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improved innovation capabilities in China**

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Asset Recombination in International Partnerships as a Source of Improved Innovation Capabilities in China

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Abstract

This paper examines how multinational enterprises (MNEs) and local partners, including suppliers, customers and competitors in China, improve their innovation capabilities through collaboration. We analyse this collaboration as a three-way interaction between the ownership-specific (O) advantages or firm-specific assets (FSAs) of the MNE subsidiary, the FSAs of the local partner, and the location-specific assets of the host location. Our propositions are examined through a survey of 320 firms, supplemented with 30 in-depth case studies. We find that the recombination of asset-type (Oa) FSAs and transaction-type (Ot) FSAs from both partners leads to new innovation-related ownership advantages, or 'recombinant advantages'. The study reveals important patterns of reciprocal transfer, sharing and integration for different asset categories (tacit, codified) and different forms of FSA and explicitly links these to different innovation performance outcomes. Ot FSAs, in the form of access to local suppliers, customers or government networks are particularly important for reducing the liability of foreignness for MNEs.

Keywords: China, joint ventures, technology sharing, suppliers, MNE theory

JEL: F23, F68, O32.

Introduction

Governments from emerging countries such as China have utilized inward multinational enterprise (MNE) investment activity as a key tool for promoting domestic technological capability. An important means has been encouraging partnerships and joint innovative activity with foreign MNEs as a way to upgrade firm-specific assets (FSAs) of domestic firms.

In principle, such upgrading of the FSAs of either firm should prove to be mutually beneficial. The domestic partner (whether in cooperation with the government or not) is able to provide access to location-bound assets such as privileged access to quasi-public assets, suppliers and domestic markets. In exchange, MNEs provide access to their stock of technological assets, as well as their experience in managing and organizing R&D activity. Emerging market MNEs hope to acquire a portfolio of assets which permits them to be competitive on global markets in these industries, while the advanced country MNE seeks to acquire local knowledge and expertise, and become an insider in the host market.

However, in practice, such partnerships – even where both firms have the relevant absorptive capacity – do not always have such straightforward outcomes, and learning tends to be uneven. Exactly why there is an imbalance in this exchange process is not especially well understood, beyond differences in absorptive capacity. This paper examines this process in some detail, combining perspectives from innovation management and international business studies, and illustrates that the challenges of such mutually beneficial upgrading of technological capacity and knowledge are associated with the complex and little-understood challenges of efficient recombination of complementary resources.

Essentially, firms require a certain threshold of assets to successfully compete in any given milieu, and this threshold of FSAs consists of several different classes of complementary assets which must be ‘bundled’ together, some of which are in fact not firm-specific, but associated with locations and to which a firm may have privileged access. Where a firm (of whatever nationality) is deficient in one type of FSA, it may nonetheless continue to remain competitive, overcoming this weakness by:

- i. compensating with stronger portfolio of assets in another category – say, if it has superior technological skills that give it a cost advantage that is greater than the disadvantage of having poor brand recognition;
- ii. seeking to utilize the complementary assets from the portfolio of another firm, say by acquiring or licensing, or by engaging in a joint venture;
- iii. seeking privileged access to location-specific advantages which compensate for the disadvantage, and where its current location does not provide such access, in a new location.

Overcoming weaknesses in one category by leveraging other assets (whether associated with a specific location or a firm) requires expertise that is not easily acquired, nor transmitted. Such expertise is therefore a FSA in its own right, which has been labelled as a recombinant advantage (Verbeke 2009, Narula 2012). This is a novelty of this paper.

Further developing Hennart's bundling model (Hennart 2009) and Verbeke's 'recombinant advantages' (Verbeke 2009) enables us to sharpen our conceptual understanding of how different sets of location- and firm-specific advantages interact. The role of location in partnerships and the importance of location-bound assets on the recombination process are poorly studied. When firms are co-located and actively engaged in collaboration, there is a three-way interaction between the FSAs of the MNE subsidiary, the FSAs of the alliance partner, and the location-specific assets of the host location. Integrating resources and assets that are external to the firm with its internal resources, or simply utilizing its existing assets in different configuration is a complex and little-understood phenomenon and a crucial asset in its own right.

The recombination of resources, assets and capabilities from both sides of the partnership can lead to new ownership advantages¹ (Verbeke and Yuan, 2010; Hennart, 2009; Verbeke, 2009, Narula 2012). We develop a better understanding of how different forms of partnership with different kinds of reciprocal interdependencies influence the above recombinations and the resultant, new FSAs.

The need to manage and generate recombinant FSAs is especially complex in cross-border activities. Where a firm has little or no experience in internationalization its FSAs are likely to be much more location-bound. That is, its assets are most efficiently utilized in its existing location, because it will suffer from the 'liability of

outsidership' (Johanson and Vahlne, 2009) when it ventures abroad, because its operations are associated with a specific production or innovation system and bound to other actors in its home milieu through complex institutions. This knowledge represents an important advantage and source of competitiveness for incumbent firms, but it is of limited use in other locations, and a cost to new entrants (Narula 2002, 2014). This is further exaggerated when the innovative activity is in knowledge intensive sectors which have a high degree of tacitness, and a large inherent complexity (particularly in the case of large-scale complex innovation projects; Berggren et al., 2011).

The interaction between the FSAs of firms and location-specific assets is an important one, and plays a significant role in understanding the process of technological upgrading in joint-ventures (JVs) and collaborative partnerships. This is especially so where governments are involved, because they can distort and adapt the ways in which markets function, and this is particularly relevant to China. We examine the effects of government intervention in these kinds of partnerships, at various stages, to identify how governments influence the recombination process and the outcomes. In an analysis of partnerships between MNEs and local firms in China we examine whether, when and how government intervention benefits the development of indigenous innovation capabilities in local firms.

The rest of this paper is structured as follows. We first review the conceptual arguments behind recombinant advantages and the interaction between FSAs and location-specific assets. A sub-section examines asset-recombination specifically within international partnerships and joint ventures. We then outline our analytical approach and methodology, which allows us to link measurable improvements in process and product innovation to particular asset recombinations in international partnerships. The questionnaire-based survey and the data-collection process used to develop the in-depth cases studies in mainland China are described. A presentation of the main survey findings is followed by a more extensive description and discussion of five selected case studies, including an in-depth presentation of one of these, the 'A-C partnership, in the Chinese aerospace industry. Finally a discussion of the findings focusses on the kinds of Oa and Ot recombinations we found and the implications for these findings on extant theory.

The nature of recombinant advantages and the role of location

Internalization theory and the eclectic paradigm, from the work of Dunning (1980) to the present has focused on the assets of firms that provide it with rent generation ability, variously called ownership-specific (O) advantages or firm-specific assets (FSAs). Entrepreneurial firms can leverage these FSAs in foreign locations to engage in value-adding activities either alone, or in competition and in collaboration with local firms (Rugman and Verbeke, 2008). These advantages must outweigh the additional costs and/or 'liability of foreignness' (Zaheer 1995) of operating in the unfamiliar (institutional, cultural, market) environments of host countries.

The literature distinguishes between two generic types of FSAs. Asset-type (Oa) FSAs are the result of 'proprietary ownership of specific assets' such as scale economies, distribution networks, intellectual property rights (IPR), brands and credit advantages. Transaction-type (Ot) FSAs stem from "the capacity of MNE hierarchies vis-à-vis external markets to capture the transactional benefits (or lessen the transactional costs) arising from the common governance of a network of these assets located in different countries" (Dunning 1988, p.2-3). Recent research defines Ot FSAs more widely, as they are a crucial basis for sustained competitive advantage (Narula, 2012, 2014). Following from Narula (2012), we view Ot FSAs as having four aspects²:

1. capabilities for the creation and coordination of efficient internal hierarchies and markets within MNEs that span a complex diversity of locations;
2. capabilities to efficiently utilize external markets;
3. knowledge of institutions and relational capabilities for institutional avoidance, adaptation and/or co-evolution (Cantwell et al., 2010; Santangelo and Meyer 2011);
4. capabilities for the re-combining (Verbeke, 2009) or 'bundling' (Hennart, 2009) of complementary assets to improve their performance.

This paper will seek to develop our understanding of the last two categories of FSAs, as they are especially relevant in understanding the process of innovation upgrading through collaborative partnerships and JVs.

The knowledge of institutions, both formal and informal, reduces the coordination costs, shirking costs and other transaction costs associated with inter-firm transactions, and can be considered to be a crucial aspect of Ot FSAs (Narula 2012). Such knowledge of institutions is central to determining the entry mode chosen by firms. Where firms establish a partnership there are considerable costs associated with becoming familiar not only with the nature of the partner, and its intra-organizational dynamics, but also the environment in which the partnership operates. Institutions are similar but not identical to relational capabilities (Johanson and Vahlne 2009). There are costs associated with becoming familiar with the various actors that make up the milieu in which firms operate.

Indeed, in general, all types of FSAs share an important characteristic: they have a context-specific nature. That is, their ability to generate optimal levels of rent for their owner depends upon the context in which they are utilized. Most commonly, this has been taken to mean that their efficient use depends upon whether they are location-bound FSAs or non-location bound FSAs. However, such a dichotomy is far too simplistic.

At one level of analysis, codifiability plays an important role. Certain classes of assets have a higher degree of codifiability than others, while others have a high tacit nature. This affects their transferability, and by extension the degree to which they are location-bound. For instance, IPRs that are patented are easily transferable, but only to the extent that the patents are recognized in other locations. Furthermore, only a small percentage of innovations tend to be patented (Arundel and Kabla 1998). However, in general, Oa FSAs remain easier to protect, because they are more likely to have a tangible, physical aspect to them.

Transaction-type FSAs, on the other hand, are much more context-specific and user-specific, and rarely codified. They can also demonstrate a high degree of inertia, even within the same MNE, and within the same establishment (Collinson and Rugman, 2008) and are much more location-bound.

Location-bound FSAs allow the firm to generate profits in a specific location, and to some extent in similar locations. Governments have more influence over such assets and may intervene in markets to restrict access for a variety of reasons, including the creation of monopoly or oligopoly conditions to support national

interests or flagship firms (common in defence industries, energy and telecoms sectors).

Location-bound transaction-type FSAs may therefore derive from knowledge of – and the capability to develop relationships with – a specific local institutions. FSAs may represent an advantage for the firm if and when such relations provide privileged access to local resources or assets, either directly or via local enterprises that are either owned or influenced by the government. It may also result when such relations form a channel for shaping the formation and implementation of government policy to better-complement existing assets or capabilities. They confer the basis to generate economic rents for incumbents and are a cost for foreign or local firms that are less embedded in the domestic institutional environment (Narula, 2003, 2010).

Assets that are potentially available to all firms in a specific location, but cannot be exploited in other locations, are termed location specific (L) assets. Location-specific assets can be public goods (available to all at marginal cost), or ‘quasi-public goods’ for which there are additional barriers or costs to their use (Narula and Santangelo 2012). They can also be made more or less available by the actions of governments who, following particular economic and development policies may restrict or promote access and use of particular location-specific assets. The quasi-public good nature of L assets thereby represents a subset of the ‘liability of outsidership’ because they may be available to local and foreign firms at differential rates. L assets and the ability of firms to utilize them efficiently rely on the knowledge of institutions, and because formal institutions are generally shaped by governments, L assets are greatly influenced by the actions of governments.

We connect these themes in Figure 1, which provides an overarching framework for our analysis. It draws from the ‘New Typology of ‘O’ Advantages’ proposed by Verbeke and Yuan (2010; p.95) and incorporates the abovementioned three-way interaction between the FSAs of the MNE subsidiary, the FSAs of the alliance partner, and the location-specific assets of the host location.

*** Figure 1 about here ***

Asset-recombination within international partnerships and joint ventures

Firms seeking to internationalize their activities require a certain threshold of both asset- and transaction-type FSAs to internationalize. Take the case of a firm X, which is an MNE with its home base in location A. Further assume it wishes to engage in asset-exploiting activity in location B and that the firm's asset-type FSAs are considerable. It has several options (Hennart 2009). For instance, if it is not in danger of losing its proprietary technological assets because the IPRs are easy to enforce in location B, it may seek to license its Oa FSAs to firm Y in location B. If it cannot easily protect its IPRs from its home location, and it possesses the necessary complementary transaction-type FSAs it can expand abroad through a wholly owned subsidiary.

However, if its portfolio of Ot FSAs is incomplete because its knowledge of markets and institutions in location B is poor, it can seek to supplement its Oa FSAs with the Ot FSAs of another firm. One way it can do so is by M&A, internalizing the Ot assets of other firms by buying assets, capabilities and 'ready-made' networks. Another option is to combine its Oa assets Ot assets of a local firm Y in B in some sort of partnership, such as a joint venture or non-equity linkage.

Both firms in a partnership must in principle benefit. Both are seeking to simultaneously augment their existing portfolio of FSAs, by exploiting its existing (but ultimately incomplete) set of assets. Take the scenario of firm Y in location B. Since it possesses the knowledge of domestic markets and institutions in location B, it is probably seeking to augment its asset-type FSAs, and/or its knowledge of international markets, and developing the skills to manage complex cross-border hierarchies (with an intention to becoming an MNE in the future), which firm X may possess to a greater degree than firm Y.

Firm X is also intent upon acquiring complementary assets. It wishes to augment its transaction-type FSAs as it simultaneously seeks to exploit its existing asset-type FSAs. It does so through two means. First, by engaging in partnership with firm Y it seeks to acquire transaction-type FSAs that are specific to location B. Second, it is seeking to become an incumbent in location B, by acquiring the knowledge of location-specific assets in location B.

Figure 2 shows a generic illustration of the kinds of assets we would expect from each side of the partnership. Differences between solid and 'dash-type' arrows represent the differences we would expect in the imbalance of asset contributions from foreign and local partners. Clearly, as location-bound assets are tied to the host location, they would come from the local (firm Y) firm, whereas the MNE would contribute non-location-bound FSAs.

*** Figure 2 about here ***

The choice of partners is shaped by two considerations. First, firms are rarely altruistic in terms of their selection of local partners and their management of partnerships. They will seek FSA complementarities and some degree of reciprocity. Second, governments can create 'failures' in the market for partners. Where MNEs enter into joint-ventures with local firms that have FSAs which are location-bound and strategically significant to the MNE (e.g., privileged access to specialized L advantages) we can expect governments to have more leverage in influencing partner selection (Narula and Dunning, 2010). This is accentuated where there is greater institutional distance between the home country of the MNE and the local firm.

Recombinant advantages are about understanding not just the value of the firm's existing FSAs, but also their limits in terms of their utility in other locations, and estimating their value to other firms (Narula 2014). Without this, it would be hard to leverage them to acquire complementary assets. Recombinant advantages enable firms to overcome a weakness in one set of assets (including the kinds of assets necessary to successfully enter new markets) by accessing complementary assets (including via joint-ventures, acquisitions or local partnerships), and being able to efficiently integrate these overlapping sets together. Superior capabilities for organizing intra-firm transactions more efficiently, or acquiring resources from external markets at lower prices (or lower risk), may compensate for Oa weaknesses.

Understanding the value of a firm's own assets (and those of its competitors, and its potential partners) is a crucial aspect of recombinant advantages. Assets of all classes are hard to value. This presents a strategic challenge for managers and

policymakers and a methodological challenge for researchers in this field. The lack of perfect information limits the ability to estimate the relative value of Oa and Ot advantages in different locations, with different competitors, different linkage options and different institutional contexts. Firms rarely have objective information about the tangible and intangible assets of their competitors (or, arguably, their own), since such information is often un-codified, embedded in routines, equipment, and brands, embodied in individuals, and variously protected (Narula, 2012).

Inevitably, errors occur in estimating the value of a potential partner's assets as well as one's own assets. Firm X may discover its Oa assets are more location-bound than expected (e.g., Starbucks in China). It may discover that it has overestimated the political or commercial acumen of local firm Y. Firm Y may have a lower level of absorptive capacity, and is unable to recombine and integrate its Oa assets with the MNE's.

Such 'imbalances' are common place in partnerships, and are hard to predict ex-ante. Indeed, a substantial share (over 50 per cent) of innovation-intensive partnerships are terminated prematurely, often due to the unilateral withdrawal of one partner (Reuer and Zollo 2005). The 'imbalance' problem is further exacerbated by two other extenuating circumstances. First, when partnerships are sequentially upgraded. A partnership initially established for one objective may work well, because the economic and learning outcomes of both partners are met, and their complementary assets are balanced. However, when the partnership is 'upgraded' to higher levels of technological intensity, the complementary assets and the recombinant advantages needed for the local firm to internalize the MNE's Oa assets may be insufficient. This is especially the case as the technology sought is close to the frontier, and highly tacit in nature. The closer to the frontier a technology is, the more challenging the catch-up process, as catch-up becomes asymptotic with diminishing returns (Criscuolo and Narula 2008).

Second, governments can affect the imbalance by 'skewing' the partnership, either by determining the local partner, by specifying the kinds of technologies and assets to be shared, the learning outcomes, or by dictating the 'upgrade' path, sequence or timing. Picking partners and upgrade trajectories in more mature industries, sectors and technologies is relatively easy: they are highly codified, and markets for these assets are well-defined. Industrial policies to promote catch-up in

these sectors are also well-defined. Selecting the 'right' technology to target and the appropriate local partner (i.e., the one with the appropriate technological capability) becomes more difficult the closer to the technological frontier. When governments attempt to select preferred industries, technologies and firms some distance away from the technological frontier, the direction in which investment is to be made is fairly obvious since firms at the frontier (i.e., the technology leaders) have already done so in the past.

These observations provide a starting point for our empirical analysis described below. We examine the exchange and recombination of assets and the development of new innovation-related capabilities in partnerships between foreign MNEs and local firms in China.

Empirical Approach: Analysing Asset Recombinations in China-based Partnerships

Our approach is novel in three specific respects. First, given the range of countries and FDI-related activities that large firms are involved in, we examined China-based joint-ventures and partnerships as the unit of analysis, rather than the overall firm. This allowed us to focus more clearly on specific recombinations of resources, assets and capabilities between the firms involved and connect these to performance outcomes. Second, we used a multi-method approach incorporating both a questionnaire survey and a series of in-depth cases studies compiled through interviews. Third, in keeping with the above unit of analysis, we adopted an intermediary set of performance measures rather than firm-level measures such as sales, profits, EBITDA or ROI. We captured data on measureable innovation-related outputs from the above partnerships, including new or improved products or production processes and traced these back to particular kinds of recombinations.

This aspect of the research draws from the field of innovation studies, both in conceptual and methodological terms (Collinson and Wang, 2012; Figueiredo, 2011; Marin and Bell, 2010; Hobday and Rush, 2007). We adopt the view that innovation capability is a recognized component of sustained competitive advantage. We therefore focus on innovation-related FSAs, integrating perspectives from mainstream international business and strategy with concepts and a methodological approach from innovation studies. By 'combining lenses' from these two fields

(Okhuysen and Bonardi, 2011) we contribute to a more inter-disciplinary approach to understanding the recombinations described above (Cheng, Henisz, Roth and Swaminathan, 2009). This includes unpacking the 'black-box' of Oa and Ot advantages by going well-beyond the R&D context, where many empirical studies in the international business field are focused, and beyond the use of simple proxy measures of knowledge transfer, such as patents. Our aim was to analyse process and product innovation using a range of output measures appropriate to these different forms of innovation. This reduces our reliance on secondary data which has certain weaknesses, as outlined by Beamish and Lupton (2009). Finally, by considering a range of partnership types we move beyond the focus in prior studies on equity vs. non-equity arrangements (Meyer et al., 2011).

Survey sample

The above propositions were examined through a combination of a questionnaire survey of foreign firms in China augmented by a set of in-depth case studies across a range of industry sectors. The questionnaire survey, conducted in 2007, provided 320 individual company responses from the China-based operations of these firms, comprised of 181 multinationals from the USA, 88 from the EU and 51 from the UK.³ Our aim in the sample selection was to be able to compare across MNE home-countries and across industry sectors.

The company case studies were developed through 105 interviews with managers, engineers, scientists and plant-level personnel, both in the home country of the MNE and in China. This study encompassed more than 30 joint-projects in 20 MNEs in the pharmaceuticals, telecoms, aerospace, automotive, consumer goods and high-tech manufacturing sectors. It was conducted between 2006 and 2008.

Our methodological approach draws directly from innovation studies, including the Oslo Manual (used in the EU Community Innovation Survey) and from prior empirical studies that have adopted these measures (Hall, 2011; Criscuolo and Haskel, 2003; Damanpour, 2010). The distinction between product and process innovation, including the respective measures of capability improvement for each are also used in the analysis of dynamic capabilities, where the introduction of new organizational routines and knowledge are compared to specific process and/or product improvements (Macher and Mowery, 2009).

As outlined in Table 1, the questionnaire and interview survey were designed to map the relationships between: type of partnership (col.1), functional/innovation context (col.2), joint-benefits and outputs (col.3), including specific measures or indicators of performance improvement, appropriate to each innovation context (col.4).

We then traced the kinds of assets and capabilities that were (re)combined within these partnerships that underpinned the performance outcomes discussed above. These included: financial resources; R&D-related expertise; disclosures of know-how, designs and patterns for innovation; new routes/channels to market; marketing or service expertise; access to low cost labour; access to new suppliers; manufacturing/production expertise and other kinds of management capabilities; knowledge about operating in different business environments. These also map onto the conventional international business studies categories of 'asset-exploiting' and 'asset-augmenting' motivation for FDI.

*** Table 1 about here ***

Survey findings

The findings show specific patterns linking dominant strategies (for example, lower-cost exports or increased local market share) the form of the partnership (such as with a local supplier, customer or competitor) and reciprocal recombinations of particular kinds of both FSAs and host location advantages. These patterns include both joint exploitation of existing FSAs (and host-location advantages from the Chinese side) and joint exploration of new FSAs, either for domestic market advantage (in China) and/ or international market (export) advantage. Contrary to the findings of some studies on 'reverse' knowledge flows, we found that transfers of FSAs from the China-based subsidiaries to other parts of the foreign MNE were limited.

Table 2 outlines the main objectives, joint-activities and benefits of MNE partnerships with each of the six kinds of local enterprise in China covered by our study. This summarizes the responses (Likert scale and frequency) to specific questions in our questionnaire.

*** Table 2 about here ***.

The strategic objectives of the MNE subsidiaries in our survey, whether asset-augmenting (gaining new, complementary inputs or capabilities from the foreign market) and/or asset-exploiting (leveraging existing assets to increase sales) are inevitably linked to the type of local partnership established and its main focus. In the case of successful partnerships we can trace these strategic intentions through to the recombinant advantages in Table 2 and specific performance outcomes using the indicators listed in Table 1. In the next section we focus our analysis on the recombinations that underpinned these performance outcomes.

Recombinations of assets and capabilities

Table 3 provides further detail from the questionnaire survey responses. It shows how respondents answered two questions: what did you gain from your partner? What did your partner gain from you? Table 3 summarizes the responses on a Likert scale of 1-5. A combination of the number of responses and the mean score indicates the importance of a particular asset or capability to the respective partner.

*** Table 3 about here ***

Table 3 shows that access to new suppliers and 'new or improved products or marketing services' are the main benefits for MNEs partnering with local suppliers. As we would expect, partnerships with local customers in China yielded 'new routes or channels to market' for MNEs, as well as 'new or improved products or marketing services'. Local customers also gained the latter from MNE partners, but not the former. This indicates a mutually-beneficial pooling of assets and capabilities for new and improved, locally-appropriate products and the means to market them. However, it also suggests that local customers did not normally gain access to other markets (including those outside China) via their MNE partners.

Figure 3 presents the same data in a format that makes the imbalances in the reciprocal 'give-and-take' within each of these partnerships more obvious. In general,

local partners are seen gain more from MNEs than vice versa (as indicated simply by the relative heights of the pairs of columns).

These reciprocal exchanges are made up of both Oa and Ot FSAs. However, while both are evident in the exchange of new/improved products, or capabilities for R&D technology or production (three of the 5 categories in Figure 3), Ot FSAs dominate in the exchange of 'access to suppliers' or 'access to the market'. The recipient is gaining superior access to specific networks in which the partner is already embedded in trust-based relationships. This enables a reduction in transaction costs for the recipient, in exchange for other FSAs. This is also discussed further in the case studies below.

*** Figure 3 about here ***

The general nature of these categories hides the specialist nature of the respective partner's input into the recombination process. So, for example, 'new or improved capabilities for production or processing' and 'new or improved capabilities for R&D-related technology', despite being roughly equal in terms of the level of sharing, represent specific recombinations of complementary, not identical, assets and capabilities. This is explored further through analysis of the cases studies.

Case Study Findings: Recombination in Practice

The in-depth case studies provide a richer set of data for explaining how Oa and Ot FSAs and location-bound assets are recombined in China-based MNE partnerships. In this section we briefly compare and contrast five case studies and take a slightly more in-depth look at the partnership in the aerospace component manufacturing business.

The five selected cases are:

- (1) an automotive component manufacturing MNE partnership with a local supplier, making turbo fans;

- (2) a large diversified MNE with a shipbuilding design and engineering division, in partnership with a local customer to develop a specific propulsion component for a scientific research ship;
- (3) a global construction machinery producer, conducting joint-manufacturing and product development for local sales with a large local partner;
- (4) a pharmaceuticals sector partnership between a large MNE and a local firm focused on product development and sales in the domestic market;
- (5) A global aerospace MNE manufacturing components in partnership with a local supplier within the AVIC (Aviation Industry Corporation of China) consortium

Our initial framework (Figure 1) provides the basis for selected examples from, and comparisons across, these five cases:

Location-specific assets of the host: The local partner in all cases provided access to cheap labour (with various levels of experience and skills), local suppliers, contractors and government-controlled infrastructure, services and support. Although we observed some degree of preferential access to government-related, location-bound assets in all of our case studies, provided to the MNE subsidiary by the local partner, this varied a great deal across these cases. It ranged from very local and low-level operating license and tax-related assistance, marginally reducing the transactions costs and uncertainty for the MNE subsidiary (Case 1), to very beneficial relationships with the city mayor's office, via senior public officials that were members of the Board of the local partner firm (Case 3). The latter provided specific examples of the biases introduced by Government involvement, easing controls (such as import constraints and work permits), providing preferential treatment over competitors, but also affecting the reciprocal balance in the partnership (for example by facilitating IPR spill-overs).

FSA's of local partner: The firm specific assets of local partner firms also varied a great deal depending on the partnership and the 'maturity' of the local firm. In Case 2 for example the local firm provided technical and engineering capabilities in some niche areas in which they were internationally competitive, plus local brands and privileged access to state-owned customer firms. In other cases the local FSA

contribution was very limited and the location-specific assets of the host firm were the primary or only focus of the collaboration.

FSA of the foreign MNE: As anticipated these were shown to lie at the heart of the 'bargaining power' which MNEs 'traded' for access to the abovementioned location-specific assets and FSAs of the local Chinese partner (Nebus and Rufin, 2010). These included: specialized technical design and engineering assets and capabilities (Case 1); materials and design-related IPR and training in leading-edge six-sigma manufacturing techniques (Case 3), and; advanced capabilities in R&D, drug development and testing in pharmaceuticals (Case 4).

Re-combined assets and capabilities

A general pattern emerges from both the questionnaire and our case study survey. The Chinese partner would normally provide land, facilities and access to local services (location-bound O assets). They would recruit or support the recruitment process, providing access to their local employee networks. The Chinese side typically also provided HR management capabilities, often via secondment of their own senior managers.

The MNE subsidiary in all these cases tended to provide the more sophisticated technological (Oa) assets for improved production or higher-quality outputs, alongside more formal production systems and expertise, plus technical, design and engineering blueprints, databases and capabilities. Generally there was an initial one-way flow of IPR from the MNE subsidiary to the local Chinese partner, although we have evidence that a significant number of partnerships developed joint IPR subsequently.

There was clear evidence of a range of improved performance outcomes resulting from the recombinations of the above Ot and Oa FSAs, using the measures outlined in Table 1. These included: lower costs through the use of local components involving process adaptation but leading to productivity improvements and higher sales (Case 1); a single specialized, high-technology component sold to the SOE (state-owned enterprise). This strengthened the brand and expanded local sales of the MNE subsidiary, while also enhancing the engineering and design capabilities of the local partner (Case 2); a new range of cheaper, locally-manufactured

construction equipment adapted to the local market. Both firms gained improved productivity, faster and more reliable delivery times and greater market share (Case 3); enhanced market share for both partners as a direct result of combined FSAs that supported locally-appropriate product development (later undermined by IPR 'transgressions' by the local partner; Case 4).

In most cases these resulting ownership advantages were location-bound. They led to improved competitiveness in terms of (normally lower-cost) exports back to the home country of the MNEs (or other foreign markets) and/or improved competitiveness in relation to the domestic Chinese market.

The A-C partnership: an in-depth case study in the Chinese aerospace industry

The Chinese aerospace industry is dominated by Government ownership and control, partly overseen by a large umbrella organization known as Aviation Industry China ('AVIC1'). Domestic AVIC1 firms were compelled to follow dual public and private sector agendas. As such they could be seen as hybrid organizations, rather than pure SOEs (Collinson and Sun, 2012). Government representatives were fully-involved in the JV contracting process and all subsequent procurement, including related technology transfer and local training.

MNE 'A' was involved in a complex set of production joint-ventures in Xian as a requirement of their investment in China, which provided access to the growing domestic market for civil aircraft. The sub-contracting involved amounted to an estimated US\$60 million per annum. One of these, the 'A-C JV' focused on the local manufacture of wing-boxes, primarily for export to assembly operations in Europe. The local partner provided the premises and plant services in conjunction with local government agencies and the AVIC consortium. It was also responsible for sourcing and managing local suppliers.

Both sides of the partnership provided assets in the form of manufacturing equipment and tooling. Factors such as cost, availability and the need to customize processes to suit local materials and/or supplier capabilities influenced the form of contribution made by the local partner.

Operational processes, engineering skills and management capabilities for quality improvement were key Oa advantages that the Chinese partner lacked and

the foreign MNE provided in the A-C JV. This included some physical assets in the form of process design blueprints, engineering data and visibility boards (used to map out operations on the plant floor and monitor process changes). But it primarily meant capability transfer, in terms of both process routines (such as quality circles and lean management systems) and problem-specific knowledge, through formal training and on-the-job learning.

An important form of recombination was the continual adaptation of these processes and techniques to suit local labour, from experienced plant floor supervisors and engineering staff to inexperienced cheap labour. That is to say, capabilities were not so much 'transferred' as adapted and re-shaped in the training or on-the-job learning process to suit the level of local absorptive capacity at every level.

Improved innovation performance resulted from these recombinations, measured by both firms in terms of reduced scrap yields, increased employee productivity and improvements in the quality and reliability of the wing box components. Industry-specific measures were also used, including the number and types of 'concessions' and 'reworks' (buyer's rejections on the basis of poor quality)

As indicated above, Government involvement was a significant factor in the partnership. The Chairman of the Board of the local joint venture partner was also the town Mayor. This gave rise to a number of benefits and constraints for the MNE relative to other foreign firms. This included preferential treatment through support from the Mayor's office and related government departments. In the most extreme case this amounted to locking-out a foreign competitor looking to supply components to the Chinese partner through an exclusivity arrangement overseen directly by the Mayor's office.

Discussion: Oa and Ot recombinations in theory and in practice

Our study of MNE partnerships in China, with local customers, suppliers, competitors, public sector R&D organizations and contractors provides empirical insights into the recombination of Oa and Ot FSAs. We focus on the capacity of the partners to jointly improve their innovation performance as this allows us to examine and to some extent measure the outcomes of this recombination. It also allows us to

narrow the range of FSAs examined in the questionnaire survey and case studies. This paper draws on specific findings from the survey, a subset of the case studies, plus an in-depth look at one particular case, the A-C partnership.

As expected we found that different asset recombinations and resulting O advantages from different partnerships tended to match the strategic intentions of the partners, whether asset-augmenting or asset-exploiting. These findings are shown in Tables 2 and 3 and in Figure 3. In all kinds of partnership the MNE tended to provide the assets and capabilities for process and product innovation while local firms provided local knowledge of the market and customer preferences and/or links to suppliers and contractors and guidance through the regulatory hurdles.

The case studies provide more insights into the recombination process and reciprocity in the give-and-take of the partnership. In particular, these illustrate the significance of the Ot FSAs that are shared and integrated, which help MNEs overcome key disadvantages of outsidership. A standard pattern was for the MNE to provide FSAs in the form of physical assets (such as equipment, design blueprints, prototype products) and process capabilities for higher-quality, more productive manufacturing and/or design and development skills for process and product development. Local firms would provide land and facilities and often cheap and/or skilled labour where the partnership focused manufacturing operations. In most cases, MNEs gained more in the way of location-bound Ot FSAs than Oa FSAs from their local partners. This included access to non-government networks, where MNE subsidiaries gained knowledge of local suppliers, customers, contractors and skilled labour sources from their local partner, plus support in the selection and development of advantageous relations with preferred members of these networks.

For the MNE, transferring and adapting particular FSAs to the China context involved a joint-effort between the partners which is the foundation for the co-production of new knowledge, routines and capabilities for locally-appropriate innovation. Relative to the transfer of physical assets, sustained advantage seemed to rely more on the successful recombination of these Ot-related capabilities by the two firms. Physical assets, such as process equipment, design blueprints and even patents can provide a temporary advantage but their adaptation to the host environment and their subsequent evolution depends on a deeper level of reciprocal knowledge-sharing. Ot-related capabilities are more location-bounded by their very

nature and their recombination can be more difficult to achieve, but provide the basis for successful partnerships. From this observation we also argue that different levels of success are partly associated with the degree to which the key FSAs are more or less location-bounded (Meyer et al., 2011; Collinson and Rugman, 2008).

We conclude that further understanding of transferability and internalization of ownership advantages and exploration of the variation in these across different forms of inter-firm partnership is required to advance theory and this study contributes to these aims.

The Role of Government

The case studies involving SOEs demonstrated how the close involvement of government agencies influenced the reciprocal sharing of Oa and Ot advantages. To illustrate the role of government in influencing access to location-bound assets we focused on the A-C partnership. Because of the institutional context in which the aerospace industry operates this was the most tightly controlled industry in our study. Here the cost of gaining access to the rapidly-growing commercial aerospace market in China was much higher for the MNE, requiring a considerable transfer of technology and capabilities for high-quality manufacturing, design and R&D. Government agencies not only built this into initial contracts and monitored progress, they co-invested in the infrastructure and managed the process of training to improve indigenous capabilities in this industry. These agencies therefore stage-managed the co-production of new knowledge and capabilities for locally-appropriate product and process innovation. The government agenda was explicitly to reduce dependence on foreign involvement over time. As a result, MNE respondents in our study (in China and in the home countries) recognized that they were involved in breeding their future competitors. This and other insights from the study have significant implications for government policy and management practice.

The case studies provide some indications of how and where government intervention has the greatest effect in terms of furthering particular policy aims. When compared with other case studies the A-C case showed how the institutional context and the power of AVIC and the related SOEs operates to both drive and facilitate the transfer of targeted Oa and Ot advantages from MNEs in partnership with local firms. Cheap labour was just one amongst a number of location-specific advantages over

which government had some degree of control (Gonnet, 2011). In this case, cost was a minor issue and control over access to the domestic market provided the AVIC consortium with the leverage to push the MNE to align with the policy agenda.

Conclusions

A central aim of our study was to improve understanding of how different sets of location- and firm-specific advantages interact, leading to particular kinds of 'recombinant advantages' (Verbeke 2009, Narula 2012). Our findings are specific to the unique context of international partnerships based in China. This context exerts an observable influence on the three-way interaction between the FSAs of the MNE subsidiary, the FSAs of the alliance partner, and the location-specific assets of the host location. This analysis also confirms the importance of location-bound assets on the recombination process.

The findings provide detailed illustrations of how firms overcome weaknesses in one asset category by leveraging other assets (whether associated with a specific location or a firm). The survey also provides evidence that Chinese Oa advantages are improving partly due to technology transfer and learning from MNE partnerships. But a common pattern observed was that the transfer of tangible assets (such as equipment, process technology and brands) led to a first-stage improvement in output quality and/or sales, with both partners benefiting. Sustained, collaborative innovation, based on recombination of more tacit (and intangible) Oa and/or Ot FSAs often proved to be more difficult. However, in some cases deeper complementarities, the recombination and the subsequent co-production of Oa and Ot advantages provided benefits for both partners. MNEs gained access to the Chinese market and/or an improved export base, improved local knowledge and complementary relationships. Domestic firms gained access to assets and capabilities that improved their ability to innovate.

The importance of local firms' knowledge of, and relationships with, government at various levels (national, regional, local) and with different agencies, as a source of leverage with MNEs, was highlighted in our findings. This is one kind of location-bound transaction-type FSAs that appears to be key in China, according to Western respondents. For MNEs this helped reduce the liabilities of outsidership (Johanson

and Vahlne, 2009) by improving knowledge of and embeddedness in both non-government (suppliers, contractors, labour groups etc.) and government-related networks and was seen to be a key success factor.⁴ This confirms previous observations, such as Meyer et al. (2011) and Ghemawat (2007), but extends this research by providing evidence of where, how and why this is important. Because of the abovementioned complex and interwoven nature of these networks, and the nature of location-specific assets as 'quasi-public goods' (Narula and Santangelo 2012), successful local partnerships are that much more important as a way of overcoming the costs of accessing them.

Because of the significance of local knowledge and local relationships as a critical set of Ot FSAs for the success of the partnership we conclude in simple terms that domestic firms relied on more tacit kinds of assets as their source of leverage and MNEs on more codifiable Oa FSAs (IPR, patented technologies and processes etc.). But there was also evidence of MNEs contributing more tacit Oa FSAs relating to management practices and procedures that underpinned innovation-related capabilities that we would class as recombinant advantages.

There were some indications from respondents that a strong reliance on location-bounded Ot and Oa advantages increases the liability of foreignness for Chinese firms abroad and is likely to limit their capacity to internationalize. It may be that a reliance on preferential government treatment and other sources of location-specific competitive advantage reduces the incentive to develop some kinds of non-location-bound FSAs. In theory this kind of local-embeddedness would apply in any context, as has been identified in other studies as a constraint on the capacity of firms to internationalize (see for example Collinson and Rugman, 2008 and Collinson and Wilson, 2006 on Japanese firms).

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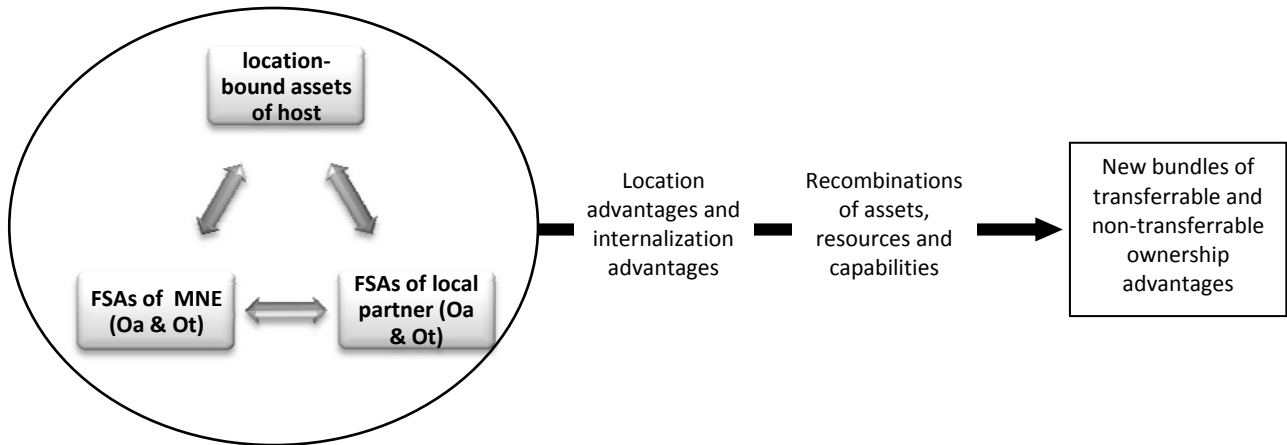
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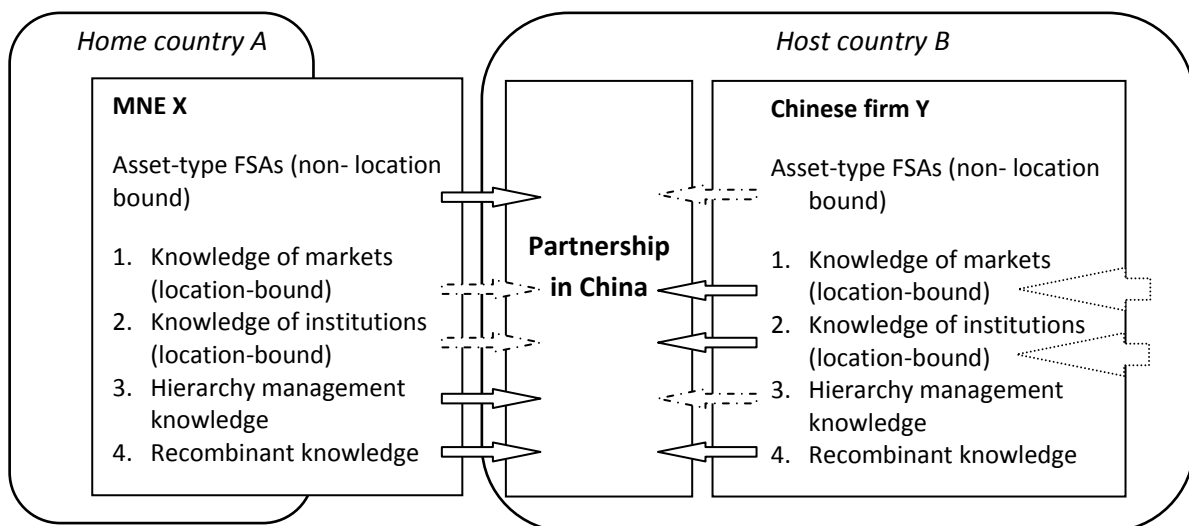
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Figure 1: Recombinations of location-specific and firm-specific assets leading to new ownership advantages



Notes: Oa FSAs or *asset-type firm-specific advantages* include brands, capital equipment, technology and intellectual property rights (IPR), such as patents, along with the capabilities and knowledge to manage and develop these. Ot FSAs or *transaction-type firm-specific advantages* include: knowledge of how to organize intra-firm activities efficiently (how to run a firm efficiently); knowledge of external markets (where to buy and sell efficiently); knowledge of institutions and relational capabilities to reduce transaction costs, and; the ability to recombine/ bundle/ substitute its own assets with other internal and external assets.

Figure 2: Asset Recombination in International Partnerships



Notes: Although not shown, the asset 'flows' could potentially be two-way flows; into the partnership and out from the partnership to the respective parent firms. This is discussed in the text.

Figure 3: What have you gained from your partner and they from you?

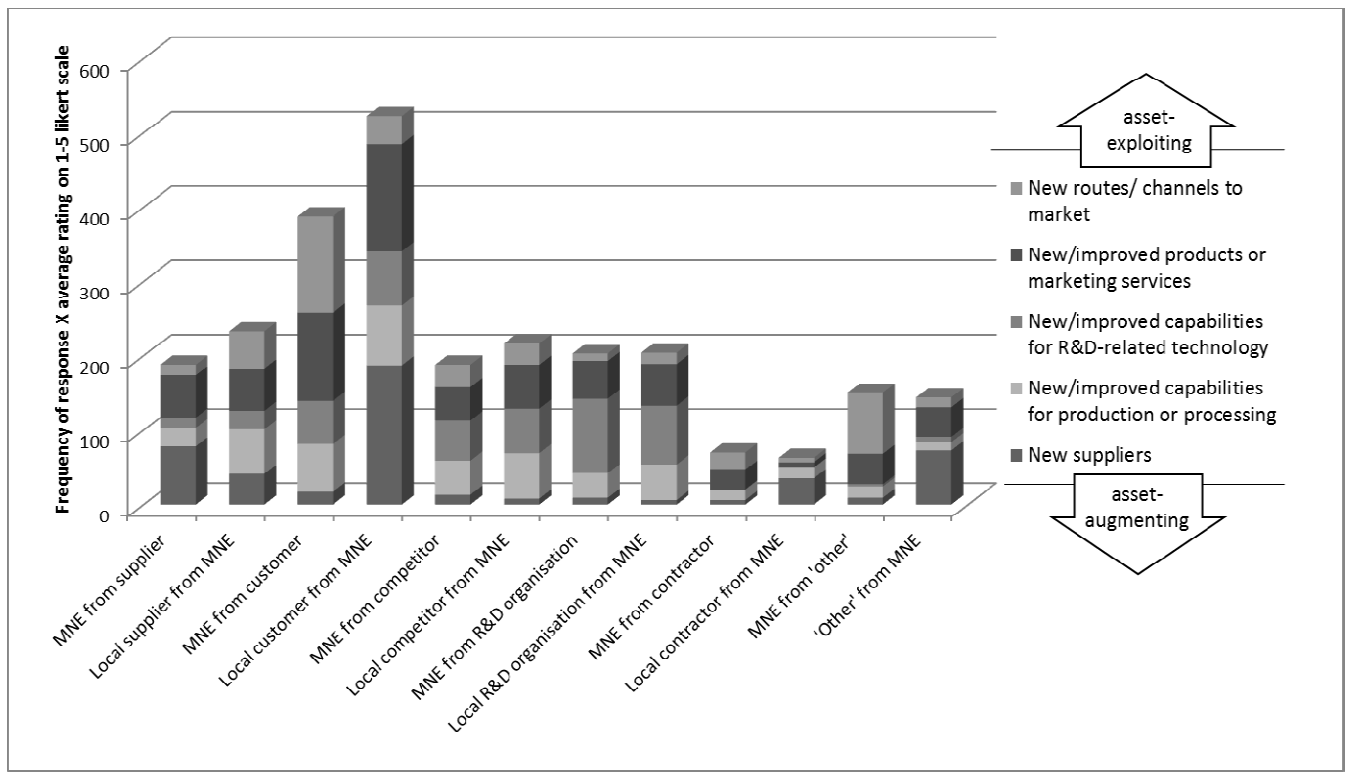


Table 1: The range of measureable innovation outputs across inter-firm partnerships surveyed

Type of Partnership:	Function/ Innovation context	Output / impact	Measures / indicators
Joint-ventures, licensing, long-term and short-term contracts..... With: customers, suppliers, competitors, contractors, public sector organizations	Marketing (market-seeking)	New / improved: brands, routes to market, customer relationships	Brand value, sales growth, market share
	Product / service development (market-seeking)	New / improved: products / services, markets / market positioning	Profitability, sales, % of total product / service portfolio or market share from new products
	R&D (resource and market-seeking)	New / improved patents, scientific & technological (S&T) assets / capabilities	Number & value of patents, licensing or royalty revenues, S&T outputs (papers, citations etc.); technical proficiency and productivity
	Process development in manufacturing (resource and market-seeking)	New / improved production, better productivity (plant level), lower costs, higher quality, reliability, speed-of-delivery of outputs	Sales, markets share, profitability; quicker delivery, improved reliability, quality; Higher total-factor productivity, lower scrap rate; achieving specific industry standards

Table 2: Main objectives, joint-activities and benefits of partnerships

MNE partnership with local... (% of responses)	Main objectives of the partnership...	Most important collaborative activities...	Main benefits of partnership in terms of sharing, combining...
Customer (34.1%)	Manufacturing for export; manufacturing for the domestic market; selling services to the domestic market	Transferring production processes into China; providing technical support for local customers	Manufacturing expertise and financial resources
Supplier (23.8%)	Manufacturing for export; new product development for global markets	Transferring production processes into China; joint-purchasing of technology and specialist expertise; creating new distribution channels	Disclosures of know-how, designs and patterns for innovation and management capabilities
Competitor (9.4%)	Manufacturing for the domestic market; new product development for the domestic market.	Creating new distribution channels	Marketing / service & manufacturing expertise; disclosures of know-how, designs and patterns for innovation; low-cost labour.
Public R&D organization (14.1%)	New product development for the domestic market	Educating and training domestic employees	R&D expertise; low-cost labour; other in-kind resources
Contractor (6.9%)	Manufacture for the domestic market	Transferring production processes into China	Financial resources; R&D expertise and marketing / service expertise
Other (11.9%)	Manufacturing for the domestic market; selling services to the domestic market	Creating new or improving existing distribution channels	Financial resources; marketing / service expertise

Table 3: What have you gained from your partner and they from you?

Who learned what in your partnership?		New/improved products or marketing services	New/improved capabilities for production or processing	New/improved capabilities for R&D-related technology	New/improved management capabilities for your business operation	New routes/ channels to market	New suppliers	Knowledge about operating in different business environments	Total n / Row Mean
MNE <i>from</i> supplier	Mean	3	3.13	3.5	2.63	2.33	3	2.4	2.86
	n	19	8	4	8	6	26	10	81
Local supplier <i>from</i> MNE	Mean	2.48	3	3.57	3.67	2.78	2.93	3.6	3.15
	n	23	20	7	6	18	14	5	93
MNE <i>from</i> customer	Mean	2.9	2.67	2.76	2.65	2.95	2.83	2.71	2.78
	n	41	24	21	37	44	6	28	201
Local customer <i>from</i> MNE	Mean	3.06	2.67	3.52	2.93	2.71	3.82	2.71	3.06
	n	47	30	21	30	14	49	21	212
MNE <i>from</i> competitor	Mean	3.21	3.07	3.18	3.17	3.33	3.25	2.8	3.14
	N	14	15	17	12	9	4	10	81
Local competitor <i>from</i> MNE	Mean	3.69	3.59	3.75	3.62	4.14	4	3.18	3.71
	n	16	17	16	13	7	2	11	82
MNE <i>from</i> public R&D organization	Mean	2.83	3.3	3.45	3	2.5	3	2.6	2.95
	n	18	10	29	1	4	3	5	70
Local public R&D organization <i>from</i> MNE	Mean	2.95	3	3.43	3.33	3	3	3.14	3.12
	n	19	16	23	6	5	2	7	78
MNE <i>from</i> contractor	Mean	2.45	2.33	-	2.83	3.29	3	3	2.82
	n	11	6	-	6	7	2	4	36
Local contractor <i>from</i> MNE	Mean	1.75	2.5	-	2.25	3	3.89	2.5	2.65
	n	4	6	-	4	2	9	6	31
	n	4	-	-	4	-	13	6	27
MNE <i>from</i> 'other'	Mean	3.5	3.75	3	4	4.4	4	3.9	3.79
	n	6	4	1	11	5	1	10	38
'Other' <i>from</i> MNE	Mean	3.57	2.75	3.5	3.56	4.33	4.33	3.63	3.67
	n	7	4	2	9	3	6	8	39

Notes:

- (1) Mean from a 5-point Likert scale (1 = unimportant; 5 = very important)
- (2) Multiple responses are accepted, so the row totals do not match the total numbers of partnerships
- (3) **Bold denotes the two most frequent responses (row-wise) and above-average scores on the Likert scale for the row**

¹ We use the terms 'ownership advantages' and 'firm-specific assets' as synonyms throughout this paper.

² It is worth noting that in Narula (2014) and in a later contribution (Narula, forthcoming) recombinant advantages are viewed as a separate category, and not as a subset of transaction-type FSAs. This principle, however, remains the same: that recombinant advantages form an important class of assets that have hitherto not been explicitly acknowledged.

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⁴ *Guanxi* (relationships) and *xinren* (deep trust) are specific forms of social capital associated with China's business environment (Kriz and Keating, 2010). Without conducting an international comparison it is difficult to assess how different and relatively how important these characteristics are to business success in China. Western respondents in our study, however, did consistently emphasise their importance, leading us to highlight Ot FSAs as particularly important to business success in terms of reducing the liabilities of outsidership.

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