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Technological Innovation as a Source of Chinese Multinationals' Firm-Specific Advantages and Internationalization

Shaowei He
University of Northampton, UK
Email: shaowei.he@northampton.ac.uk

Zaheer Khan*
University of Kent, UK
*Corresponding author- email: z.khan-53@kent.ac.uk

Yong Kyu Lew
Hankuk University of Foreign Studies, South Korea
Email: yklew@hufs.ac.kr

Grahame Fallon
Brunel University London, UK
Email: grahame.fallon@brunel.ac.uk

Abstract

This paper examines how innovation-related firm-specific ownership advantage (FSA) plays a role in developing the competitive advantage of Chinese multinationals when they internationalize. Based on a review of the existing literature concerning foreign direct investment by emerging economy multinational enterprises (EMNEs), we identify that numerous studies explain this phenomenon on the basis of their location-bound country specific advantages. However, such views do not fully explain the key underlying factors behind the rapid rise and success of many EMNEs as these firms rapidly internationalize and develop global competitiveness in developed markets. The current research explores three leading innovative Chinese EMNEs from the engineering sector: BYD, Sany Heavy Industry and CSR China. We find that their knowledge, and particularly their innovation-creating technological knowledge has contributed greatly to their successful internationalization. The illustrative cases show that the three firms have now moved beyond the infant to the mature stage of EMNE development through developing their technological knowledge in order to realize firm-specific advantage (FSA) through internationalization. This study helps in contributing fresh reflections to the continuing debate concerning the causes of internationalization and global competitive development by EMNEs and the role of their FSAs in these processes.

Key words: emerging market multinational enterprises, innovation capability, firm specific advantages, internationalization, knowledge; China

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1. Introduction

During the last decade, international business (IB) and strategy scholars have paid increasing attention to understanding the emergence and rapid growth of emerging market multinational enterprises (EMNEs) and their outward foreign direct investment (OFDI) (Buckley et al., 2007; Buckley, 2017; Deng et al., 2017; Guillen and Garcia-Canal, 2013; Meyer and Thaijongrak, 2013; Huang et al., 2017; Li et al., 2017; Luo and Tung, 2017). Most existing research has focused on understanding the reasons underlying the rapid rise, internationalization and competitive successes of EMNEs, including Chinese EMNEs (Buckley, 2017; Deng, 2012, 2013; Deng et al., 2017; Meyer and Thaijongrak, 2013; Ramamurti, 2012; Huang et al., 2017; Li et al., 2017; Sun et al., 2017) and the question of whether existing theories can account for the OFDI of such firms (e.g., Buckley, 2017; Luo and Tung, 2007, 2017; Hennart, 2012; Madhok and Keyhani, 2012; Ramamurti, 2012; Hernandez and Guillén, 2018).

Some scholars argue that the ownership, location and internalization advantages (OLI) paradigm provides a theoretical basis for EMNEs' emergence and their internationalization behaviour (Dunning, 2006; Narula, 2006, 2012). This stream of research links EMNEs' international expansion to the type of firm-specific advantage (FSA) that is predominantly associated with most developed economy multinational enterprises (DMNEs), such as reputational resources and innovative technologies.

However, others argue that the conventional OLI paradigm does not fully account for EMNEs' OFDI behaviour (e.g., Meyer and Thaijongrak, 2013; Moon and Roehl, 2001; Ramamurti, 2012; Luo and Zhang, 2016). More specifically, such scholars argue that EMNEs' motivations and internationalization processes differ from those of traditional DMNEs'; and therefore, that there is a need to revise conventional IB theoretical frameworks. Contributions to this view include the creation of the linkage-leverage-learning (LLL) (Matthews, 2006,

2017; Si, Liefner, and Wang, 2013), springboard (Luo and Tung, 2007, 2017) and bundling (Hennart, 2009, 2012) frameworks. Matthews (2006), for example argues that the OLI paradigm is not relevant to the circumstances facing most EMNEs since few possess any meaningful ownership advantages; EMNEs therefore use internationalization as a rapid means of gaining access to assets, resources and capabilities which are not readily available in their home markets (e.g., Matthews, 2002, 2006, 2017). Luo and Tung (2007) contend that EMNEs use rapid internationalization as a well thought-out and recursive strategy that helps to overcome the liability of late foreign market entry and a lack of strategic asset ownership. From the complementarity perspective, Hennart (2009) asserts that EMNEs can achieve new competitive advantages by bundling their FSAs with complementary resources in overseas locations. Taken together, these divergent views regarding EMNEs' internationalization behavior raise two important questions: Do EMNEs possess FSAs? If so what is the nature of those FSAs?

This research partly accepts the critiques put forward by some of post-OLI theories concerning EMNEs mentioned above (e.g., Matthews, 2006, 2017; Luo and Tung, 2007; Hennart, 2009). It reviews the existing literature from the EMNEs' country-specific advantage (CSA) as well as the FSA perspectives. Regarding FSAs, we examine EMNEs' capacity for internationalization and competitiveness development. We do so by making use of three leading Chinese MNEs (i.e., BYD, Sany Heavy Industry and CSR China) in order to examine the preceding questions. We believe that this investigation offers a valuable reference for future studies of EMNEs' internationalization. Our findings regarding Chinese EMNEs' ownership advantages and their impact on these firms' rapid expansion into foreign markets contribute new reflections to the theoretical debate on the causes of their OFDI.

This paper contributes to existing research on EMNEs by arguing that the FSAs of some Chinese EMNEs are not contingent on its unique, emerging market context. Our case

study findings show that their FSAs seem to align with those enjoyed by traditional DMNEs. Thus, this study provides important insights into the way in which innovative EMNEs, particularly those from China are now developing FSAs which are becoming increasingly similar to those of DMNEs. We believe that, by so doing, it contributes to the EMNE literature regarding the motivation, rapid rise and home-based advantages of latecomer firms, and on the extent to which existing theories explain OFDI by EMNEs. Our study also bridges the gap between EMNE internationalization and traditional IB theories, based on our analysis of the three chosen companies from China and the unique way in which they are developing their FSAs.

The structure of the rest of the paper is as follows: First, we review the existing literature linking CSAs and FSAs to the internationalization of EMNEs (including those based in China). Second, we discuss our research context and methods. Third, we present our analysis of the three Chinese MNEs. We conclude with a discussion on the resultant insights into the internationalization of these EMNEs, their fuelling by key FSAs and the resultant theoretical implications, current research limitations and suggested future research directions.

2. EMNEs and their Internationalization

2.1 Do EMNEs internationalize to overcome ownership disadvantages at home?

Recent studies on EMNEs' internationalization argue that EMNEs may internationalize in order to overcome their ownership disadvantages (cf. Mathews, 2002; Luo and Tung, 2007, 2017). In other words, EMNEs can realize their existing ownership advantages through internationalization and they can develop new FSAs by acquiring strategic assets in developed markets. Advocates of this view argue that EMNEs' internationalization cannot be fully explained by existing IB theories such as OLI (Dunning, 1988a; 1995; 2000), which were developed mainly in the context of DMNEs.

More recent theoretical contributions take into account the problem that EMNEs (at least initially) lack FSAs, which asset-augmenting OFDI in developed countries and copycat product development and knowledge-acquisition strategies can help to provide (Ramamurti, 2012; Luo et al., 2010). Mathews' (2006) pioneering work contributed to the development of this view by putting forward an LLL framework. He predicted that latecomer EMNEs' internationalization is typically driven by the desire to overcome ownership disadvantages at home by acquiring strategic assets, resources and capabilities abroad through an accelerated process of internationalization. Thus, EMNEs' learning and network development in foreign markets plays an important role in expediting their internationalization and the development of internal capabilities which become their new FSAs (cf. Mathews, 2017).

Others argue that EMNEs use of international expansion serves as a springboard enabling them to obtain critical resources by aggressively acquiring strategic assets in developed markets; global alliances as well as mergers and acquisitions can be used as a means to this end (Luo and Tung, 2007, 2017; Gubbi et al., 2010). EMNEs' intangible resource-seeking OFDI in developed markets allows them to gain access to complementary local resources (Hennart, 2009). Luo and Tung (2007: 481), for example argue that EMNEs often undertake acquisitions in order to gain 'strategic resources and reduce their institutional and market constraints at home' and 'overcome their latecomer disadvantage in the global stage.'

Taken together, the above views regarding EMNEs' internationalization assume that most EMNEs initially lack FSAs. The use of OFDI can help them to develop FSAs, by overcoming the liabilities of foreignness, relative inexperience and their emerging market countries of origin (Chang, Mellahi and Wilkinson, 2009; Madhok and Keyhani, 2012; Sun, Peng, Ren and Yan, 2012).

2.2 Do EMNEs internationalize in order to exploit home-based CSAs abroad?

A number of scholars argue that EMNEs possess few ownership-related FSAs, but that conversely, many enjoy a range of CSAs that enable them to benefit considerably from internationalization (e.g., Bhaumik et al., 2016; Guillen and Garcia-Canal, 2013; Hennart, 2012; Kotabe et al., 2011; Pananond, 2013). For example, Rugman (2008b: 17) maintains that.., ‘MNEs from emerging markets tend to lack [the] advanced managerial skills in internal knowledge generation and in ...*systems integration required to develop FSAs.... [But some may] ... enjoy economies of scale based on home country CSAs in cheap labour (even cheap skilled labour as in India’s case), natural resources and/or possibly cheap money (as in China’s case).*’

In a similar vein, Dunning et al. (2008: 177) contend that although ‘emerging market [MNEs] rarely have the firm-specific advantages [needed] to ensure success in their outward FDI, ... they do appear to have ... a variety of home-country-specific advantages that they are able to internalise and use outside their national boundaries.’ It follows from these views that EMNEs’ rapid internationalization behaviour can be explained in terms of the exploitation of home-based CSAs, including low-cost labour, finance, favourable government policy, managerial talent and skills, and natural resources, despite their relative lack of traditional FSAs (e.g., Bhaumik et al., 2010; Gaffney et al., 2013; Guillen and Garcia-Canal, 2009; Matthews, 2002; 2006; Ramamurti, 2012; Rugman, 2009).

2.3. Is EMNEs’ internationalization based on their non-traditional FSAs?

Some scholars argue that EMNEs should be treated as a special case. This is because they possess unique FSAs such as organizational flexibility, coordination of diverse knowledge, and possession of operational knowledge, developed as coping strategies in their weak domestic environments which are often characterized by institutional weaknesses and

voids (Khanna and Palepu, 1997, 2000; Mair et al., 2012; Madhok and Keyhani, 2012). EMNEs are, therefore quite cost efficient compared to DMNEs, while their ability to restructure processes efficiently and their ambidextrous capabilities also give them advantages compared to DMNEs (Luo and Rui, 2009; Madhok and Keyhani, 2012; Luo and Tung, 2017). Some emerging market firms have gained advantages over conventional DMNEs by leveraging their unique experience in managing diverse businesses and highly diversified strategic business portfolios. EMNEs also rely more on their home country-based social networks and government support in order to offset weak FSAs in the areas of technological know-how and global brand recognition, relative to many DMNEs (Gammeltoft, Barnard and Madhok, 2010; Gubbi et al., 2009; Peng, 2012).

Other scholars have a slightly different view concerning EMNEs' internationalization. They believe that many EMNEs move beyond copycat product development and knowledge acquisition strategies to develop non-mainstream FSAs (Luo et al., 2010). Such advantages could differ from those based on innovative products and global brand reputation which DMNEs often possess. EMNEs tend instead to capitalize on the distinctive CSAs that they build in response to their home market conditions (Matthews, 2006; Ramamurti, 2009). Such home-based advantages take a variety of forms, including EMNEs' ability to deal effectively with adverse institutional environments (Buckley et al., 2007; Morck et al., 2008; Khanna and Palepu, 2000; Madhok and Keyhani, 2012), their privileged access to resources, markets and to key domestic institutions (Hennart, 2012; Cuervo-Cazurra and Genc, 2008; Peng, 2012), and their ability to make use of domestic social networks and relational assets (Manolova et al., 2010; Erdener and Shapiro, 2005; Yiu et al., 2007; Gammeltoft et al., 2010). EMNEs can employ these CSAs to develop a variety of distinctive FSAs, such as an enhanced understanding of emerging markets' customer needs, an ability to supply products and services at very low cost, and a capacity to develop new, stripped-down

products quickly and cheaply (Kumar and Chadha, 2009; Guillen and Garcia-Canal, 2009; Ramamurti, 2009, 2012; Govindarajan and Ramamurti, 2011). Some of these FSAs may depend on EMNEs' location in particular countries of origin, whilst others are likely to be available to all EMNEs (Amighini et al., 2009).

2.4 Is there a missing element- EMNEs' traditional FSAs?

It can be argued that each of the theoretical perspectives discussed above carries attendant difficulties in terms of explaining the competitive advantages, internationalization and OFDI behaviour of EMNEs. Firstly, the pursuit of FSA-augmenting OFDI by EMNEs should not be taken to exclude the possibility that they already possess ownership advantages developed in their domestic markets (e.g., Anwar and Nguyen, 2011; Bhaumik et al., 2010; Bhaumik et al., 2016; Luo and Rui, 2009; Madhok and Keyhani, 2012). Ramamurti (2012: 42), for example lends support to this view, maintaining that '...while there is considerable evidence that EMNEs venture abroad in search of valuable technologies or brands, it is quite another thing to argue that they do so without ownership advantages ex ante.'

Where EMNEs lack FSAs resulting in ownership disadvantages (see Table 1), it is difficult to 'explain how firms that are going abroad to learn can, at the same time, *successfully compete with their teachers*' (Hennart, 2012: 171). For example, recent IB research reports on the rapid rise of some globally competitive Chinese EMNEs, including Haier (Child and Rodrigues, 2005; Kotabe and Kothari, 2016; Meyer, 2017), Huawei and ZTE (Fan, 2011), and many equally competitive MNEs based in other emerging economies (Boston Consulting Group, 2006-2014). These studies indicate that taking the view that these EMNEs' lack FSAs makes it difficult to fully explain their rapid internationalization, and the role that OFDI plays in contributing towards the success of this process.

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The argument that EMNEs' internationalization is driven by the desire to exploit home country-based CSAs (see Table 1) should not, indeed be taken to equate with the view that they lack FSAs. Many Chinese MNEs have, for example become increasingly prominent players in global markets, despite the fierce competition that they face from their domestic and foreign rivals (Matthews, 2006) and strategic coupling with lead firms in global production networks (He et al., 2017). Moreover, it is difficult to defend the view that EMNEs enjoy unique access to particular CSAs. For example, some of their alleged cost advantages are also available to DMNEs that undertake direct investment in emerging market countries, where they are able to develop connections with local network partners (Wright et al., 2005; Khanna and Palepu, 2010). Some scholars also suggest that not all EMNEs are able to utilize CSAs fully although these firms are better in exploiting their CSAs than non-MNEs operating in their domestic markets (e.g., Bhaumik et al., 2016:1).

Much of the extant analysis of Chinese MNEs suggest that most are neither innovative nor competitive, thus their advantages lie with their monopoly position in their protected home market (see e.g., Rugman, 2008a; 2008b; 2009). It can be argued, however, that this view does not provide a full picture of Chinese MNEs' ownership advantages as other sources (such as the Boston Consulting Group, 2006-2014) indicate that a number of internationalizing Chinese MNEs own more dynamic and ambidextrous capabilities than Rugman's views suggest (see Luo and Rui, 2009; Luo and Tung, 2017).

The belief that EMNEs internationalize in order to exploit their distinctive but non-traditional FSAs is also debatable, since some FSAs can be limited in value or even disadvantageous for EMNEs in certain circumstances. The widely assumed cost advantages attributed to EMNEs, for example, are likely to disappear over time as labor costs rise in leading emerging market countries such as China (Buckley, 2007). EMNEs' institutional assets may also turn into disadvantages in some cases. For instance, the 'distinctive cultural

and institutional legacy' of China can actually 'increase the liability of foreignness' as well as exacerbate the 'liability of emergingness' (Madhok and Keyhani, 2012) where internationalizing Chinese firms tend... 'to rely on close personal relationships in business transaction' (Child and Rodrigues, 2005: 385). Strong relationships with national governments can also disadvantage EMNEs (Peng, 2012) in cases where state intervention restricts their commercial freedom, or the entrepreneurially active leaders of internationalizing firms are removed by the state (Child and Rodrigues, 2005).

The availability of non-traditional FSAs, often derived from CSAs, may also be confined to location-bound ownership advantages which enable MNEs to 'generate profits, but only in a specific location, or, to an extent, in similar locations' (Narula, 2012: 191). For example, the value of their home country-based institutional assets may be of little or no value when operating abroad in countries with markedly different institutional frameworks. Similarly, their privileged access to local resources in the home country context is unlikely to be internationally transferable (ibid).

Taking all of these criticisms into account, it appears that each of the arguments for building FSAs and exploiting CSAs during the course of EMNEs internationalization have their limitations. Importantly, none of the key literature has been able fully to explain the reasons underlying the rapid rise and success of many EMNEs. The limited discussion around EMNEs' FSAs still assumes these are CSA-derived and location-bound (see Luo et al, 2010; Ramamurti, 2009; Buckley et. al., 2008; Hennart, 2012), with the result that it is not easy to transfer them to overseas markets. We summarize the results of our overall literature review in Table 1.

Surprisingly, much of the existing scholarly work does not see innovation capabilities as a source of the FSAs underlying EMNEs' rapid internationalization. Perhaps,

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the lack of such a view may stem from the lack of extant empirical evidence regarding the internationalization of MNEs from emerging and developing economies.

Insert Table 1 here

The following sections set out the research context and methods underlying our study, followed by an analysis of the links between EMNEs' FSAs and their internationalization drawing on illustrative case examples of three Chinese MNEs from the engineering sector.

3. Research Context and Methods

3.1 Research context

Local institutional factors can, and undoubtedly do contribute directly to the development of FSAs owned by EMNEs, including those originating in China. For example, the multiple embeddedness of firms, with the backing of state institutions in China as well as the strategic assets that they acquire in developed foreign markets, can facilitate their innovative capability development and internationalization (Meyer et al., 2011). The role of the state appears to have been critical in supplying the required resources to Chinese firms, including capital, power in the domestic market, and firm-specific information tools (Li et al., 2014; Luo et al., 2010). Sustained government support for the building of China's national innovative capacity has also helped both state- and privately- owned businesses to develop innovative capabilities, thus adding to their ability to acquire technological competences that may help in successful internationalization (Hu and Matthews, 2008; Xu and Meyer, 2012; Wang et al., 2012; He et al., 2017).

Some Chinese MNEs have entered international markets quite late, employing copycat product development and knowledge-acquisition strategies. However, others are now

entering these markets as ‘first movers’, employing distinctive innovation-led strategies to develop their knowledge-based FSAs (Williamson and Yin, 2014; Ramamurti, 2012; Williamson et al, 2013). Some are using their growing innovation capabilities to develop FSAs that are ‘cost saving’ (delivering existing products at lower cost and price), ‘frugal’ (reducing the complexity and cost of a good and its production by removing non-essential features), ‘architectural’ (finding innovative applications for existing technologies and products), and reverse innovation-based (selling low-cost products developed at home in developed country markets) (Zeng and Williamson, 2007; Radjou et al, 2012; Govindarajan and Ramamurti 2011; Yu and Hang, 2011; Govindarajan and Trimble, 2012). Others are engaging in ‘grafting’ innovation involving the acquisition of new and innovative firms, or delivering low-cost improvements in business models by changing their customer value proposition and services, profit formulae, key resources or production processes (Christensen, 2006; Benner and Tushman, 2003; Puranam et al, 2003; Feng et al, 2010).

The potential for Chinese MNEs to develop or acquire such knowledge-based FSAs can reflect their evolutionary development in conjunction with the levels of foreign expansion maturity that they have attained. A number of studies regarding this topic argue that as EMNEs move from ‘infant’ to ‘adult’ and ‘mature’ stages of development, their resources and capabilities evolve, as do their sources of competitive advantage (Ramamurti and Singh, 2008; Ramamurti, 2009; Narula, 2012). Early reliance on their home country-based advantages shifts gradually to a significant emphasis on the development of FSAs, which may in turn become increasingly sophisticated as international development intensifies. This section of the paper uses some illustrative examples of Chinese MNEs. Based on these examples, we argue that existing theories on internationalization and competitive advantages need to be revised and updated in order to explain how EMNEs’ FSAs are now contributing

towards the development of their capabilities for internationalization and competitiveness in global market terms.

3.2 Research methods

In order to identify a set of innovative Chinese MNEs, we reviewed the EU Industrial R&D Investment Scoreboard (EU, 2016), a leading source of information and analysis for the world's top innovative companies. Making use of data extracted direct from annual company reports from forty five countries, the Scoreboard ranks the world's biggest 2,500 companies in terms of their R&D expenditure and groups them into broad industrial sectors. Over fifty manufacturing and services sectors are included, with a particular focus on those that are the most innovative, such as ICT-, health-, transport- and engineering- related businesses.

Taking account of information published in the Scoreboard, we based our sample on engineering-based Chinese MNEs. This was due to the fact that engineering is widely accepted as being one of China's most innovative industrial sectors (see Williamson et al, 2009). We next employed judgemental and purposive sampling to select three leading Chinese innovative MNEs in the engineering-related sectors for our illustrative examples, BYD, Sany Heavy Industry and CSR China (see Table 2). We examined and analysed their innovation capabilities, related FSAs and internationalization records, and analysed qualitative data drawn from academic research, media reports (both in English and Chinese), company websites and annual company reports.

[Insert Table 2 here]

The historical case analysis approach that we followed is in line with a number of recent studies in the field of IB, particularly in the context of EMNEs (e.g., Kotabe and Kothari, 2016). Our illustrative cases and their respective FSAs are presented in the following section.

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4. Illustrative Cases

4.1 BYD

BYD was established in 1995 and entered the rechargeable nickel-based (nickel-cadmium, NiCd) battery industry with little capital. Responding flexibly and quickly to changing demand in the cell phone batteries industry, the company had emerged by the end of 2002 as the world's largest producer of NiCd batteries and an important player in the NiMH and Li-ion battery markets, becoming the world's largest supplier of rechargeable batteries. BYD has also applied its new battery production technology to other industries, including the automotive industry. In 2008, it launched the world's first commercial plug-in hybrid electric vehicle not needing a professional charging station. Subsequent business expansion has also seen the company enter the green energy market.

BYD started its internationalization process at the end of the 1990s and now has offices located in the United States, Europe, Japan, South Korea, India, Taiwan, and Hong Kong. In 2012, it sold electric buses to the Netherlands and announced that it was manufacturing electric buses for both Bulgaria and the U.S. By 2011, the company had 14.9% of its sales and profits coming from regions outside China¹.

The development of BYD's F3DM (the first commercialized plug-in hybrid electric vehicle that does not need a professional charging station) provides a good example of the company's possession and utilization of FSAs. F3DM was launched in 2008, based on the application of the firm's FSAs in battery technology within the vehicle manufacturing field. Building on its existing hybrid vehicles development capabilities, BYD later produced a range of electric vehicles making use of its newly developed ferrous-based batteries. Further application of the company's battery technologies has resulted in its entry into the electricity grid energy storage sector. These illustrations show that EMNEs such as BYD are now

¹ In 2015, the global market share of BYD in the electronic vehicle industry is 11% (61,722 cars sold), ranked at the top position, and followed by Tesla Motors (9%, 50,574 sold), Mitsubishi (9%, 48,204 sold), Nissan (9%, 47,671 sold) and Volkswagen (8%, 40,148 sold).

developing flexible and ambidextrous FSAs (e.g., Luo and Rui, 2009; Madhok and Keyhani, 2012).

4.2 Sany Heavy Industry

Sany Heavy Industry was established in 1989 in what was initially a small welding material factory, but has since grown rapidly to become the world's fourth largest construction equipment manufacturer in terms of sales revenue by the end of 2012. In its early years of trading in the concrete machinery industry, *Sany's* products were inferior in quality and durability compared with those of leading foreign brands, yet it developed a competitive advantage in customer service based on faster and cheaper after-sales service. This enabled Sany to attract many customers from within China and overseas. Sany has recently reinforced this source of advantage by launching an Enterprise Control Centre (ECC), allowing it to identify the location of each product sold, monitor its status, and provide tailored and timely customer services supported by periodic inspection training (China Business Daily, 2010).

Sany has also focused on technological innovation. Its innovations have included the development of the world's first fully hydraulic motor grader, as well as its largest crawler crane and 86-meter, truck-mounted concrete pump (demonstrating its leadership in concrete pumping technology). These innovations have led to impressive commercial growth, increasing revenue from 100m RMB in 1993 to 50bn RMB in 2011.

Sany has accelerated its pace of internationalization in recent years, on the basis of its innovative capabilities. It has invested in excess of USD \$1 billion overseas, while setting up offices in more than 100 countries globally. In 2006, it launched its first overseas manufacturing plant in India since when it has added manufacturing plants in the United States of America in 2007, Germany in 2009, Brazil in 2010, and Indonesia in 2011.

Particularly worth noting was its €100m investment in an assembly plant and R&D centre in Bedburg, Germany in 2009, which represented the biggest Chinese corporate investment in Europe prior to 2012. Also significant was its acquisition of German manufacturer Putzmeister in 2012, which solidified the company's position as the world's largest concrete machinery manufacturer. Later in the same year, the company announced joint ventures in both Austria and China with Palfinger - the market leader in knuckle boom cranes.

4.3 CSR China

CSR China was a state-controlled company that designs, engineers and produces electric locomotives for China's high-speed railway network.² It was one of the largest rolling stock manufacturers in China and became increasingly influential in global markets. CSR China possessed extensive research capabilities, enabling it to develop a high-speed electric multi units (EMU) in 2002 that could operate at speeds of 200 km/hour on China's railway system. In 2004, it collaborated with Bombardier and Kawasaki Heavy Industries to jointly design and manufacture 100 high-speed EMUs for use in China that would run at 250km/hour. Within a short time, it was able to design, engineer and produce EMUs that ran at the considerably faster speed of 350 km/ hour, going on by December 2010, to set a world record operating speed of 486.1 km/hour during trial operation of its new its CRH380A EMU unit. In the same year, the company also developed and strengthened its core technological capabilities in engineering and producing high-speed EMUs convertors, focusing particularly in the areas of propulsion and control systems.

CSR China extended the application of its core (propulsion and control) technologies to develop products in a number of new areas, such as urban metro transit, electric vehicles, and wind power generation. Its launch of A-type metro vehicles in 2008 ended the foreign

² CSR Corp., Ltd., formerly known as China South Locomotive & Rolling Stock Corp., Ltd. was a Chinese manufacturer of locomotive and rolling stock. In 2015, the company merged with China CNR Corp., Ltd. to form CRRC Corp., Ltd.

company monopoly in this growing Chinese market, enabling it to win nearly 68.5% of contracts awarded for such products in 2011. It has also emerged in recent years as an important player in the Chinese new energy vehicles and components markets. In 2008, it bought a 75% stake in Dynex, a specialist high power semiconductor company based in the UK, in order to make use of the latter's advanced technologies in areas such as Insulated gate bipolar transistors (IGBTs) to improve the performance of its high-speed trains. The company then began to develop IGBT modules to be used in wind power generation and in construction of smart electricity grids, so illustrating the way in which local factor market conditions in China were helpful to it in developing innovative capabilities and rapid internationalization.

Like BYD and Sany, CSR China also accelerated its internationalization in recent years. It recorded overseas revenue of \$59m in 2001, rising quickly to \$1bn by 2011; its overseas revenue doubled between the first halves of 2011 and 2012, rising to represent 11.3% of its total revenue by the latter time. CSR China also established R&D centres in the UK and USA, by acquiring a local company in the former case.

In 2015, the company merged with its home rival, CNR China becoming CRRC. The merged company then won a \$US 1.31bn contract to supply 846 metro cars to Chicago Transit Authority (CTA), involving the opening of a new manufacturing plant in the city. Eager to further compete with the Japanese and German rivals, CRRC has already started research and development of maglev trains that can reach 600 km per hour whilst advancing their EMUs.

5. Discussion and conclusion

5.1 Technological innovation as a source of FSA for EMNEs

These illustrative cases of Chinese MNEs demonstrate the existence of linkages between their innovative capabilities, resultant technological FSAs, and their internationalization behaviour. All of our sample case firms exhibited the propensity to find new uses and applications for existing technologies, leading to the development of new products and solutions based on the application of their core technologies to new markets. This indicates to us that these firms have developed technological competences in innovation as a source of FSA.

As discussed in the previous section, these three EMNEs should not be regarded mere 'innovation copycats' (Luo et al., 2010). We would argue that their innovation competences are not simply rooted in CSA-dependent FSAs. They have, in our view clearly developed distinctive, technology-based FSAs which have helped to facilitate their internationalization process and global competitive development.

BYD, for example, entered the rechargeable nickel-based (nickel-cadmium, NiCd) battery market in the late 1990s, but in doing so, it did not simply follow its other competitors by purchasing an entire set of automated production lines from Japanese firms. Instead, it designed its own hybrid production lines, replacing many expensive machines with manual procedures that could be completed by the then-low cost workers in China. This allowed BYD to reduce production costs dramatically, reaching one fifth of the Japanese level (Kang and Ke, 2008); it also enabled it to manufacture different products with only minor adjustments in production and workforce training, rather than having to construct a completely new production line for each new product (Wang, 2009). The company was thus able to respond flexibly and quickly to changing demand in the cell phone battery market, helping it emerge by the end of 2002 as the world's largest producer of NiCd batteries, and an important player in the NiMH and Li-ion battery markets (Kang and Ke, 2008).

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Many other Chinese firms have also quickly enhanced their technological capability by employing different approaches. CSR China, for example, took advantage of technological transfers from leading global players and successfully combined them with in-house innovation efforts. This allowed it to design, engineer and produce EMUs that ran at speeds of 350 km/ hour, as noted above (He et al., 2017).

A strong competence in battery technology has also resulted in BYD producing and selling electric buses to developed countries, including the US and the Netherlands. Similarly, Sany invested 100 million Euros in 2009 to build a mechanical manufacturing base in Germany. CSR China, in turn bought Dynex in 2008 not only in order to facilitate its learning of the latter's IGBT technology, but also with the aim of making use of its strong competences in propulsion and control systems, to better meet customer demands in the railway and other markets.

Our findings are in line with existing research concerning EMNEs' competences. For example, Govindarajan and Ramamurti (2011) emphasize the need to study EMNEs' ownership advantages where these allow them to pioneer innovations. Kumar (2007) argues that Indian MNEs' main source of advantage lies in frugal innovation – the ability to reduce the complexity and production cost of goods by removing their non-essential features. In a similar vein, Zeng and Williamson (2007) argue that Chinese MNEs' use their superiority in cost innovation to disrupt global markets and competition. Williamson and Yin (2014) further argue that some Chinese firms have found a way of achieving 'accelerated innovation,' allowing them to reduce production lead times and accelerate problem solving. Other scholars argue that EMNEs have developed organizational ambidexterity in order to overcome their late mover disadvantages in global markets (e.g., Luo and Rui, 2009).

Taken together, the recent literature indicates that EMNEs' innovation capabilities extend beyond cost or frugal innovation into areas such as grafting, service-inclusive, and

potentially ground-breaking innovation (as shown in our three Chinese MNE cases). Our findings suggest that the development of such technological competence-based FSAs appears to be providing a major boost to leading innovative EMNEs' competitiveness and internationalization both in emerging home markets and increasingly, in those of the developed world (Govindarajan and Ramamurti, 2011). This is, in turn allows an increasing number of these EMNEs (from China and beyond) to disrupt global markets and competition (Sinkovics et al, 2014; Williamson and Zeng, 2009; Zeng and Williamson, 2007), and to begin challenging established DMNEs in a growing range of industrial sectors and markets (Boston Consulting Group, 2006-2014; He et al., 2017).

5.2 Implications for existing IB theory

Our review of existing theoretical approaches, supported by our illustrative case study findings, identifies the need to revisit existing IB theory, in order to take better account of the role that knowledge-based FSAs play in mature EMNEs' internationalization and global competitive development. As discussed above, many existing efforts to identify EMNEs' competitive advantages consider their relatively low production costs, together with their distribution systems, institutional assets, government relationships and privileged access to local resources and home markets (Gammeltoft et. al., 2010, Hennart, 2012). However, a number of commentators confine these advantages to 'location bound FSAs' (Rugman et al., 2011) in which EMNEs cannot realize cost advantages abroad, while it is also difficult for them to transfer distribution systems, privileged government relationships and domestic monopoly positions to other countries. Pursuing this line of argument, it would still be difficult to explain why innovative firms from emerging economies are rapidly rising in global competitive terms and are displaying an increasing pace of internationalization (Gammeltoft et al., 2010; Ramamurti, 2012).

We agree with the view that EMNEs internationalize in order to compensate for their competitive disadvantages compared with DMNEs in traditional areas such as brand reputation and possession of key technological know-how (Mathews 2006, 2017; Child and Rodrigues, 2005; Luo and Tung, 2007, 2017). However, such a line of reasoning does not fully explain how some EMNEs are able to compete successfully with DMNEs in both domestic and foreign markets. Our identification of Chinese EMNEs' innovation capabilities indicates that they also possess some of the non-location bound³ FSAs which DMNEs have traditionally enjoyed. For EMNEs, such FSAs are now internationally transferable, with the result that they can be realized overseas. As illustrated in the cases, their non-location bound FSAs now include the ability to efficiently package technological products and innovative solutions, as well as the achievement of accelerated internalization capabilities associated with being flexible and ambidextrous in overseas markets.

If we recognize that evolving EMNEs now develop technological innovation as a source of FSAs, as they advance their capabilities and their positions in the global value chain, then their rapid rise and internationalization can be seen as being less of a puzzle than before. The OLI paradigm can still have explanatory power regarding the internationalization of EMNEs, where their technological competences for innovation and ownership advantages help them to mitigate the costs of foreign expansion. For example, when Sany decided to invest 100m Euro to build a mechanical manufacturing base in Germany and BYD announced that they would build a manufacturing facility for electric buses in California, neither of these firms was able to enjoy cost advantages and monopolized access to local resources in their host countries. They also suffered from a 'liability of emergingness' as well as 'liabilities of foreignness' (Hymer, 1976), arising from the fact that they came from an emerging market country (Madhok and Keyhani, 2012). It would, therefore be difficult to understand their

³ Verbeke (2013) split FSAs into non-location bound FSA transferable and location-bound FSAs home market.

rationale in choosing to manufacturing in such high-cost countries without first developing the FSAs needed to overcome these liabilities.

One of the main problems on the part of critics of the OLI paradigm is that many take for granted the argument that EMNEs do not have non-location bound ownership advantages without examining this issue carefully. Advocates of the OLI paradigm, however, often focus only on non-traditional CSAs-derived FSAs with the result that they cannot articulate the linkage between the rapid rise of EMNEs and their unique FSAs. We also feel that there is a danger for scholars, having observed EMNEs' asset-augmenting overseas investment, to rush to the conclusion that EMNEs do not possess any FSAs. Dunning (2006) and Narula (2012) both point out, however that EMNEs' asset-augmenting overseas investment implies that existing ownership advantages are there to be augmented. Therefore, asset-augmenting FDI cannot exclude EMNEs' existing ownership advantages.

For us, all three Chinese companies in our study had already accumulated significant technological capabilities (i.e., traditional and non-country bound FSAs) before their major push towards internationalization. We have observed them establishing manufacturing sites in developed markets in order to exploit their existing technological capabilities (including, for example CSR in the train, BYD in the electric vehicle and Sany in the construction machinery market). We have also seen them launching R&D centres in developed countries in order to further strengthen and augment their existing technological capabilities for innovation.

Following a critical review of international business theories, this paper has drawn evidence from an analysis of three illustrative case studies, reflecting the evolution, internationalization and competitive development of three leading, innovative Chinese EMNEs from the engineering sector. Our findings indicate that each of these sample companies has developed knowledge-based FSAs, which have helped to facilitate their

internationalization processes. Although our underlying study has considered a limited number of firms and a focus on innovation capabilities alone, we believe that these findings have contributed to the continuing academic debate on the causes of internationalization and global competitive development by mature and innovative EMNEs, and on the role that knowledge-based FSAs are playing in these processes. Thus, this paper contributes to the existing research on EMNEs by suggesting that the FSAs of some of the EMNEs from China are not entirely based on the unique context of emerging market conditions of China. On the contrary, the case firms' FSAs seem to align with the features of DMNEs' FSAs such as technological capabilities and innovations. We believe that this new insight has enabled us to add to the existing EMNE literature which has mainly highlighted the motivation and the rapid and aggressive OFDI of EMNEs, and to examine whether current IB theories explain their internationalization. Our study shows technological innovations underpin the unique processes used by Chinese EMNEs' as a means of developing their FSAs. We believe that this finding provides a valuable addition to current scholarly views about EMNE internationalization and to traditional IB theories.

5.3 Limitations and Future Research Directions

Our discussion in this paper has been supported by the analysis of limited secondary data, linked to a review of the existing academic literature, and by insights from our analysis of a limited number of EMNEs in China. Although our illustrative cases demonstrate that Chinese EMNEs' use FSAs in connection with rapid internationalization, the lessons drawn from these cases might not be applicable to all EMNEs' internationalization processes. Thus in order to overcome the methodological limitations of the current study, future empirical research could make use of in-depth interviews and surveys in order to provide a better understanding of Chinese EMNEs' innovation capabilities, drawing on traditional vis-à-vis

non-traditional FSAs, and their respective roles in the internationalization process. Future research could also add to our analysis by carrying out a comparative study including EMNEs originating in several other emerging market countries, such as Brazil, Russia, India, South Africa, Turkey as well as China. Such studies could also examine the different entry strategies adopted by these firms and how these entry mode choices interact with their FSAs (e.g., Li et al., 2017). They could also focus on how EMNEs transfer and utilize their FSAs in developed markets, and how they influence the capability development of their local partners in such markets (e.g., He et al., 2018).

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Tables

Table 1: Existing views on EMNEs' CSAs, FSAs and internationalization

Overcome ownership disadvantages	
Key arguments	<ul style="list-style-type: none"> ✓ EMNEs lack traditional FSAs; ✓ EMNEs often copy products and know-how of others; ✓ EMNEs learn from overseas' networks, and then improve capabilities
Problems	<ul style="list-style-type: none"> ✓ Asset-augmenting OFDI should not exclude the presence of possible ownership advantages; ✓ It implies EMNEs have ownership advantages to be augmented; ✓ Difficult in explaining EMNEs success
Exploiting home country based CSAs	
Main arguments	<ul style="list-style-type: none"> ✓ EMNEs lack traditional FSAs; ✓ EMNEs' exploitation of CSAs, e.g., low cost labour, managerial talent, cheap financial and natural resources
Problems	<ul style="list-style-type: none"> ✓ Possession of CSAs should not equate lacking FSAs; ✓ Omission of more dynamic firms; ✓ Some extension of OLI 'tautological'
Building non-traditional FSAs and exploiting distinctive CSAs	
Main arguments	<ul style="list-style-type: none"> ✓ EMNEs' limited FSA; ✓ Ability to deal with opaque environment; access to key institutions; networks; and relational assets; monopoly access to resources; understanding of the emerging market customers
Problems	<ul style="list-style-type: none"> ✓ Some FSAs are limited or even disadvantageous; ✓ Some may only lead to location bound advantages

Table 2: Overview of the three Chinese case firms

	BYD	Sany Heavy Industry	CSR China
Industry	Battery, automotive, new energy	Construction equipment	Rail equipment
Year of establishment	1995	1989	1986
Revenue (2012), USD, bn	7.1	21.5	14.4
Profit/sales (2013, %)	3	6.1	9.8
Employees (2012)	150,000	60,000 (in 2011)	90,000
R&D investment (2013, €m)	298.4	127.1	431

Source: EU Industrial R&D Investment Scoreboard

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