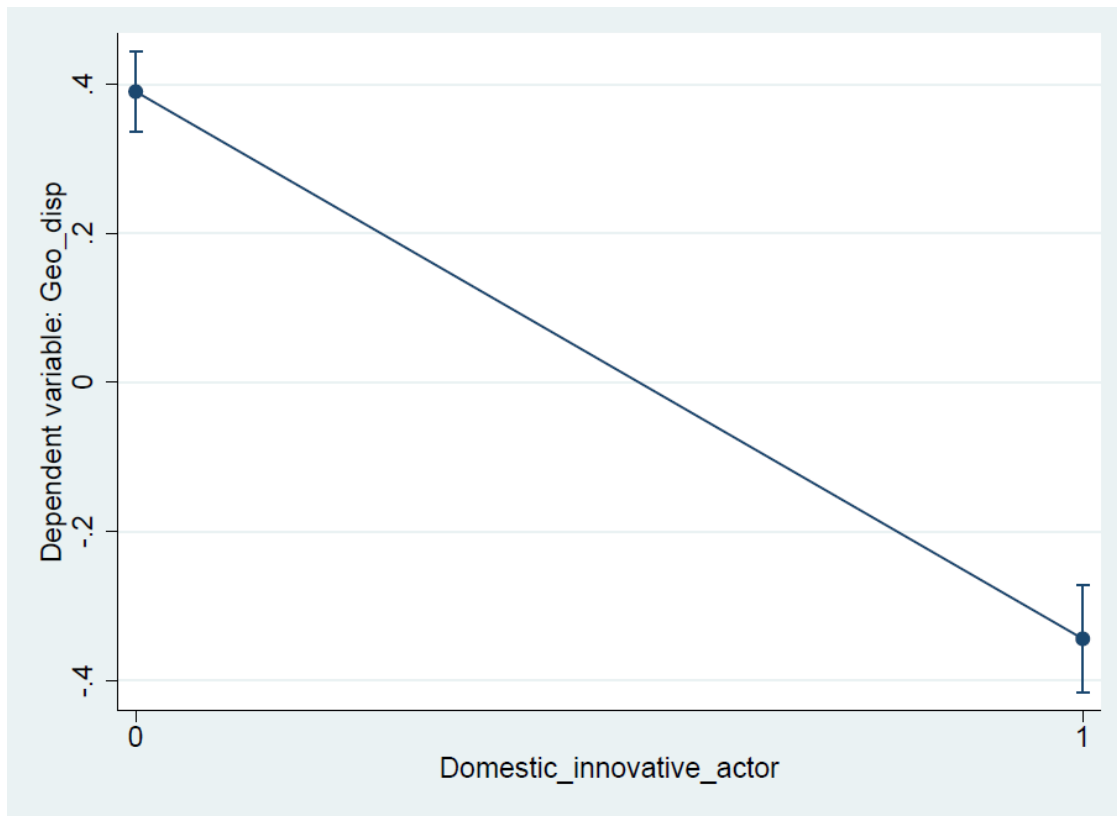


Figure 2. Interaction plot: *Single\_location* \**Domestic\_inn\_actor* (*Single\_location*=1)

Of the control variables, *Leaders* and *Team\_size* show a positive and significant effect ( $p < 0.001$ ) in all the tested models. This means that patents by innovation leader assignees are more connected than the ones by laggard innovative actors, because the former better leverage their ability to recombine knowledge that is diffused among different inventors. Further, and not surprisingly, we find that the larger the inventor team of a patent, the higher the connectedness, because it is higher the chance that one or more of the inventors is located in a different country. Also *Know\_sources* is positively and significantly ( $p < .001$  in Model 1,  $p < .1$  in Model 2, 3 and 4,  $p < 0.5$  in Model 5) associated with the dependent variable *Geo\_disp*, meaning that patents that source more from previous innovations tend to be more globally connected. Conversely, the control variable *Design* presents a negative and significant effect ( $p < .05$  in Model 1 and 2,  $p < .1$  in Model 3, 4 and 5). This is in line with the finding of Cano-Kollmann and colleagues (2013), confirming that design patents tend to be less geographically dispersed compared to utility patents. Finally, the variable *Tech\_composition* shows a

negative coefficient, but it turns out to be significant only in Model 1 ( $p < .5$ ). It suggests that the higher the concentration in a specific technological class, the lesser the international connectedness of the patent.

## **6. Limitations**

The use of patent data comes with a series of well-known limitations (Alcacer and Gittelman 2006). In the specific case of this paper, the choice of employing USPTO data may under-estimate the connectivity of the Chinese innovation system, especially with other emerging countries. Yet, USPTO patents are likely to capture high quality Chinese innovation, rather than the questionable inventiveness of repeated patents granted by emerging markets' local patent offices (Hu and Mathews, 2005). Moreover, because our focus is on the catch-up process of emerging economies, connectivity with other emerging markets, which by definition have less to offer in terms of learning opportunities, is less relevant to the objective of our study. Finally, it is worth noting that pharmaceutical patents do not represent - per se - innovations of commercial value, given the several stages that the patented drug has to undergo before reaching the market.

## **7. Discussion and concluding remarks**

*Big pharma* perform different activities in different emerging markets, some of them being used only as sales platforms due to the fear of knowledge leakage. This paper explores the role of emerging markets as locations for innovative activities in the pharmaceutical industry. As demonstrated by the considerable flow of inward investment that has targeted the country in the last decade, China is a very attractive location for R&D to advanced economy. In fact, in spite of the relatively low standards of intellectual property protection, MNEs have learned to implement effective strategies to avoid the risks of knowledge spillovers, for instance through the creation of strong internal linkages among technologies (Zhao, 2006). We focus on the catch-up process of the Chinese innovative system in the pharmaceutical industry. We argue that a key



aspect of this process is integration into global value chains and the global innovative system. There are two drivers of integration into global innovation systems: foreign actors undertaking innovative activities in the local (Chinese) economy and domestic actors undertaking innovative activities in foreign (typically advanced economy) locations. We examine the extent of integration into the global innovation system by looking at knowledge networks that are linked to China, either through organizations or individual inventors. We find that, compared to domestic innovative actors, foreign innovative actors generate more globally dispersed knowledge networks involving Chinese inventors, thereby sustaining the integration of China into the global innovation system. Moreover, the institutional type of the innovative actor matters for the connectivity of emerging markets. In fact, universities and research centers are responsible for the highest connectivity, while single location firms spawn less dispersed innovative networks. Finally, our results show that these latter effects vary with the geographic origin of innovative actors.

It is interesting to note that we are able to replicate the findings of Balconi et al. (2004), that relate to an advanced economy (Italy), for an emerging economy. In other words, universities and research centers have more dispersed innovative networks than commercial organizations. These non-commercial organizations have even more widely dispersed innovative networks than foreign MNEs.

This finding has important implications for the institutional audience. Since a greater dispersion can be traced to foreign universities and research centers, we suggest that attracting advanced economy universities and research centers is particularly valuable for emerging economy catch-up processes, even more important than attracting high knowledge FDI. It may also be the case that non-commercial actors are less sensitive to issues of knowledge spillovers than commercial actors like MNEs. However, as highlighted by Kafouros et al. (2014) we should also take into consideration Chinese within-country difference that may enhance or undermine the role of universities and research centers in favoring international research collaborations.

We find that single location firms have less dispersed innovative networks and amongst these firms, domestic Chinese firms have particularly low connectedness. This suggests that in the emerging economy context, smaller local firms are less promising as sources

of catch-up innovation. This could be because such firms have lower absorptive capacity and tend to rely on their local cluster also for knowledge sourcing, given that are not able to develop knowledge linkages with the global innovative system. Thus, highly innovative international new ventures (INVs) may be mainly an advanced economy phenomenon.

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# Conclusions

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The emergence of new global players from emerging economies and their outward foreign direct investments (FDI), especially toward advanced markets, are changing the worldwide competitive scenario. Due to the increasing importance of emerging market multinationals (EMNEs) and the growing impact of their strategies on the global economy, EMNEs have inspired a lively debate among scholars and policy makers about their distinctive features. As we discussed in Chapter 1, the literature has extensively investigated the drivers and strategies underlying EMNEs' internationalization, in order to find out whether – and how – they differ from traditional MNEs, with the final goal to assess the applicability of traditional international business (IB) theories to interpret the strategic behaviour of EMNEs.

Within this context, the present work focused on EMNEs' international expansion and strategies for accessing and acquiring knowledge, technological competences and innovative resources. In fact, EMNEs need to pursue a long-term strategy aimed at strengthening their technological base in order to effectively compete with established MNEs in the global market, especially in knowledge-intensive sectors. External collaboration could represent one of the fastest way to upgrade their skill, directly learning from more advanced partners, i.e. foreign firms, universities and external inventors. More specially, the overall research question we address is framed as follows: *How do EMNEs behave during their technological upgrading process through international expansion and external knowledge sourcing?*

Using different types of data, i.e. cross-border acquisitions and patents, and various levels of analysis, we have been able to analyze complementary knowledge sourcing strategies by EMNEs.

Specifically, first we examine knowledge-intensive acquisitions towards advanced countries, studying the ownership-choice strategy, as it is crucial in determining the effectiveness of the integration and transfer of knowledge between partners. The

objective is twofold. On the one hand, we study the relationship between EMNEs' ownership choice and the main motivation of the international expansion; on the other, we focus on the importance of the home-country specific characteristics, presenting a comparative analysis of Chinese and Indian MNEs. Second, we employ patent data on the innovative activity of Chinese inventors, to study the extent to which the integration of emerging countries into the global system of innovation represents a channel for their technological upgrading.

Our empirical analysis show that EMNEs prefer to acquire less control in the foreign target company, if the objective of the acquisition is technological competences rather than a customer base or established brand name. In fact, partial acquisitions more likely favour the cooperation between the acquiring and the target companies, enabling a smooth transfer of knowledge and competences from the more advanced target company to the EMNE. We show also that firm-level and industry-level characteristics have different impacts on the ownership decision depending on the reason for the acquisition.

Going beyond these results, we empirically highlight that home-country specific characteristics substantially influence EMNEs internationalization strategies. Focusing on China and India, the two main emerging economies, we find that in knowledge-intensive acquisitions Chinese and Indian home country-specific (dis)advantages related to heterogeneous degree of development in (i) the infrastructure and technical knowledge and (ii) the institutional system differently influence the ownership choices of their MNEs. Namely, Chinese MNEs are more likely to rely on the local partner, compared to Indian companies. Specifically, Chinese companies suffer from greater comparative disadvantages in value-added and knowledge-intensive activities, which more likely drive them to leave some control of the foreign activities to the local partners because of their embedded valuable knowledge and competences.

Additionally, we find that foreign innovative actors, i.e. MNEs and universities located in advanced economies, sustain more effectively the integration of emerging economies into the global innovation system, compared to domestic innovative actors. Moreover, the institutional type of the innovative actor matters for the connectivity of emerging

markets. In fact, universities and research centers are responsible for the highest connectivity, while single location firms spawn less dispersed innovative networks.

The abovementioned findings contribute to extend the literature on ownership choice in cross-border acquisitions, a topic that has been largely neglected so far. We also add to the empirical literature on EMNEs' internationalization strategies, which have extensively relied on exploratory case studies due the lack of fine-grained firm-level data. Further, to classify acquisitions according to their main aim, we introduced a novel methodology based on content analysis applied to the information provided in public announcements and company reports. Additionally, we offer a contribution to a better understanding of the differences between Chinese and Indian MNEs in their internationalization and knowledge-sourcing strategies, complementing other studies on EMNEs that generally consider them as a homogenous category. Finally, we enrich the literature on the technological upgrading of emerging countries by investigating the channel of inventors' international connectivity, focusing on the internationalization of inventors' collaborative activities.

Considering the limitations discussed at the end of each chapter, it seems clear that there is room for future research in this field.

First, more investigation is needed to better understand the role of MNEs from advanced countries in emerging economies in favoring the technological upgrading process of EMNEs. Through cooperation agreements (e.g. original equipment manufacturing, joint ventures and alliances), EMNEs can learn from their advanced partners. However, the weak intellectual propriety regime and the inadequate absorptive capacity of domestic firms can limit the likelihood of knowledge spillovers and effective transfer of knowledge. Expatriate scientists may play a crucial role in favoring the learning process, as they are able to mitigate institutional and technological distance between cooperating actors.

Second, it would be interesting to test how the characteristics of EMNEs' portfolio of foreign subsidiaries influence their innovative performance. Specifically, analyzing different dimensions of innovative capabilities, e.g. the scale, the quality and the diversification, future research could assess to what extent international breadth and

depth of the subsidiaries' network and their establishment modes, i.e. greenfield investments or acquisitions, influence the technological performance of the EMNEs.

Third, an interesting research question to be further explored should deal with the impact of the ownership choice on the subsequent technological performance of the EMNEs. As these acquisitions should lead to an improvement of the knowledge base of the acquiring company, future research direction need to shed light on whether and how EMNEs learn from international knowledge-sourcing through acquisitions.

Finally, one of the most pressing improvements in our research agenda should be to include and explore the role of managers' educational and work experience and interpersonal relationships in influencing the EMNEs' internationalization decision. It will be an interesting topic to examine whether and how network relationships and individual managerial experience help to overcome some difficulties perceived by acquiring companies in advanced economies.