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DOI:
10.1016/j.ibusrev.2019.01.004

This is the author's version of the accepted manuscript to the ELSEVIER journal INTERNATIONAL BUSINESS REVIEW. The document was accepted in 19/01/2019

Unpacking the effect of strategic ambidexterity on performance: A cross-country comparison of MMNEs developing product-service innovation

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Abstract

This study tests whether strategic ambidexterity improves Product-service innovation (PSI) outcomes for manufacturing multinational enterprises (MMNEs). It also tests successful pathways to develop PSI properly by organizing exploitation and exploration activities. Data from a survey of 338 MMNEs are analysed through Structural Equations Modelling. The sample contains firms from five world regions, including emerging economies. This approach enables contrast to determine cross-country heterogeneity in PSI outcomes. The results show that, to maximise firm performance, PSI must be developed through a sequential Exploitation-Exploration pathway. Although this optimal sequence is consistent across all world regions (except Japan), noticeable contextual differences emerge in the relative importance of exploration and exploitation to firm performance. Our findings show that exploitation (i.e., cost efficiency through PSI design) and exploration (i.e., PSI R&D) capabilities are equally important in emerging economies.

Keywords: Strategic ambidexterity, product-service innovation, performance, manufacturing multinational enterprises.

Acknowledgements: Oscar F. Bustinza and Ferran Vendrell-Herrero acknowledge support from the European Commission under the Horizon 2020- Marie Skłodowska-Curie Actions project 'MAKERS: Smart Manufacturing for EU Growth and Prosperity', and the Spanish Government under Grant ECO2014-58472-R. Emanuel Gomes would like to acknowledge financial support from Fundação para a Ciência e Tecnologia (UID/ECO/ 00124/2013) and Social Sciences Data Lab (LISBOA-01-0145- FEDER007722 and Project 22209).

1. Introduction

The third industrial revolution (Alcacer, Cantwell, & Piscitello, 2016) is increasingly attracting the attention of the international business (IB) community, being services and technology a driving force of this evolving revolution (Knight & Liesch, 2016; Vendrell-Herrero, Gomes, Bustinza, & Mellahi, 2018). This is a global trend and recent studies show how developed countries manufacturing multinational enterprises (DMMNEs) and emerging countries manufacturing multinational enterprises (EMMNEs) have turned progressively to Product-service innovation (PSI) or *servitization* (Baines & Lightfoot, 2013), a business model based on adding services into product firms (Bustinza, Gomes, Vendrell-Herrero, & Baines, 2017a). PSI requires a critical organizational transformation of MMNEs incorporating new services into their traditional product offerings (Bustinza, Vendrell-Herrero, & Baines, 2017b). This organizational transformation is location dependent (Cano-Kollmann et al., 2016) and contextual to economic regions (Khan, Lew, & Marinova, 2018; Bustinza, Gomes, Vendrell-Herrero, & Tarba, 2018a). Furthermore, considering strategic intent, recent studies show that PSI enables DMMNEs to escape from price-based competition (Tukker & Halen, 2003; Rabetino, Harmsen, Kohtamäki, & Sihvonen, 2018), whereas EMMNEs resort to PSI as a way to leapfrog into more advanced markets (Xing, Liu, Tarba, & Cooper, 2017).

Combining products with integrated services requires ambidextrous capabilities, as firms must be able to possess not only exploration and exploitation capabilities (March, 1991; Junni, Sarala, Taras, & Tarba, 2013; Lew, Sinkovics, & Kuivalainen, 2013; Miller, McAdam, Moffett, Alexander, & Puthusserry, 2016), but also the capacity to shift the innovation process by performing research and development (R&D) activities simultaneously with service delivery (Visnjic, Turunen & Neely, 2013). Ambidextrous organizations are capable of balancing exploration and exploitation capabilities to the extent that positively affects performance (He & Wong, 2004). In the context of servitized manufacturing firms, through co-creation involving deeper relational engagement between provider and client, service innovation becomes intertwined and overlaps with the exploratory and exploitative R&D activities (Visnjic, Turunen, & Neely, 2013). Thus, PSI generates tensions related to the organizational ambidexterity debate in terms of the integrative mechanisms that enable MMNEs to coordinate explorative and exploitative activities within the firm (Raisch, Birkinshaw, Probst, & Tushman, 2009). Our study investigates how PSI development affects

interrelationships between the exploration and exploitation capabilities of MMNEs, contextualizing the different effects of PSI on performance for DMMNEs vs EMMNEs.

Previous studies have demonstrated that MMNEs must adjust their activity system design and product offerings to respond better to new market needs (Gupta, Czincota, & Melewar, 2013; Visnjic, Wiengarten, & Neely, 2016). Although the IB literature has studied the relationship between international expansion of MMNEs, MMNEs' product diversification strategies (Hitt, Hoskisson & Kim, 1997), and to a lesser extent their product-service strategy (Kowalkowski, Windahl, Kindström, & Gebauer, 2015), no previous study has investigated the effect of ambidextrous PSI on MMNE performance. Since PSI for new international markets requires redesign of the activity system, it must encompass exploitation (improving existing processes), exploration (developing new knowledge), and the simultaneous interplay between exploitation and exploration known as strategic ambidexterity (Agarwal & Helfat, 2009; Junni et al., 2013; Martin, Javalgi, & Cavusgil, 2017; Rao-Nicholson, Khan, Akhtar, & Tarba, 2016). Most research on Strategic ambidexterity has been focused on developed countries (Raisch et al., 2009), while neglecting its ability to explain sustained performance in different conditions as those that occur in emerging countries (Khan, Rao-Nicholson, & Tarba, 2018).

Our research fills this gap and contributes to the IB, strategic ambidexterity and innovation literatures by analysing the effect of ambidextrous PSI on the performance of both developed and emerging market MMNEs. In doing so, we focus on testing the importance of strategic ambidexterity for product firms implementing service innovation. More specifically, we analyse the influence and interplay between exploitation and exploration on the relationship between PSI and firm performance. By confirming that exploration and exploitation are inherently different capabilities related to product development (Aoki & Wilhelm, 2017), we examine if the configuration of these capabilities is equal for developing PSI, and if there are different business practices between developing and developed regions. By doing this, we respond to recent research calls requesting the need for additional work in understanding the external boundary conditions within which the exploration-exploitation relationship occurs (Raisch & Birkinshaw, 2008), and seeking contextualization on how strategic ambidexterity is managed in developed and emerging economies (Hsu, Lien, & Chen, 2013). Therefore, this study responds to the need for more contextualized theories advocated by the IB community (Teagarden, Von Glinow, & Mellahi, 2018).

The unique dataset used—338 firms operating in Canada/the US, Europe, Japan, the UK and China—allows us to compare, contrast and contextualise our findings. As suggested by several scholars (Gomes, Bustinza, Tarba, Khan, & Ahmmad, 2018; Khan, Rao-Nicholson, Tarba, 2018; Luo & Bu, 2018), the contextualisation of existing theories is important because it enables testing of the relevance of established theories in different international contexts. Such testing is important in the case of this particular study. It allows us to avoid the so-called 'contextual parochialism' of the Western paradigm (Boyacigiller & Adler, 1991) and to understand whether the geographical context (developing vs. emerging economies) influences the effect of PSI's on firm performance. By adding the geographical context as a moderating variable, our pathway analysis tested through Structural Equations Modelling (SEM), we will allow us to better understand the heterogeneities in PSI development across regions.

The paper is structured as follows. We first review the existing literature on PSI and strategic ambidexterity in the context of MMNEs. Proposal of hypotheses precedes an empirical analysis that enables us to elucidate successful pathways to PSI development. The main findings of the study are then discussed in light of the extant literature, and future avenues for research identified in light of some of the limitations of this study.

2. Theoretical grounding

2.1. PSI and issues of contextual heterogeneity for MMNEs

PSI is another term for servitization, one grounded in early definitions of innovation, that view "*[i]nnovation [a]s conceived as a means of changing an organization, either as a response to changes in the external environment or as a pre-emptive action to influence the environment. Hence, innovation is here broadly defined to encompass a range of types, including new product or service, new process technology, new organization structure or administrative systems, or new plans or program pertaining to organization members*" (Damanpour, 1996, p. 694). We adopt this comprehensive definition of innovation because PSI embraces the different aspects of developing innovation in manufacturing firms through the addition of new services on to the existing product offer, that can result in the development of new business models (Vendrell-Herrero, Parry, Bustinza, & Gomes, 2018) involving the provision of customised services throughout the entire life-cycle of

manufactured products. Whether and how these innovative business models affect firm performance remains unresolved, as the effect seems to depend on strategic decisions and contextual aspects of the organization (Kowalkowski, Gebauer, Kamp, & Parry, 2017). For instance, PSI may, or may not, require the strategic choice of vertically integrating service units inside manufacturing firms (Turunen & Toivonen, 2011).

Organization of services units in PSI can take one or more of the following forms: a) a centralised service department responsible for all of the firm's services, b) a centralised service department responsible for the firm's core strategic services only, c) all service managed separately by business functions, d) service developed through strategic alliances between manufacturing firms and knowledge-intensive business service (KIBS) firms, or e) services being fully or partially outsourced to KIBS firms. This first strategic decision about the organization of production has significant consequences for the firm, such as increasing customer satisfaction, achieving higher margins (Bustinza, Bigdeli, Baines, & Elliot, 2015; Bustinza et al., 2017b), and leveraging innovation performance (Vendrell-Herrero et al., 2018a; Bustinza et al., 2018b).

Other strategic aspects of successful PSI involve the interplay between current product innovation processes and development of new service innovation processes. For instance, Eggert, Hogreve, Ulaga, and Muenkhoff (2011) find that adding complementary services to existing products only increases the firm's profits in the case of firms with high product innovation outcomes, whereas adding services that support customers increases the firm's profits without product innovation. It can thus be argued that firms that do not have high product innovation can also benefit from PSI if they can engage with customers, something usually occurring in firms with a downstream position within the supply chain value system (Bustinza, Parry, & Vendrell-Herrero, 2013).

Wise and Baumgartner (1999) were the first authors to encourage manufacturing firms to "[go] downstream" in search of new streams of revenue based on services. "Going downstream" can be a source of competitive advantage, as it enables firms to access information directly from customers and thus to capture additional value (Vendrell-Herrero, Bustinza, Parry, & Georgantzis, 2017). From this viewpoint, strategic positioning in the value system is a critical contextual issue for understanding the relationship between PSI and value creation and value capture (Bigdeli, Bustinza, Vendrell-Herrero, & Baines, 2018; Bustinza et al., 2015). This argument is rooted in seminal *servitization* work, which understands PSI as a competitive tool to lock-out competitors, lock-in customers, and achieve differentiation

(Vandermerwe & Rada, 1988). Recent work strengthens this view by suggesting that PSI is having a transformative effect on different industries, reshaping their entire value systems (Porter & Heppelman, 2014).

This view also seems to be of particular importance in an increasingly globalised market, where MMNEs integrated into global value chains are finding that they must add services to their product export offers. According to Ariu et al. (2018), firms selling products and services are increasingly popular in the export market, which attests to the importance of PSI for MMNEs. A mix of strategic and contextual organizational issues affects PSI in the case of MMNEs. To increase revenues through PSI, MMNEs might consider establishing strategic partnerships with KIBS as a mechanism to downsize, reduce risks and increase knowledge exchange (Bustinza et al., 2017b). Along similar lines, internationalising the service function through captive offshoring and cross-border partnerships increases the positive outcome of PSI development (Vendrell-Herrero et al., 2018a).

As to contextual aspects affecting MMNEs, an increasing number of scholars are examining the role of R&D intensity in the industry in which firms operate (Visnjic et al., 2016) and the role of knowledge exchange with local service firms (Lafuente, Vaillant, & Vendrell-Herrero, 2017). Other contextual factors affecting how PSI is developed are related to the different strategic objectives that DMMNEs and EMMNEs have. While DMMNEs develop PSI as competitive tool for setting up barriers to competitors (Vandermerwe & Rada, 1988), EMMNEs develop PSI as a means for venturing into advanced economies through mergers and acquisitions (Xing et al., 2017). Therefore, DMMNES should pay close attention to the overseas acquisitions of EMMNEs competitors as PSI is becoming an important competitive 'weapon' for achieving sustainable competitive advantage in global manufacturing markets (Bustinza et al., 2015). Another critical strategic issue raised by some scholars is strategic ambidexterity (Luo & Rui, 2009), a concept that will be analysed in relation to PSI in the next section.

2.2. Strategic ambidexterity, innovation and performance

Strategic ambidexterity has been analysed mainly through three different disciplines: organizational learning, organizational design and technological innovation (Luo & Rui, 2009). It can be defined as the ability "to be aligned and efficient in the management of today's business demands while simultaneously adaptive to changes in the environment"

(Raisch & Birkinshaw, 2008, p. 375). Strategic ambidexterity is related to the strategic capability of pursuing two different objectives at the same time: exploitation and exploration (Khan, Rao-Nicholson, & Tarba, 2018). Whilst exploitation enables firms to maximise the efficiency of day-to-day business operations and keep their organization aligned with the changing environment, exploration enables firms to explore innovative ideas and adapt to new environmental demands (Birkinshaw & Gibson, 2004). Some authors argue that firms must balance both objectives (Au & Menguc, 2005; Cunha et al., 2018; Lavie & Rosenkopf, 2006) and be able to shift from exploration to exploitation (or vice versa) over time to achieve strong firm performance. *Servitizing* manufacturers may thus shift between exploitation and exploration during the various stages of the PSI process.

Strategic ambidexterity from a technological innovation point of view involves the management of processes for effective organizational adaptation to changing conditions (Benner & Tushman, 2003). Organizational adaptation is substantially related to innovation and efficiency (Abernathy, 1978), and rooted in the firm's dynamic capabilities to both exploit and explore (Barrales-Molina, Bustinza, & Gutierrez-Gutierrez, 2013; Teece, Pisano, & Shuen, 1997). In other words, the ability to exploit and explore is built upon the dynamic capabilities of the firm (March, 1991), and this ability simultaneously favours efficiency and innovation to achieve performance gains (Benner & Tushman, 2003). This paradoxical approach to exploit and explore has not received sufficient attention by the IB community. According to Hsu et al. (2013, pp. 58), "conventional IB theories stress the importance and implications of a firm's exploitative strategy" but the "unprecedented competitive nature of contemporary business necessitates firm ambidexterity". These authors found some of the contextual factors affecting ambidexterity in multiple contexts. Analysing EMMNEs, Hsu et al. (2013) showed that, for these firms, strategic ambidexterity is highly vulnerable to the environment complexity, previous firms' capabilities and international experience. Thus, showing that strategic ambidexterity is rooted in the firm's dynamic capabilities (Agarwal & Helfat, 2009).

Strategic ambidexterity has been shown to be a critical determinant of sustained competitive advantage even though the debate over its effects on performance –and how to articulate this effect– is still ongoing (Junni et al., 2013). Empirical research demonstrates a positive relationship between strategic ambidexterity and performance, having this field three main research streams. One stream of the literature considers exploration and exploitation as independent and equally important. For instance, Raisch et al. (2009) find that exploitation

and exploration should be balanced for the firm to secure sustained financial performance. For Cao, Gedajlovic, and Zhang (2009), firms balancing exploitation and exploration capabilities generate a synergistic effect on firm performance. This is the case because an organization pursuing exploitation without exploration risks transforming core competency into core rigidities. Similarly, pursuing exploration without exploitation leads to neglect of the core business and to ideas that never materialise. Studying the importance of top management's behavioural integration for ambidexterity, Lubatkin, Simsek, Ling, and Veiga (2006) demonstrate that combined management of exploitation and exploration activities is conducive to enhancing the firm's performance.

Another stream of the literature argues, however, that exploration and exploitation are conflicting capabilities. For instance, Menguc and Auh (2008) show that firms should prioritize one of these capabilities to achieve optimal performance. A third literature stream seems to suggest that the differences in how each ambidextrous capability is weighted depend mostly on organizational and contextual aspects. These authors (Benner & Tushman, 2003; Sirén, Kohtamäki, & Kuckertz, 2012; Lisboa, Skarmeas, & Lages, 2011; Yalcinkaya, Calantone, & Griffith, 2007) believe that ambidexterity must be approached as a process. They argue that exploitation and exploration are not only interrelated but also there is an optimal sequential pathway that exhibits superior firm performance, a path that could starts with exploration (Benner & Tushman, 2003; Sirén et al., 2012), or, in contrast, with exploitation (Lisboa et al., 2011; Yalcinkaya et al., 2007). This latter literature stream is of particular relevance in the context of PSI, as the servitization literature suggests that the product innovation process for products is significantly different from that for services. Visnjic, Turunen and Neely (2013) suggest that product innovation occurs primarily through R&D activities and precedes product launch, whereas service innovation occurs through a co-production process and tends to intertwine with other steps in the value chain in which services are simultaneously produced and delivered. Such integration seems to be particularly challenging for MNEs because it requires not only developing new competencies to integrate services into product offers, but also crossing geographical, cultural and institutional boundaries in order to maximise the learning process that takes place during the initial delivery.

2.2.1. Exploitation capabilities, exploration capabilities and performance

For the context of PSI, we first analyse exploration and exploitation in isolation and then examine how they are connected. Exploration is associated with innovative search and experimentation, while exploitation is related to increases in efficiency (March, 1991). Efficiency is thus essentially leveraged by developing appropriate technological innovations and efficiency benefits secured when firms successfully exploit their resources and technologies (Ghemawat & Ricart-Costa, 1993). If MMNEs have the right organizational processes to deal simultaneously with the technological and market-inherent uncertainties of innovations (Keupp & Gassmann, 2009), they will achieve efficiency when the firm's innovation activities are adequately exploited and value captured (Kafouros, Wang, Piperopoulos, & Zhang, 2015; Hitt, Hoskisson, & Kim, 1997). By arguing that efficiency is as important in the context of PSI as in other innovation contexts, we posit the following empirical hypothesis:

Hypothesis 1. *Exploitation activities in MMNEs developing PSI are positively related to firm performance.*

Research shows that exploration capabilities are connected to firm performance. For instance, Cao et al. (2009) find a positive and significant relationship between exploration and firm performance in the context of Small and Medium Enterprises (SMEs). Vahlne and Jonsson (2017) obtain the same relationship for MMNEs. We consider exploration as essential for PSI as well. Exploring new forms of technology can leverage certain service business models. For instance, truck and tyre manufacturers have developed better sensors to monitor trucks and tyres while they are on the road, a solution that requires investment in R&D and exchange of knowledge with external partners (Bigdeli et al., 2018). Such exploration creates value and thus has a positive impact on firm performance (Visnjic et al., 2016). Based on this reasoning, we establish the following hypothesis.

Hypothesis 2. *Exploration activities in MMNEs developing PSI are positively related to firm performance.*

2.2.2. The relationship between exploitation and exploration capabilities

As stated above, firms' dynamic capabilities are the forces behind strategic ambidexterity, since they convert resources into exploitation and exploration capabilities (Eisenhardt & Martin, 2000; Vahlne & Jonsson, 2017). Dynamic capabilities do not only facilitate generation of exploitation and exploration capabilities, they also generate a

significant strategic dilemma. While exploitation capabilities provide short-term success in developing new products, they can also restrain exploration activities in a firm paradox termed "capability-rigidity" (Leonard-Barton, 1992; Ritala, Heiman, & Hurmelinna-Laukkanen, 2016) or core-rigidity (Bener & Tushman, 2003). Some authors argue that this dilemma is substantially subject to the understanding of current and future customers (Atuahene-Gima, 2005; Noble, Sinha, & Kumar, 2002). Customers' desires can be translated into insightful information for developing new products or services (Bustinza et al., 2013; Holmström, Brax, & Ala-Risku, 2010; Martin, Javalgi, & Cavusgil, 2017; Sheng, Amankwah-Amoah, & Wang, 2017).

PSI enables MMNE firms to achieve competitive advantage by providing customers with a wide set of knowledge-based services during the entire product life-cycle (Gomes et al., 2018; Vandermerwe & Rada, 1988). Since manufacturers exploit their core competencies primarily by selling their products, exploration activities can, in the context of PSI, leverage MMNEs with the knowledge required for designing and upgrading their product-service offerings (Baines et al., 2017; Rabetino et al., 2018). We thus argue that ambidexterity in PSI is best approached from the perspective of the group of studies that analyse ambidexterity and performance assuming an optimal pathway between exploitation and exploration (Lisboa et al., 2011; Yalcinkaya et al., 2007).

Contrary to the traditional conceptualisation of product development, in which exploration (normally through R&D) enhances product features and ultimately affects exploitation capabilities, we argue that PSI firms with more sophisticated and efficient products (i.e., exploitation capabilities) can explore more by offering services. This argument is consistent with Yalcinkaya et al. (2007), who find that exploitation capabilities provide a foundation for generating exploration capabilities; and with Visnjic et al. (2013), who argue that PSI should be seen as a process of reverse innovation, in which service design and its cost-benefit analysis (exploitation) precede service development and R&D (exploration). In the example of tyres and trucks manufacturers presented above, the firms had first to identify consumer needs and then design a cost-efficient product-service configuration to develop the sensor technology, implying that design (exploitation) precedes research (exploration) in PSI. Based on these arguments, we hypothesise that:

Hypothesis 3. *Exploitation activities in MMNEs developing PSI have a positive influence on exploration activities.*

The above hypothesis implies an optimal sequential pathway in PSI. This pathway starts with exploitation (service design and cost-benefit analysis) and is followed by exploration (R&D activities), which occurs simultaneously with service delivery through a co-production process involving seller and buyer. Nevertheless, there are three different relationships between exploitation and exploration found in the interplay between organizational behaviour and innovation literatures. Firstly, a pathway between exploitation-exploration as proposed above. Yalcinkaya et al. (2007) found that exploitation capabilities provide a foundation for the development of exploration capabilities. Along the same lines, Lisboa et al. (2011) stated that exploitative capabilities precede explorative capabilities being exploitative capabilities responsible for current performance, whereas explorative capabilities are related to future performance. Secondly, a pathway between exploration-exploitation: Benner and Tushman (2003) proposed that, on a first stage, exploration activities buffer process management activities, whereas subsequent ambidexterity in the form of both exploration and exploitation activities are necessary to cope with incremental innovation and change. Similarly, Sirén et al. (2012) demonstrated that exploitation moderates the effect from exploration to strategic learning. Third, and finally, a balance between exploitation-exploration activities: Andriopoulos and Lewis (2009) suggested that exploitation-exploration capabilities are interwoven forces that generate synergies for managing innovation paradoxes and fuelling virtuous cycles of ambidexterity. In the same vein, Lavie & Rosenkopf (2006) found that companies balance continuously their explorative and exploitative tendencies over time. Applying these different visions of the relationship between exploitation and exploration to the PSI development context, we craft our arguments on the basis of exploitation as a foundation of exploration activities. This means that exploration mediates the relationship between exploitation and performance (Lisboa et al., 2011). Mediation represents the mechanism by which exploitation transmits its effect on performance through exploration activities. In the optimal PSI sequence, exploitation is directly related to performance and indirectly affected through the mediating variable, exploration, which structures the relationship (Hayes & Preacher, 2014; Hayes, 2017). Hence, we posit that:

> **Hypothesis 3a.** *Exploration activities in MMNEs developing PSI mediate the relationship between exploitation and firm performance.*

2.2.3. Ambidexterity in PSI in developing economies

In the new realities of global production, the development of innovation strategies depends on the intrinsic nature of mobile (firms and individuals) and immobile (headquarters location) factors (Cano-Kollmann et al., 2016; Cantwell, 2009; Mudambi, 2008). Our previous argumentations have focused exclusively on mobile factor and now we proceed to theoretically analyse how headquarters location affect the interplay between ambidexterity, innovation, and performance. Previous studies suggest that manufacturers from emerging economies have a different set of capabilities from those firms from developed economies (Awate, Larsen, & Mudambi, 2015). Based on these findings we argue that the motivation (why) and management (how) of innovation strategies is different in EMMNEs and DMMNEs.

The central reason of DMMNEs for developing PSI strategies is to upsurge customization and differentiation while preserving high levels of efficiency and scalability to uphold competitive advantage (Bustinza et al., 2015). By doing this there is the expectation that entry barriers will be set against the rapid rise of global production in emerging countries (Crozet & Millet, 2017). On the contrary, EMMNEs' long-term survival and growth require the development of new capabilities that can compensate for their disadvantage in innovation experience (Luo & Tung, 2007). By entering into PSI, EMMNEs aim for catching up with industrial standards. As Xing, Liu, Tarba, and Cooper (2017) stated, this process requires accessing research and development capabilities, innovative technologies and patents that enable them to compete in the long term. These authors assert that such practices are particularly frequent in Chinese MMNEs acquiring German technology firms as a means to develop PSI capabilities.

Although ambidexterity is necessary for all firms operating in an increasingly fast-changing global environment, it is even more crucial for EMMNEs, which must be able to develop and leverage ambidexterity to offset their late-mover disadvantages (Luo & Rui, 2009). As these authors suggest, EMMNEs must be able to maintain short- and long-term co-orientations in order to simultaneously: 1) capitalise on "their existing ownership-specific advantages, such as cost-effective mass production capabilities", so as to tap into existing short-term opportunities (stability), and 2) explore future opportunities (flexibility) with the purpose to compensate for innovation capabilities disadvantages and to achieve long-term growth competitiveness (Luo & Rui, 2009, p.53).

Further to this, recent research seems to suggest that the development of innovation capabilities in EMMNEs requires an additional investment in exploration capabilities in order

to strengthen firm's absorptive capacity (Kahn, Lew, & Marinova, 2018). We argue that this additional focus on exploration is particularly important in the context of PSI, where firms need to have a deep technological understanding (exploration) before capturing the value of added services (exploitation). In our framework this is translated into a more significant mediation effect of exploration in emerging markets. We thus posit that:

Hypothesis 3b. *Headquarters location moderates the mediation role of Exploration in the Exploration-Performance relationship; the Exploration mediating role will be more intense in firms from emerging economies.*

3. Sample and variables

3.1. Data collection procedure

We derived the sample through an online questionnaire. The items measured manufacturing practices oriented to PSI strategies involving exploitation and exploration, as well as firm performance. An industry partner with expertise in service management solutions collaborated with a data management consulting firm to conduct the survey. According to our partner records, the global population of servitizing MMNEs whose annual revenue exceeds $1 billion is 7,000 firms. The target sample size was validated by a group of external industry experts.

Our goal was to construct a survey whose results would be statistically representative of the different industry sectors composing the global population of servitizing MMNEs.[1] The sample thus had to include at least 365 firms. Our partner contacted all the 7,000 targeted firms by email. Each firm received a separate username and password enabling them to access the survey online during the study period (November-December 2013). After several email and telephone reminders, we obtained a total of 370 complete survey responses from the MMNEs.

Intentionally, there is only one respondent per firm. We acknowledge that when the same respondent is asked to measure several constructs the data is subject to spurious correlations, an issue known in the literature as Common Method Bias (CMB). The effect of this bias on

[1]Here, $n = \frac{N*Z^2*p*(1-p)}{(N-1)*e^2+Z^2*p*(1-p)}$, where n is the target sample size, N is the population (N=7000), Z=1.0+1.96 (confidence level of 95%), e is the margin of error (e=5%), and p is a realistic estimate of the desired probability (p=50).

the analysis can be tested following Chang, Van Witteloostuijn, and Eden (2010) recommendations. According to these authors, three ex-ante precautions should be considered. Firstly, objective measures are less susceptible to CMB than self-reported measures. We consider that the high degree of objectivity of our independent variables, e.g. development of PSI Exploitation and PSI Exploration, minimised the influence of CMB. Secondly, pathway analysis goes beyond a respondent's cognitive map therefore reducing CMB. Finally, we verified that respondents were familiar with the implementation of firm's innovation strategies. In doing so, we confirmed that they were responsible of at least one cost or profit center, being 45.8% of them directors, 42.9% of the respondents had a corporate-level position, and 11.3% were executive vice-presidents. Furthermore, we performed an ex-post-test of CMB by conducting a Confirmatory Factor Analysis (CFA) for the entire set of variables (independent and dependent). For analyzing the fit of the model, this procedure loads all the aforementioned variables onto a common factor (Carson, 2007; Schwens, Zapkau, Brouthers, & Hollender, 2018). Values for Goodness-of-fit indicators showed unsatisfactory levels (TLI = 0.618 and CFI = 0.768, acceptance range >0.900; RMSEA = 0.099, acceptance range 0.050-0.080). As a result of the arguments and values reported, we can confirm that CMB does not affect the analysis and results of the study.

Following common practice in IB research (Chidlow, Plakoyiannaki, & Welch, 2014), when required by the respondents' language, the survey was translated into and back-translated from English by professional translators to ensure clarity and consistency of meaning. Most of the respondents decided to answer in English (58.4%), whereas other respondents answered the survey in French (8.4%), German (10%), Chinese (11.3%) and Japanese (11.9%).

3.2. Sample and subsamples

Due to our study's IB comparative focus, we eliminated countries/regions with insufficient observations. The final sample of regions/countries with sufficient observations for individual analysis was composed of 338 MMNEs with headquarters located in Canada and the US (N=81), the UK (N=68), Europe (N=98), Japan (N=46) and China (N=45). The final sample is distributed evenly across the sectors analysed, i.e. aerospace and defence, automotive and transportation, commercial and cargo airlines, electronics and high tech equipment, heavy and industrial equipment, medical devices and equipment, and white goods manufacturing. Each industry comprises between 13-15% of the total sample. We also can

split the sample by firm size. We define four size categories depending on the firm's annual revenues: $1-$4.9 billion, $5-$9.9 billion, $10-19.9 billion, and more than $20 billion. Whilst the first three groups have approximately 30% of the observations each, the group with the largest firms only comprises 10% of the sampled firms. Figure 1 exhibits the size and industrial distribution by world region.

– Insert Figure 1 about here –

Having Chinese firms in the sample provides an opportunity to test the DMMNEs-EMMNEs dichotomy. In the sample, Chinese firms seem to be overrepresented in the smallest revenue group and the electronics sector. This specific composition of the sample of Chinese firms might bias the results, e.g. the differences observed, if any, might depend on the revenue and sector categories and not on the country of origin. In order to test the importance of this bias we run binary choice models in which being an EMMNE is the dependent variable (value '1' for China and '0' for other country of origins) and revenue and sector fixed effects are the independent variables. Based on the predicted values of these models we compute propensity scores (Deheija & Wahba, 2002). At the top of Figure 2 we report the kernel distributions of the propensity scores, comparing Chinese firms with each of the other world regions considered. According to the Kolmogorov Smirnov test the difference of distributions is statistically significant at 1%, suggesting that revenue and industrial distribution might condition our results. In order to correct for this potential bias we artificially construct a comparable sample of untreated (DMMNE) firms using a matching technique (Schmiedeberg, 2010). The matching procedure enabled us to construct samples of firms from Europe, America, UK and Japan that are comparable to the original sample of Chinese firms. We used the most common and restrictive matching method to identify comparable pairs; the nearest neighbour matching without replacement (Aranguren et al., 2014). We retained the maximum number of firms in the untreated sample, with the constraint that the difference in propensity scores distribution between groups becomes non-significant, as exhibited at the bottom of Figure 2. This procedure resulted in a matched sub-sample of 181 firms (45 in China, 41 in Europe, 35 in America, 31 in UK and 29 in Japan). The results obtained from the full sample (338 observations) were also produced for the matched subsample (181 firms), corroborating the consistence of the results.

– Insert Figure 2 about here –

3.3. Variables

Exploratory PSI strategy: This variable was adopted from Bustinza et al. (2017a). The variable was operationalised using the following four 5-point Likert scale items (1=disagree completely, 5=agree completely): new product innovation, updated product lifecycle, service feedback and analytics, and product-service alignment. All items focused clearly on developing and establishing methods to improve the products and services offered, and on how to align these offerings. The scale's internal consistency was measured through the *Cronbach's alpha* ($\alpha = 0.792$), yielding scale reliability measures of 0.832 for *composite reliability* and 0.554 for *average variance extracted*. The scale's validity allows us to include this scale in the model (Hair, Anderson, Tatham, & Black, 2001).

Exploitative PSI strategy: This variable was measured through 4 items included in a questionnaire using a 5-point Likert scale (1= Total disagreement, 5 = Total agreement) to assess the distinctive indicators of an exploitative strategy: a) Lower inventory costs for service components (Botter & Fortuin, 2000; Hillier, 2000; Reyes, Worthington, & Collins, 2015), b) Reduced warranty costs (Chandrasekaran, Linderman, & Schroeder, 2015; Liu, Chen, Huang, & Yang, 2007), c) Reduced impact of complaint and service recovery (Driessen et al., 2015; Goldstein, Johnston, Duffy, & Rao, 2002), and d) Better feedback mechanism for future design changes (Goldstein et al., 2002; Sarkees, Hulland, & Chatterjee, 2014). All items applied to the context of PSI. This scale was validated by Confirmatory Factor Analysis. Principal component analysis with Varimax rotation confirmed its one-dimensionality with statistically significant items ($t > 3.29$, confidence level 99.9%), as did factor loadings above the recommended level of 0.4, individual reliabilities higher than 0.6, Total Variance Extracted of 61.97%, Kaiser-Meyer-Olkin test of 0.84 and a nonsignificant Bartlett's test of sphericity, $\chi^2 = 296.192$ (p=0.000). Since all firms in the sample provided PSI, we produced both an index of discrimination and criterion-referenced tests to analyse values in extreme positions. The *Cronbach's alpha* of 0.83 reflected the scale's internal consistency, while *composite reliability* of 0.85 and *average variance extracted* of 0.57 demonstrated its reliability. These values enable us to validate this new scale (Hair et al., 2001).

Overall performance: As one of the hypothesis tests the appropriate pathway between exploitation and exploration in the context of PSI, we follow preliminary empirical models that selected exploitation and exploration as independent variables, and choose overall performance measures as the dependant variable (Lisboa et al., 2011; Yalcinkaya et al.,

2007). This variable was measured using the scale validated by Bustinza et al. (2017a) that incorporates proximal indicators (competitive advantage and higher customer satisfaction) and distal performance indicators (profit margin, profit level change and increased profitability). The current study also adds consistency to this latent measure by including an additional intermediate indicator that better reflects service performance (Sparrow & Cooper, 2014): focus on service. The resulting 6-item scale reported a *Cronbach's alpha* value of 0.92, *composite reliability* of 0.88, and *average variance extracted* of 0.56. Based on these values, the scale meets the levels of internal consistency and reliability required to provide valid measurement instrument of overall performance.

4. Results

We performed three subsequent steps to identify the optimal path between Exploitation-Exploration and Performance using the full sample. Firstly, we analysed the balance between the variables Exploitation and Exploration (Lavie & Rosenkopf, 2006), obtaining a correlation parameter of $r_{Exploi\,Explor} = 0.21$. Secondly, we contrasted whether there were statistically significant differences between the coefficient of the relationship between Exploitation and Performance, $\beta_{Exploi \rightarrow Perf} = 0.04$ ($t = 3.15$; $p < 0.01$), and the coefficient of the relationship between Exploration and Performance, $\beta_{Explor \rightarrow Perf} = 0.34$ ($t = 5.33$; $p < 0.001$). Testing between these parameters showed statistically significant differences at a 95% confidence level ($\chi^2(1) = 6.38$; $p < 0.01$), indicating a statistically significant effect of Exploitation and Exploration on Performance. Comparing the coefficients obtained, we conclude that the effect of Exploration on Performance is greater than the effect of Exploitation on Performance.

Thirdly, we considered the following two paths: $Exploi \rightarrow Explor \rightarrow Perf$ and $Explor \rightarrow Exploi \rightarrow Perf$ (Figure 3). Path analysis is conducted using the statistical software Stata 15. As we have two possible paths, the first step is to test the indirect effects to see if the paths have statistical validity (Acock, 2013). Table 1 reports the coefficients for the indirect effects. Only the coefficient $\beta_{Exploi \rightarrow Explor \rightarrow Perf}$ is positive and statistically significant (β = 0.074; p<0.01). Our evidence thus supports Hypothesis 3a, which states that Exploration mediates the relationship between Exploitation and Performance, and that this is the optimal path in the context of PSI.

– Insert Figure 3 about here –

– Insert Table 1 about here –

Once the path Exploi→Explor→Perf is established, we can analyse the parameters resulting from this relationship. The results are shown in Figure 4, where coefficients and model fit measurements were estimated through Maximum Likelihood estimation. The results pinpoint that MMNEs' PSI begins with design processes, not the traditional research processes undertaken for product innovation (Visnijc et al., 2013). Furthermore, we find a positive impact of Exploitation on Exploration –$\beta_{Exploi \rightarrow Explor} = 0.21$ ($t = 3.11$; $p < 0.01$), supporting Hypothesis 3– and a positive effect of Exploration on Performance – $\beta_{Explor \rightarrow Perf} = 0.34$ ($t = 5.33$; $p < 0.001$), supporting Hypothesis 2. These results explain the total effect of Exploitation on Performance– $\beta_{TE\ Exploi \rightarrow Perf} = 0.21 * 0.34 = 0.07$ ($t = 2.86$; $p < 0.01$), supporting Hypothesis 1. Exploitation is thus positively linked to Exploration, and both Exploitation and Exploration are linked to Performance, with Exploration mediating the positive effect of Exploitation on Performance. These relationships are consistent with previous research arguing the existence of a balance between exploitation and exploration (Raisch et al., 2009). Overall, these results advance the literatures of organizational ambidexterity and learning, design and innovation (Luo & Rui, 2009), as well as the debate about the heterogeneous effect and complex relationship between servitization and performance (Bustinza et al., 2017b).

– Insert Figure 4 about here –

Country/region heterogeneity was examined by analysing world region full and matched subsamples (Table 2). Generally speaking, the results from the full sample were confirmed in all subsamples, with Japan as the only exception. Our results indicate that ambidexterity seems to be more important in Europe and China, where the total effect was considerably higher than in the English speaking countries in our sample (US, Canada, UK). The highest direct effect occurs in Europe ($\beta_{D\ Europe} = 0.16; p < 0.1$) and the highest indirect effect in China ($\beta_{IND\ China} = 0.10; p < 0.1$).

China is the emerging economy in our sample. The results reveal that the indirect effect is more important in emerging markets than in the developed world. The result is consistent for the matched subsamples indicating that the industrial and revenues composition do not bias the nature of the results. More specifically, when considering the full sample the indirect effect represents 56% of the total effect in China, followed by 50% in Canada/the US, 36% in the UK and 35% in Europe. This result confirms Hypothesis 3b. Location of the firms' headquarters moderates the mediation model, showing that MMNEs in emerging economies

implementing PSI are more dependent on the Exploitation→Exploration→Performance path than are firms in developed economies.

These results show that exploitation (PSI design and cost efficiency processes) is the foundation for achieving competitive product-service offerings for Chinese manufacturers. Whilst the direct effect of exploitation on performance is limited (it only explains 44% of the total effect), Chinese MMNEs rely on consumer understanding and further service development—Exploration—to maximise firm performance (which explains the remaining 56% of the total effect). This result is consistent with the view that China, like other emerging economies, is supported by the knowledge-leveraging production phase (Lavie & Rosenkopf, 2006; March, 1991). The result is also consistent with a growing trend of Chinese MMNEs acquiring German product firms with well-established service units (Xing et al., 2017).

Exploration (PSI research & development processes), in contrast, is critical for MMNEs in the UK, the US and Canada (high β_3 and low β_1 relative to other countries/regions). Manufacturers from these countries rely on the knowledge-generating production phase to generate performance in PSI, where the learning experience through customer involvement takes place (Bustinza et al., 2013; March, 1991). In Europe, both Exploration and Exploration are highly important and in balance. This situation is explained partly by the fact that most firms in our sample are from Germany, one of the global leaders in PSI, with advanced systems of service design and development in place (Gomes et al., 2018).

Finally, in Japan, Exploitation and Exploration have negative effects on performance (e.g. result for the full sample: $\beta_{D\ Japan} + \beta_{IND\ Japan} = -0.01^{**} - 0.03^{**} = -0.04^{**}$). Neither the investments made to deliver the service (e.g., IT infrastructure) nor production of the service itself impacts performance. Whilst this result contributes to the debate about heterogeneity in the literature on the relationship between PSI and performance (Kowalkowski et al., 2017), more evidence is required to understand the drivers and bottlenecks causing this particular result in Japan.

– Insert Table 2 about here –

5. Discussion and conclusion

5.1 Findings outline

The evidence reported in this research demonstrates that the set of firm's ambidextrous competences depends on the type of innovation that is being developed. Our findings show

that the pathway to an economically profitable PSI starts with exploitation of firm's existing resources and capabilities to secure long-term agreements with industrial consumers, and is followed with exploration to determine and develop the appropriate technological applications that meet specific consumer demands. Methodologically this is shown through a partial mediation of exploration in the relationship between exploitation and firm performance. For our full sample, containing 338 MMNEs across the globe, the indirect effect is two thirds of the total effect. As robustness, we test for the opposite pathway starting with exploration and following with exploitation and the statistical significance washes away. Our results suggest that a pathway starting from exploitation and following with exploration is imperative to deploy fruitful PSI. Additionally we examine whether the PSI optimal pathway found in the full sample applies to our subsamples of DMMNEs and EMMNEs. The results confirm the existence of the exploitation-exploration pathway but also indicate that the indirect effect of exploration is particularly important in EMMNEs, implying that the latter firms lack technological skills that need to be developed during the delivery of PSI. Since our EMMNEs and DMMNEs samples differ slightly in terms of size and industrial composition we replicate the comparative analysis using the nearest neighbour matching procedure and the results remain the same.

5.2 Theoretical implications

This research is grounded on the dynamic capabilities that underpin the firms' ability to generate strategic ambidexterity (Benner & Tushman, 2003). Drawing on different approaches to analysing strategic ambidexterity –organizational learning, organizational design and technological innovation (Luo & Rui, 2009)– this article investigates strategic ambidexterity (exploitation and exploration capabilities) in the context of service innovation in manufacturing firms. Within this framework, our research provides several important contributions. First, we provide additional nuances that enhance understanding of the use of exploration and exploitation in the context of PSI. Contrary to March's (1991) argument that strategic ambidexterity is unfeasible for most firms because exploitation and exploration capabilities are substantially incompatible, we find that exploration and exploitation are closely linked in the specific context of MMNEs developing PSI and that these capabilities follow a sequential pathway for improving performance. Our results align with Yalcinkaya et al. (2007), and Lisboa et al. (2011) who suggest the existence of an optimal pathway for

deploying exploration and exploitation capabilities. This is of particular importance for MMNEs developing PSI. In international markets, MMNEs must encompass exploitation, exploration, and the interplay between both –strategic ambidexterity.

This important contribution helps us understand how servitized MMNEs can successfully engage in PSI. Several authors –Holmström et al. (2010) in the context of Original Equipment Manufacturers developing base services, Bustinza et al. (2013) for MNEs in creative industries embarking on radical service innovations, Vendrell-Herrero et al. (2017) for MMNEs in the retailing industry using digital innovations to enhance their value system dominance and Bigdeli et al. (2018) for Original Equipment Manufacturers establishing partnerships with service providers to develop advanced service offerings– show different strategies for successful development of PSI. The current study makes an important contribution to this research stream by showing the sequential steps for successful deployment of PSI. Contrary to traditional organization of product development, which begins with research and development (Exploration) and is followed by product design and cost-benefit analysis (Exploitation), our results show that the optimal development of service innovation in product firms should start with exploitation in service design, followed by the necessary technological research on how the service can be implemented (exploration). This process of reverse innovation in PSI was first described in a Cambridge Service Alliance white paper (Visnjic et al., 2013). However, and to the best of our knowledge, ours is the first quantitative study to test this process of reverse innovation.

Another contribution of this research is shedding light on the need for additional work in understanding the external boundary conditions in which strategic ambidexterity occurs (Hsu et al., 2013). Our research shows the inherent heterogeneity of successful PSI development. This contribution responds to recent calls in IB for wider contextualisation of established theories (Teagarden et al., 2018) and recent calls in servitization research to identify factors that explain the heterogeneous relationship between PSI and performance found in the literature (Kowalkowski et al., 2017). By contextualizing how strategic ambidexterity is managed in developed and emerging economies, this research highlights the different motivations behind PSI strategies in DMMNEs and EMMNEs. As it is extensively described in the literature, PSI enables DMMNEs to escape from price-based competition (Rabetino et al., 2018; Vendrell-Herrero & Bustinza, 2019), but EMMNEs sense PSI strategies as a way to explore and learn new business models and technological opportunities that enable developing sustainable competitive advantage in the longer run (Xing et al., 2017).

Using a unique survey-based sample of MMNEs headquarters in Canada/the US, China, Europe, Japan and the UK, our research shows the different effects of exploration and exploitation to explain firm performance throughout these countries. While most of the countries follow the sequential Exploitation→Exploration→Performance pathway, an important specificity emerges in China, the only developing economy in our sample. Comparison shows that the sequential path is more important in China than in the other countries/regions. This path dependence is consistent with the fact that emerging economies are in the knowledge-leveraging production phase (Lavie & Rosenkopf, 2006; March, 1991). To achieve international competitiveness, EMMNEs must understand all processes involved in innovation rather than specialising in certain tasks. On the contrary, our research suggests that DMMNEs are in the knowledge-generating production phase (Bustinza et al., 2013; March, 1991) and should specialise in Exploration (US, UK, Canada) or Exploitation (Europe) activities. Therefore, our research shows that PSI in international contexts can be explained as developing strategic R&D activities in which DMMNES seek to establish strategies based on setting entry barriers and competence exploitation, while EMMNEs look for strategies to catch-up with manufacturing industry leaders (Awate et al., 2015).

5.3. Managerial implications

Our research has important implications for managers in product firms that have implemented (or are in the process of implementing) PSI. Firstly, it shows the sequential pathway Exploitation-Exploration-Performance for maximising PSI outcomes. This is a critical finding, as it helps managers to optimise resource allocation (Damanpour et al., 2009). The findings thus determine the existence of a reverse innovation process, in which service design and cost-benefit analysis (Exploitation) should be implemented before undertaking research on how to implement service innovation technologically (Exploration). This process works because, unlike product innovation, in which prototype products are developed and tested prior to product launch, service innovation (research and development, exploratory learning) occurs only during delivery of the initial service. Exploration in PSI thus takes place as a co-production process in which the customer's contribution is critical to maximisation of exploratory innovation. This result suggests that MMNEs must be able to develop long-term collaborative relational ties with their clients; and this result may become even more important for EMMNEs.

Moreover, this study contextualises the results geographically. Such contextualisation is relevant for managers because it helps them to realise the importance of understanding the competitive business environment in which they operate when deploying PSI, specifically when comparing developed and developing economies. Since EMMNEs operate in more challenging institutional environments characterised by limited property rights and legal protection, they are more likely to need to develop stronger relational ties with various local and international stakeholders. Having to turn more frequently to collaborative interpersonal business transactions may facilitate the exploratory learning and innovation that can only occur during delivery of the service through a co-production process between suppliers and customers. Finally, managers should realise that PSI has become a critical resource to establish a strategic dominance in business ecosystems, where EMMNEs firms need acquiring the most innovative resources in the market, while DMMNEs realise the importance of locking-out competitors by establishing entry barriers in global markets.

5.4 Limitations and future lines of research

The current study identifies several country-specific differences in analysing the effect of PSI on performance. All countries except Japan follow the same general pattern. Future research must determine what the exploitation/exploration antecedents in the context of PSI are and how could they explain why Japanese firms do not seem to benefit from strategic ambidexterity capabilities. Perhaps, and investigation of the interplay between ambidexterity and Japanese lean production system (also called 'Toyotism'), could shed some light onto this.

From a theoretical standpoint, future research should consider whether strategic ambidexterity capabilities can be outsourced, offshored or developed in partnership. This issue raises some important questions. For example, future research should analyse how EMMNEs and DMMNEs manage the relationship between exploitation and exploration activities, cultural diversities, institutional differences and social relationships when undertaking PSI.

Another limitation arises from the form of the dataset, which does not contain information on the type and value of contracts associated with the R&D in these firms' PSI. This limitation is important, as it influences exploration capabilities and could hinder unexpected costs (Visnjic et al., 2013). Future research should consider collecting further

information about specific R&D activities and their underlying contracts to better understand the relationship between exploration and performance. Another limitation is that the database is cross-sectional. Future longitudinal analysis is needed to increase our understanding of the optimal sequential pathway. Finally, the nature of our analysis (SEM) does not consider the inclusion of control variables. Future research should implement other methodologies and include variables such as firm age/experience, size, sector, and other international business environment variables such as cultural and institutional distance in the analysis.

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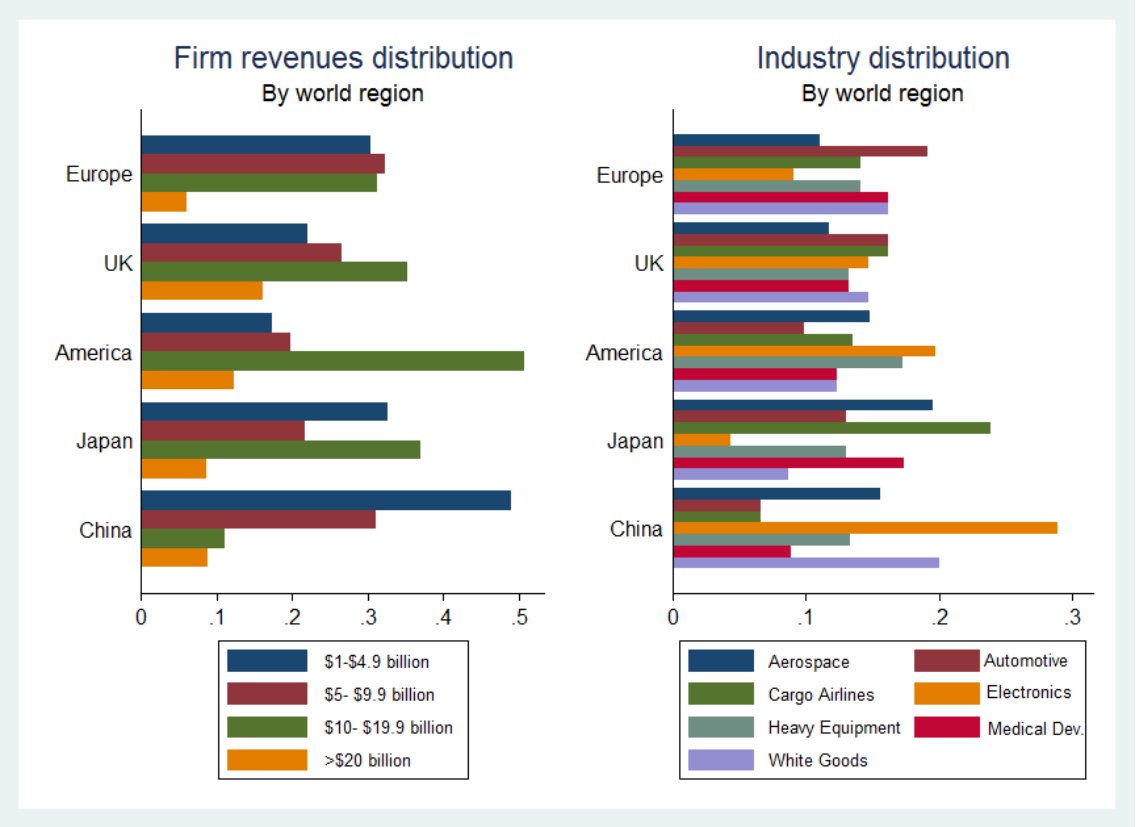

Fig. 1. Firm revenues and Industry distribution by world region

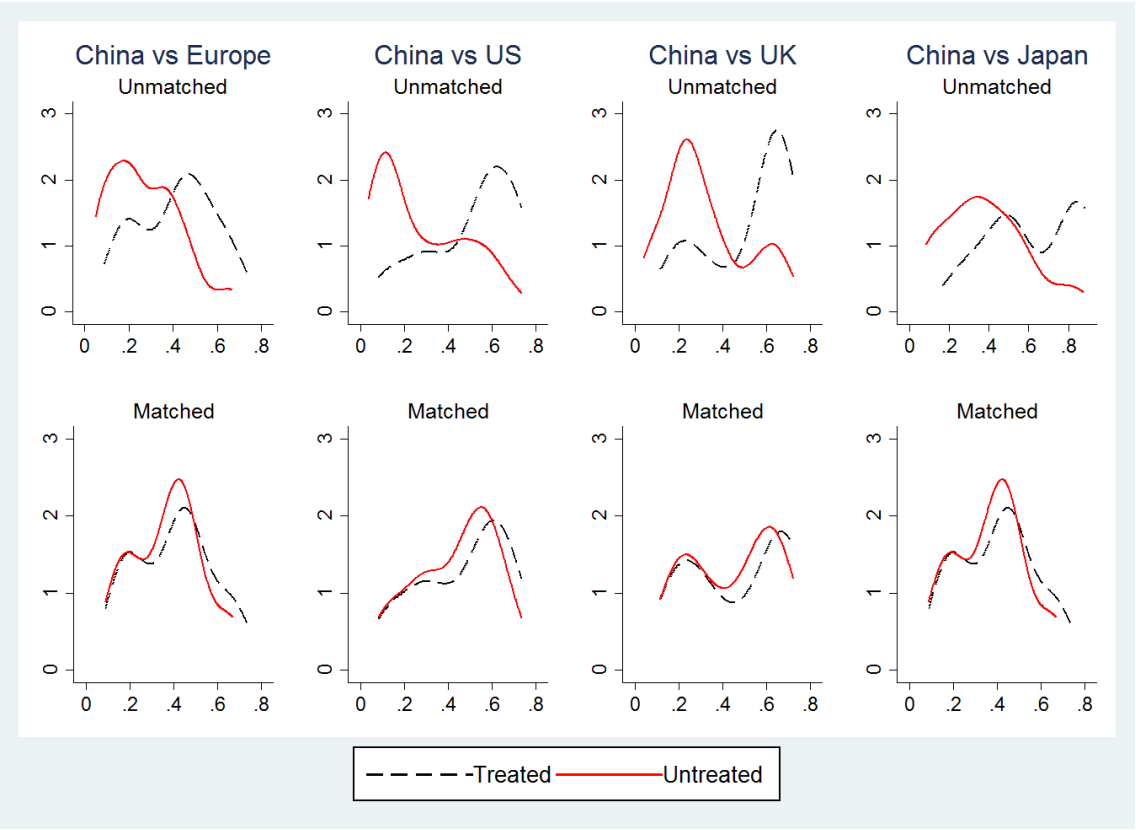

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Fig. 2. Propensity Score: Matched vs Unmatched samples

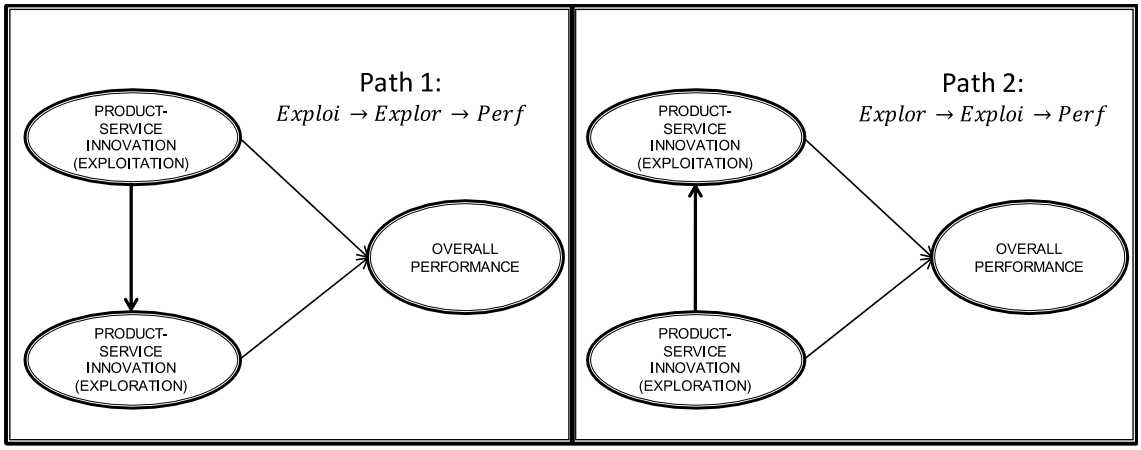

Fig. 3. Modelling of paths $Exploi \rightarrow Explor \rightarrow Perf$ or $Explor \rightarrow Exploi \rightarrow Perf$

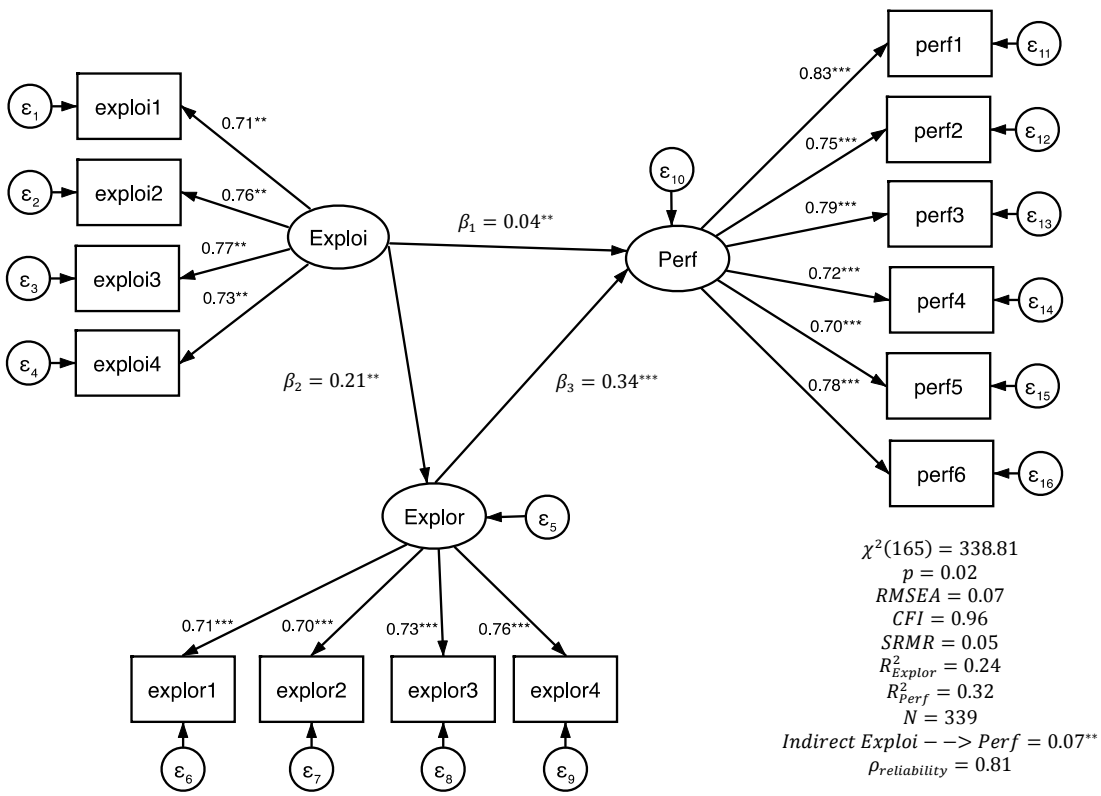

Fig. 4. General model

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Table 1

Testing statistically significant difference of the indirect effect between Exploitation, Exploration and Performance

	$Coef.$	$Std.Err.$	z	$P > \|z\|$
$\beta_{Exploi \to Explor \to Perf}$	0.074	0.027	2.741	0.009
$\beta_{Explor \to Exploi \to Perf}$	0.009	0.017	0.518	0.605

Table 2

Summary table for hypotheses and total effects

	Region	**Sample (Obs)**	**Standardized coefficients**			**Direct, indirect and total effects**		
			β_1	β_2	β_3	$Direct$	$Indirect$	$Total\ effect$
EMMNEs	China	Full (*N*=45)	0.08**	0.34**	0.28**	0.08**	0.10* (56%)	0.18**
DMMNEs	Europe	Full (*N*=98)	0.15*	0.52*	0.16***	0.15*	0.08** (35%)	0.23**
		Matched (*N=41*)	0.13*	0.54*	0.17***	0.13*	0.09* (38%)	0.24**
	North America	Full (*N*=81)	0.04**	0.15**	0.26***	0.04**	0.04** (50%)	0.08**
		Matched (*N = 35*)	0.03**	0.14*	0.24**	0.03**	0.03** (50%)	0.06**
	UK	Full (*N*=68)	0.07**	0.08**	0.46**	0.07**	0.04** (36%)	0.11**
		Matched (*N=31*)	0.08**	0.09**	0.45**	0.08**	0.04** (33%)	0.12**
	Japan	Full (*N*=46)	- 0.01**	- 0.16**	0.21***	- 0.01**	- 0.03** (75%)	- 0.04**
		Matched (*N =29*)	- 0.01**	- 0.14*	0.20**	- 0.01**	- 0.03* (75%)	- 0.04**
	Total	Full (*N*=338)	0.04**	0.21**	0.34**	0.04**	0.07** (65%)	0.11**

Levels of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$