Unraveling asset recombination through the lens of firm-specific advantages: a dynamic capabilities perspective

Unraveling asset recombination through the lens of firm-specific advantages: A dynamic capabilities perspective

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ABSTRACT

The dynamic capabilities perspective highlights that continuous asset augmentation enables firms to address changing environments and sustain competitiveness. However, the literature is still unclear about the nature, interaction, and configuration of dynamic capabilities, and why not all firms are able to successfully upgrade. We propose that the parallel and ongoing IB discussion on asset recombination and firm-specific advantages (FSAs) sheds light on this debate. Continuous asset upgrading is achievable through asset recombination, but this requires a certain set of 'recombinant FSAs'. We delve into asset recombination by decomposing it into three different types (namely intra-firm, extra-firm, and network) depending on the source of complementary assets and organizational boundaries. We address the three procedural activities of sensing, seizing, and transforming that underlie asset recombination and discuss the associated recombinant FSAs. This study provides a better understanding of the mechanisms available to augment the firm's asset portfolio in cross-border settings.

Keywords: asset recombination; dynamic capabilities; international business theory; firm-specific advantages

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1. Introduction

What drives firms to maintain competitiveness and sustainably grow? This question has been the subject of much scholarly interest over the last two decades in several fields of business research. The landmark study by Teece, Pisano, and Shuen (1997) proposed that the answer lies in understanding dynamic capabilities, which are higher-level competences that determine the firm's ability to integrate, build, and reconfigure internal and external resources to address (and possibly shape) rapidly changing business environments. Dynamic capabilities are particularly essential for multinational enterprises (MNEs) because they need to adapt (often simultaneously) to the changes in multiple different locations and boundaries with fierce global competition and rapid technological change (Schotter, Mudambi, Doz, & Gaur, 2017; Teece, 2014).

Dynamic capabilities have primarily been explored in the field of strategic management, although the international business (IB) literature has also provided many useful insights into the role of dynamic capabilities in explaining the determinants, processes, and effects of cross-border activities (Matysiak, Rugman, & Bausch, 2018; Pitelis & Teece, 2010; Teece, 2014; Zahra, Sapienza, & Davidsson, 2006). Much of the literature has adopted a dynamic capabilities perspective to examine internationalization processes (Luo, 2000; Prange & Verdier, 2011; Vahlne & Ivarsson, 2014) particularly those of born global firms (Sapienza, Autio, George, & Zahra, 2006; Weerawardena, Mort, Liesch, & Knight, 2007). Research has also focused on the capability development in MNEs, stressing the role of organizational processes and structure in learning and innovation across borders (Griffith & Harvey, 2001; Hung, Yang, Lien, McLean, & Kuo, 2010; Luo, 2002; Michailova & Zhan, 2015).

The dynamic capabilities approach provides a coherent framework for how MNEs develop and maintain competitive advantages over time (Augier & Teece, 2007). MNEs must continuously upgrade their resource base in response to changing business environments. Such upgrading requires dynamic capabilities that are highly tacit, hard-to-imitate, and path-dependent since they are embedded in a unique set of relationships and histories of the firm (Eisenhardt & Martin, 2000; Winter, 2003). The dynamic capability perspective argues that asset orchestration accompanied with entrepreneurial management enables MNEs to identify (sense) and capture (seize) opportunities in

fast-moving global environments by continuously combining and reconfiguring (transforming) both tangible and intangible assets inside and outside of the firm (Helfat et al., 2007; Pitelis & Teece, 2018; Teece, 2016). In particular, asset orchestration highlights the harmonious transition of old and new assets, and the combination of selected technologies, individuals, and other complementary assets in new products and processes regardless of location and across organizational boundaries (Helfat et al., 2007; Lessard, Teece, & Leih, 2016; Pitelis & Teece, 2018).

However, there is no clarity as yet on how asset orchestration actually happens in the MNE context. The dynamic capabilities thinking (as well as its intellectually-oriented cousin, the resource-based view) has mainly focused on the firm dimension but it has not explicitly incorporated multinational and/or cross-border aspects which are essential for the value creation and competence upgrade of MNEs (Matysiak et al., 2018). We argue that the ongoing (but nascent) IB discussion on the nature of firm-specific advantages (FSAs) and asset recombination helps to shed light on asset orchestration in MNEs. This paper seeks to make explicit the connection between FSAs and dynamic capabilities by elaborating on asset recombination. IB literature has stressed that the competences of MNEs are increasingly developed across many locations via subsidiaries and/or through collaborations with external partners. The firm's ability to create new value by recombining multiple sets of assets dispersed across intra- and inter-organizational boundaries has become important in the MNE context (Meyer, Mudambi, & Narula, 2011; Schotter et al., 2017). Despite the intellectual connection and complementarities between the dynamic capabilities thinking and asset orchestration (Teece, 2014), asset recombination has hitherto been typically used as a black box.

This study attempts to open up this black box. We decompose asset recombination into three different types, namely, intra-firm recombination, extra-firm recombination, and network recombination, depending on the source of complementary assets and organizational knowledge boundaries involved during the recombination process. We argue that (successful) asset recombination requires a certain set of firm-level capabilities, which we call 'recombinant firm-specific advantage' (FSA_R), to create new value by recombining complementary assets available from both inside and outside the firm. Although the concept of FSA_R is not new (Collinson & Narula, 2014; Narula, 2014; Verbeke, 2009), we intend to flesh out the concept drawing from recent IB insights into FSAs

(Buckley, 2009; Casson, 2005; Narula & Verbeke, 2015) and boundary spanning capabilities (Schotter et al., 2017). Specifically, we discuss FSA_R based on sensing, seizing, and transforming activities across intra- and inter-organizational boundaries. By doing so, we introduce FSA_R as a crucial subset of dynamic capabilities. That is, while dynamic capabilities highlight the continuous asset augmentation for sustainable competitive advantages, we contend that FSA_R allows MNEs to implement asset recombination that leads to asset augmentation. Our taxonomy and discussion contribute to a more nuanced understanding of asset recombination as the driver of sustainable competitive advantages and provide a deeper insight into the underlying mechanisms that MNEs can utilize to effectively recombine their assets and thus create and capture value over time in cross-border settings.

2. Asset portfolio of the firm and the different classes of FSAs

It has long been recognized that there is considerable variation in the kinds of assets a firm must possess to achieve a competitive advantage. The dynamic capabilities perspective divides firm capabilities into two broad categories. First, ordinary (or operational) capabilities are directed toward maintaining the status quo (i.e., making a living in the present). They enable firms to produce and sell a defined set of products and services using more or less the same techniques on the same scale for the same customer population. Second, dynamic capabilities are directed toward strategic change (i.e., altering how a firm currently makes its living). They enable firms to make changes in their resource base, ecosystem, and external environment, typically through the three procedural activities of sensing, seizing, and transforming. Dynamic capabilities are therefore distinguished from ordinary capabilities and considered as a higher-order competence that allows firms to purposefully create, modify, extend, or upgrade their (ordinary) resource bases to address (and possibly shape) changing environments (Helfat et al., 2007; Helfat & Winter, 2011; Teece, 2014; Winter, 2003; Zahra et al., 2006).

In contrast, IB literature has emphasized a two-way classification of FSAs (Cantwell & Narula, 2001; Dunning, 1988). The first class is asset-type FSAs (FSA_A). These are commonly associated with all sorts of functional resources and capabilities such as physical assets, technologies, intellectual

property, skills, and know-how. These may be embedded in the physical equipment of the firm through the ownership of property rights or in organizational processes and routines. The second class is transaction-type FSAs (FSA_T) that have to do with organizational capabilities to efficiently control and organize firm activities to generate economic rents from FSA_A. An important sub-class of FSA_T is referred to as the 'advantages of common governance' that mirror the capacity of MNE hierarchies vis-à-vis external markets to capture the transactional benefits (or lessen the transaction costs) arising from the common governance of FSA_A located in different countries (Dunning, 1988). FSA_T is mostly concerned with the managerial expertise of efficiently running a complex multi-locational organization (Dunning & Lundan, 2008). The knowledge-based view argues that the MNE's capability to transfer and exploit FSA_A across geographically dispersed locations constitutes a substantial part of FSA_T (Kogut & Zander, 1992). Both FSA_A and FSA_T are complementary and crucial for rent generation.

When FSAs are developed in a given location (for example, in the home country of the firm), they can be either location-bound or non-location-bound (Rugman & Verbeke, 2001). Conventionally, the possession of non-location-bound FSAs is considered essential for the internationalization of the firm (Verbeke, 2009). FSA_A have often been regarded as less location-specific, because (relatively speaking) they are easier to transfer as certain aspects of FSA_A are more tangible and codifiable (e.g., patents, brands). FSA_T can also be non-location-bound, but they are often regarded as being much more context-specific, and more difficult to codify. FSA_T are more location-specific because their development is dependent on relationships with local actors and institutions (Narula, 2002) and the embedded routines often exhibit a high degree of inertia when coping with different contexts (Collinson & Rugman, 2008; Collinson & Wilson, 2006).

Every firm has an asset portfolio that is comprised of different portions of location-bound and non-location-bound FSA_A and location-bound and non-location-bound FSA_T at a given point in time (Figure 1). Essentially, firms require a certain threshold of assets to successfully compete in any given milieu, and this threshold of FSAs consists of different classes of complementary assets that must be bundled together (Collinson & Narula, 2014). Thus, an excessive imbalance of the FSA portfolio may impede the competitiveness and growth of firms. Moreover, it is the general nature of FSAs that their

value as a rent-generating mechanism diminishes over time, possibly faster in the rapidly changing environments (Grant, 1991). Therefore, firms are motivated to continually balance and upgrade their asset portfolio.

[Insert Figure 1 about here]

3. Asset recombination and recombinant FSAs

Successfully augmenting an asset portfolio is often the result of effective bundling or recombination of complementary assets with existing FSAs (Galunic & Rodan, 1998; Kogut & Zander, 1992; Sirmon, Hitt, & Ireland, 2007). Asset recombination may occur through either the synthesis of existing FSAs with complementary assets (Hargadon & Sutton, 1997; Helfat, 1997) or the reconfiguration of the ways in which existing assets are linked to achieve broader or novel objectives (Henderson & Cockburn, 1994; Henderson & Clark, 1990). Either way, new competencies cannot be characterized as independent of the current FSAs (Kogut & Zander, 1992) while the nature of knowledge (e.g., context specificity, transferability) and how the recombination process is organized within the firm (e.g., entrepreneurial management) influence the consequences of asset recombination (Galunic & Rodan, 1998).

A few studies have discussed the firm's ability to create value through asset recombination. Kogut and Zander (1992) argued that new learning or innovations are the product of a firm's *combinative capability* to generate new applications from existing knowledge. Verbeke (2009) proposed that the MNE's *recombination capability* leads to processes and products that embody integrated bundles of knowledge, meaning melded bundles of old and newly accessed knowledge. The firm's ability to create new value by recombining or reconfiguring its existing assets is developed inside the firm through learning and experience. Thus, such capability is by nature, firm-specific, highly tacit, and path-dependent. It still remains an open question whether recombinant capabilities can be categorized by the classic two-way FSA classification (Narula & Lee, 2020). Some scholars have argued that recombinant FSAs cannot comfortably be classified as either FSA_A or FSA_T, but are best positioned as a higher-order FSA which straddles the two classic categories (Narula, 2014; Verbeke & Yuan, 2010).

The importance of extending the conventional FSA classification reflects a growing acknowledgment of the importance of asset-exploration investment by MNEs (Cuervo-Cazzura & Narula, 2015; Dunning & Lundan, 2008). New knowledge is increasingly developed in host locations, and this is strongly associated with the recombination of knowledge originating from multiple local contexts (Doz, Santos, & Williamson, 2001; Meyer et al., 2011; Mudambi, 2008). The conventional two-way classification of FSAs, therefore, does not clearly reflect the critical dimension of geographic sourcing of complementary assets, leveraging of subsidiary-specific advantages (Rugman & Verbeke, 2001), and strategic asset recombination processes inside the MNE (Verbeke & Yuan, 2010).

Based on the above discussion, we define recombinant FSAs (FSA_R) as a set of firm-level capabilities to create new value by recombining or reconfiguring complementary assets available from inside and outside the firm, which is positioned as a higher-order FSA. Although the boundaries of FSA_A are relatively clear, there is a degree of fuzziness between FSA_T and FSA_R. We argue that this is an extension of an 'unavoidably blurry' line between ordinary and dynamic capabilities (Helfat & Winter, 2011). Our conceptualization of FSA_R as a higher-order FSA is similar to how dynamic capabilities are distinguished from ordinary capabilities (Helfat & Winter, 2011; Winter, 2003). For example, FSA_T that are needed to capture the transactional benefits from common governance (Dunning, 1988) and/or the diffusion of knowledge across locations (Kogut & Zander, 1992) are akin to ordinary capabilities that permit a firm to generate rents in the present. Hence, they are one step short of FSA_R or dynamic capabilities (Teece, 2014; Winter, 2003). Moreover, such FSA_T often exhibit commonalities across firms (i.e., best practices), so they are not themselves likely to be the source of sustainable competitive advantages. On the contrary, in most cases, FSA_R are not common across firms but unique to individual firms because they cannot be bought but must be built inside the firm. In particular, the development and use of FSA_R require linking available or accessible resources with productive opportunities (Verbeke & Yuan, 2010). Asset recombination is improvisational depending on the management's understanding of and responses to environmental circumstances. The distinctiveness of FSA_R comes in the specific ways in which firms develop and utilize their assets. This variability provides firms with a foundation to pursue different types of competitive advantages.

Global automotive firms illustrate this well. Organizing efficient global operations (i.e., procurement, manufacturing, or wholesale) is an important FSA_T for firms, and without such capabilities, it is hard to compete successfully in the automotive business. However, the manufacturing portion of the automobile business has been thoroughly optimized over the decades, and hence, it does not vary much among firms and can be managed with a focus on repetitive processes. Almost all car manufacturers have such FSA_T, and thus, there are few competitive advantages to be gained by greater investment in procurement, manufacturing, or distribution (Lutz, 2011). This indicates that FSA_T, even at the global level, can be at most an extension of ordinary capabilities (Teece, 2014). Tesla, an American electric car manufacturer established in 2003, seemed to successfully enter the market based on its FSA_A including new technologies, and different marketing, production, and sales strategies from conventional manufacturers. However, while Tesla does not have any demand problems, it suffered from various production issues including repeated recalls, delays, and delivery problems due to their lack of FSA_T associated with organizing efficient operations (Holley, 2017). Tesla, however, does not plan to solve the problem by developing conventional FSA_T prevalent in the industry. Instead, they aim to make up for their weak FSA_T by embracing full automation and artificial intelligence (Wilson & Daugherty, 2018). We believe this is an application of Tesla's FSA_R by complementing and substituting more FSA_A for absent/weak FSA_T.

4. Complementary assets available to MNEs

Successful MNEs are assumed to be able to systematically engage in asset recombination with each international expansion move, dealing with various levels of complexity in different markets (Grøgaard, Verbeke, & Zargarzadeh, 2011). The global leveraging of subsidiary-specific advantages (Rugman & Verbeke, 2001) and the integration of knowledge originating from multiple local contexts are considered a prime source of MNE innovation and competitive advantages (Meyer et al., 2011; Narula, 2014). Recent literature also highlights that, as MNEs become increasingly complex with a plethora of geographical and organizational boundaries (Verbeke, Li, & Goerzen, 2009), asset recombination has much to do with navigating, spanning, and coordinating across different intra- and inter-organizational boundaries (Narula, Asmussen, Chi, & Kundu, 2019; Schotter et al., 2017).

However, we still do not know much about how MNEs implement asset recombination in different circumstances. We offer a better explanation of asset recombination by decomposing three different types of asset recombination that MNEs can use depending on the source of complementary assets and organizational boundaries involved in the recombination process. Figure 2 illustrates the complementary assets that MNEs can utilize for asset recombination. The figure depicts geographic and organizational boundaries that the MNE always must deal with. Cell A is a baseline that represents the asset portfolio of the focal MNE located in the home country. Although MNEs may have subsidiaries at home and headquarters in the host country (Nell, Kappen, & Laamanen, 2017), we assume that, in most cases, Cell A refers to the asset portfolio of MNE headquarters that, as illustrated in figure 1, includes different types of FSAs developed in the home country. The development of Cell A is largely influenced by home country endowments or home country-specific advantages (Dunning, 1980). Cell B shows the FSAs possessed by the subsidiary located in the host country. These FSAs include the assets transferred from headquarters and those adapted in the local context as well as those developed by subsidiaries either autonomously or by the mandates (Birkinshaw, 1997; Rugman & Verbeke, 2001). Cell B can also represent international joint ventures or partnerships established in the host country (Collinson & Narula, 2014). Both subsidiaries and joint ventures can create new complementary assets by bundling the asset of MNEs with local assets (Dunning, 1998; Hennart, 2009). The development of Cell B is also affected by the host country milieu. Some location-bound assets that are transformed into non-location-bound assets by the subsidiary can be shared across geographic boundaries (Rugman & Verbeke, 2001). Cell C presents assets possessed by external actors (e.g., suppliers, customers, competitors, governments) in the home country, whereas Cell D refers to those in the host country. These external assets are not automatically available to the focal firm, but MNEs can obtain these assets through a range of mechanisms from market to hierarchy such as contracts, alliances, joint ventures, and acquisitions (Hennart, 2009). MNE headquarters can manage sourcing external assets in the home country by themselves (sometimes also through subsidiaries and joint ventures at home). In general, external assets in the host country can be sourced through their subsidiaries (Cell B) but sometimes headquarters can directly source external assets located in the host country (Nell, Ambos, & Schlegelmilch, 2011). In principle, external assets from

both home and abroad are 'potentially' available to MNEs for asset recombination, although they are not free, and there is no guarantee for their availability. This suggests that there can be some external assets 'currently' available to the focal MNE by contract, partnership, or other means. These assets are referred to as 'quasi-internal' assets to MNEs reside on the boundary between internal and external assets (Narula et al., 2019).

[Insert Figure 2 about here]

5. The three types of asset recombination

In this paper, we propose three different models of asset recombination, namely, *intra-firm recombination*, *extra-firm recombination*, and *network recombination* that are distinguished by the source of complementary assets required for creating new value through recombination. This distinction is relevant and important because, as we detail below, different types of asset recombination involve different attributes, activities, and processes, and hence, require considerably different sets of firm capabilities (FSA_R).

5.1. Intra-firm recombination

Intra-firm recombination is about leveraging and upgrading the MNE's asset portfolio by reconfiguring FSAs that are already available within the firm boundary. This mainly refers to asset recombination taken place between and within Cell A and B. It is noteworthy that for intra-firm recombination, complementary assets are not necessarily external, but they are internal. There are two different types of intra-firm recombination, one is FSA substitution, and the other is reverse knowledge integration.

FSA substitution concerns leveraging stronger FSAs to compensate for weaker FSAs in the existing asset portfolio. Collinson and Narula (2014) highlighted that asset substitution enables firms to overcome the imbalance in their asset portfolio at least temporarily. For example, a firm with superior technology (i.e., strong FSA_A) can substitute its weak managerial knowledge (FSA_T) if superior technology provides a cost advantage outweighing high intra-firm transaction costs

originating from weak managerial knowledge. Such substitution may allow the firm to generate rents, at least temporarily. Likewise, if a firm has the capability to organize intra-firm activities efficiently (and thereby, reducing costs), it may compensate for weaknesses in its FSA_A, such as laggard technology or weak brand assets. By doing so, it is overcoming its weaknesses in FSA_A with stronger FSA_T. Substitution is not necessarily limited to different categories of a firm's FSA portfolio (i.e., $FSA_A \leftrightarrow FSA_T$) but also applicable to the same category (i.e., $FSA_A \leftrightarrow FSA_A$, $FSA_T \leftrightarrow FSA_T$). A cost advantage originated from superior technology may compensate for the disadvantage of having poor brand recognition ($FSA_A \leftrightarrow FSA_A$). A capability to acquire valuable resources from external markets at lower prices or fewer risks than competitors (i.e., relational assets providing privileged access to location-specific assets) may offset some disadvantages of having inadequate managerial knowledge ($FSA_T \leftrightarrow FSA_T$). Asset substitution can take place within the home country or across borders, but they require different capabilities to do so, in other words, FSA_T to manage cross-border activities.

Reverse knowledge integration forms another type of intra-firm recombination, which relates to leveraging FSAs from the MNE's established foreign subsidiaries. Apart from the traditional, home-centric view of the MNE that considers the parent firm as the only knowledge-creating entity (Stopford & Wells, 1972), it is now well established that subsidiaries also create new knowledge that is not available to parent firms and that is potentially valuable for the whole MNE beyond the inventing subsidiary (Ambos, Ambos, & Schlegelmilch, 2006; Birkinshaw & Hood, 1998; Gupta & Govindarajan, 2000). MNEs can utilize such knowledge across different locations with minimal modifications and also create new or improved FSAs by recombining them with their own assets (Meyer et al., 2011; Verbeke, 2009).

It is well documented that Japanese automotive MNEs brought their captive component suppliers when they began to invest in the US and the UK in the late 1970s (Dunning, 1986; 1993). A critical FSA of Japanese auto manufacturers was the capability to develop a lean supplier network based on close relationships with suppliers. However, these FSAs were location-bound FSA_T, and developing completely new networks in the US and the UK would have eroded their competitiveness. Relying on their strong relationship and trust with their suppliers, Japanese automakers persuaded their suppliers to transplant themselves. Many components and parts suppliers made huge investments into the US

and the UK to supply Japanese car manufacturers. This illustrates an example of asset substitution. Japanese automakers overcame a lack of complementary assets in the host country (i.e., a lean supplier network) by substituting it with their existing superior FSA_T. By doing so, they could maintain their competitiveness in foreign locations during the early period of expansion. The examples of reverse knowledge integration are prevalent in the IB literature that discusses how subsidiaries independently develop new products and knowledge for international markets and how MNEs utilize such subsidiary initiatives (Birkinshaw, 1997; Rugman & Verbeke, 2001). A few among those are NCR's Scottish subsidiary developing the automatic teller machine (Birkinshaw & Fry, 1998) and T-Mobile's US subsidiary innovating in wireless technology (Ambos & Schlegelmilch, 2005).

5.2. Extra-firm recombination

Extra-firm recombination is about upgrading the MNE's asset portfolio or overcoming weaknesses in its asset portfolio by recombining complementary assets available from outside the firm boundary. This refers to a combination of Cell A with Cell C or D. Extra-firm recombination can be sought through a variety of mechanisms including licensing, joint venture, alliance, or acquisition. Hennart (2009) bundling model constitutes a major illustration of extra-firm recombination, which explains how an MNE with superior intangible assets and a local firm with complementary local assets seek to combine their assets to create new value. Hennart's model discusses bundling activities taken place in host countries, mainly focusing on rent generation. In this paper, we aim to focus on FSA recombination taken place at MNE headquarters in the home country.

We argue that location matters in extra-firm recombination because sourcing complementary assets from external actors at home (Cell C) and abroad (Cell D) involves different processes and capabilities. Sourcing complementary assets from external actors requires information and knowledge not only about the focal assets possessed by external sources, but also about contextual factors linked with these assets such as human resources, institutions, and supplier networks that potentially affect the location-boundedness and separability of the assets (Monteiro & Birkinshaw, 2017). Therefore, extra-firm recombination using complementary assets located in the home country is generally less complicated because the focal firm tends to have a better understanding of interdependencies between

complementary assets and contextual factors. On the contrary, extra-firm recombination using complementary assets located in foreign countries can be much more complicated as the focal firm is likely to have less information about the contextual factors associated with necessary complementary assets. This is also relevant for the threshold level of FSA_T required to manage their activities with external actors. Extra-firm recombination abroad involves cross-border activities and hence requires a more sophisticated set of FSA_T compared to extra-firm recombination at home. When sourcing complementary assets from external actors at home, headquarters tend to manage the process directly by itself, although sometimes it may involve domestic subsidiaries or joint ventures. When it comes to sourcing external assets from foreign locations, MNE headquarters typically maintain their relations with external actors in foreign countries through their local subsidiaries. However, MNEs may also directly develop and maintain relationships with specific local actors when necessary (Nell et al., 2011).

The recently observed shift in the life sciences and pharmaceutical industry is a good example of extra-firm recombination. In the past, this industry has been reluctant to allocate research and development (R&D) activities outside firm boundaries. However, drugmakers have increasingly moved selected R&D activities outside the firm, often to emerging markets. Both push and pull factors such as pricing pressures, higher competition from smaller players, and increased innovation and promising talent in emerging markets have triggered this shift in both locations from developed to emerging markets and from a reliance on in-house activities to outsourcing (Jha, Dhanaraj, & Krishnan, 2018). Novartis, for example, has entered various external collaboration agreements with contract research organizations such as Syngene, the largest contract research and manufacturing firm in Asia, to stimulate new drug discovery and development, and Jubilant Biosys from India to benefit from its bioinformatics services (Fraser & Pontille, 2006).

5.3. Network recombination

Network recombination refers to leveraging and upgrading the MNE's asset portfolio by recombining complementary assets from both inside and outside the firm boundaries. However, this is not a simple amalgamation of intra-firm and extra-firm recombination that we discussed above. Instead, we argue

that network recombination is a more comprehensive, ecosystem-oriented recombination that has much to do with 'orchestration' of multiple assets from inside and outside the firm, home and abroad, and across different business and technological domains (Pitelis & Teece, 2009; 2018; Sirmon, Hitt, Ireland, & Gilbert, 2011). Asset orchestration highlights the firm's ability to search, select, align, configure, and deploy various assets in a way to create competitive advantages and fit dynamic environments (Helfat et al., 2007; Sirmon et al., 2011). During the process of asset orchestration, new assets enter at some point while old ones drop out, as with musical instruments in an orchestral score (Teece, 2007). Network recombination is about the value-enhancing orchestration of assets inside, between, amongst firms and other institutions within the business ecosystem. Therefore, network recombination simultaneously deals with all cells in Figure 2. Network recombination typically takes place at MNE headquarters (Cell A) that search and collect complementary assets from Cell B, C, and D and recombine them to upgrade the asset portfolio of the MNE. As we explained above, sourcing complementary assets from Cell B, C, and D requires different processes and capabilities (i.e., FSA_T). Furthermore, network recombination commands firm capabilities to effectively coordinate the multiplicity of local contexts (i.e., the variety of Cell B, C, and D) (Meyer et al., 2011) and to shape and deliberately design intra-firm and inter-firm networks (Lorenzoni & Lipparini, 1999).

Network recombination concerns two important issues. First, MNEs have increasingly fuzzy boundaries among firms and nations (Cantwell & Narula, 2001). Firms today are typically embedded in networks of various economic actors (e.g., strategic alliances and platform partnerships), making a constellation of firms the locus of advantages rather than any individual firm (Lessard et al., 2016). In such networks, legal ownership does not always imply control or vice versa. Therefore, the global asset portfolio of the MNE often involves assets beyond its legal boundaries. Even though these assets are formally external, MNEs must actively control these assets (Mudambi & Puck, 2016). Modern MNEs have also become less hierarchical. Subsidiaries, especially competence-creating ones, now have considerable autonomy and power, and the ownership does not always serve as the ultimate control mechanism, nor give parent firms full access to the assets possessed by subsidiaries (Andersson, Forsgren, & Holm, 2007; Schotter & Beamish, 2011). In other words, there are 'quasi-internal' areas even within the MNE (i.e., between headquarters and subsidiaries) where full

ownership does not extend all the way to the *de facto* boundary of the firm (Narula et al., 2019). In this sense, network recombination has much to do with managing and coordinating across different and dynamic inter- and intra-organizational boundaries (Schotter et al., 2017).

Second, firms rely on institutionalized routines and standardized processes to maintain reliability and accountability. While they are essential for organizational survival and stability, they also result in path dependency and organizational inertia that make it difficult to reorganize and break away from existing routines (Hannan & Freeman, 1984; Teece, 2007). Most established (and successful) MNEs are path dependent. They have strong routines that constitute a critical part of competences in their existing FSA portfolio. However, this may be detrimental to asset recombination because departure from routines usually provokes a certain level of resistance and heightened anxiety within the organization (Teece, 2007). Specifically, this concerns architectural inertia that involves some sort of built-in resistance to changing architectures (Hannan, Laszlo, & Carroll, 2002). Architectural inertia is stronger in a complex organizational setting, like network recombination, where there are a high number of complementary assets to be considered, exceeding the managerial capacity to simultaneously assess the possible impact of changes (Hannan & Freeman, 1984; Hannan et al., 2002).

In sum, network recombination is to orchestrate the global portfolio of FSAs spanning across fuzzy organizational boundaries to maintain competitiveness and evolutionary fitness while escaping from unfavorable path dependencies. Panasonic, one of the world's largest electronics producers from Japan, has been implementing business transformation with what they view as a major paradigm shift to a 'smart society'. Over the last decade, the company has made a huge strategic investment in eco-solutions and automotive-related businesses. Panasonic now has more than half of sales and profits from these new businesses rather than from its traditional consumer electronics business. Panasonic strongly believes that its sustainable growth requires innovation and speedy commercialization, and that innovation comes from "bundling, combining, or bringing about the evolution of a wide variety of core technologies, and amalgamating them with newly developed technologies and external technologies" (Panasonic, 2018: 22). Panasonic has set up an effective international network of R&D organizations that spans across its four business divisions. This structure allows Panasonic's R&D units to engage, both formally and informally, in direct communication with each other thus making a

central R&D lab as an intermediary redundant (Verbeke, 2009). Panasonic also stresses the 'cross-value innovation' where the company aims to draw on the specialized technologies and the manufacturing capabilities of its business divisions in combination with the strengths of external business partners to create new value. For instance, based on its competitiveness in the storage battery business, Panasonic aims to achieve mutual development through strong partnerships with Tesla and Toyota. Panasonic is keen to take up the challenges of exploring a new mobility business and creating contributions together with its partner companies (Panasonic, 2018).

6. Recombinant FSAs as dynamic capabilities

The dynamic capabilities framework highlights three procedural activities. Firstly, firms need to identify and assess the opportunities at home and abroad (sensing); and then mobilize resources globally to address the opportunities and to capture value from doing so (seizing); and finally, align and realign specific tangible and intangible assets to maintain evolutional fitness and sustain profitable growth (transforming) (Teece, 2007; 2014). We argue that these procedural activities can usefully be applied to the process of asset recombination which augments the asset portfolio of the firm (Figure 3). Firstly, firms need to identify and select the necessary complementary assets inside and outside the firm (sensing); and then mobilize and obtain necessary complementary assets across the firm and national boundaries (seizing); and finally, recombining complementary assets into the firm's asset portfolio (transforming). There can be tensions between and amongst these processes because the firm capabilities needed for each process are considerably different from other processes. However, successful firms must build and simultaneously employ a set of capabilities required for all three processes to achieve asset recombination (Teece, 2007; 2009).

[insert Figure 3 about here]

6.1. Sensing: Identifying necessary complementary assets

Sensing refers to the identification, (co)development, assessment of business and technological opportunities (and threats) at home and abroad. Dynamic capabilities literature stresses that sensing

activities are about scanning, searching, and exploring changes and possibilities across technologies and markets, both local and distant, including those in suppliers, customers, and competitors (Nelson & Winter, 1982; Teece, 2007). We argue that, for the asset recombination, sensing concerns not only discerning changes in the business ecosystem but also comprehending the 'relative' value of the firm's current FSAs in the business ecosystem. The potential for deriving a competitive advantage lies in an objective understanding of the strength and weakness of the firm's assets vis-à-vis its competitors in a certain context. Here, distinguishing between firm-specific 'assets' and firm-specific 'advantages' is important (Narula, 2012). Sometimes, the mere possession of an asset can be an advantage, for instance, when the asset provides a monopoly as with a patent, a trademark, or other property rights. However, in most cases, simply owning an asset does not generate an income stream and create advantages without a certain level of complementary assets to extract its value. Complementary assets required to create value from an asset in question can be diverse, ranging from generic to specialized assets or capabilities. Complementary assets are often possessed by external actors but they are not necessarily external. In many cases, firms may need to develop and/or identify complementary assets internally (e.g., co-specialized complementary assets) (Teece, 1986; 2006).

Therefore, being able to objectively understand the constitution of the MNE's asset portfolio constitutes an essential part of FSA_R related to sensing. Firms capable of assessing the relative value of their assets, particularly concerning the extent to which their assets create 'advantages' and how sustainable these advantages are, can also recognize the limitation of their assets. This permits firms to identify complementary assets needed to upgrade their asset portfolio. Once a firm recognizes what complementary assets are needed, it can then search for these assets inside and outside the firm, and determine what types of asset recombination it will do. This process can be depicted as a problemistic search that is steered by past experience in the firm's own (or related) industries or technologies. It is also driven by the perception and goals of the management (Cyert & March, 1963). While it is difficult and costly to overcome a narrow search horizon for the firm management tied to established problem-solving routines, the degree to which it can escape from such path dependency and bounded rationality will lead to different results of search activities. This process, therefore, concerns

entrepreneurial management which has been stressed as a core element of the dynamic capabilities thinking (Teece, 2016).

Firms without sufficient FSA_R to assess the relative value and limitation of their current FSAs may face difficulties to identify the 'right' complementary assets and potentially suffer from unproductive investments and high opportunity costs. For intra-firm recombination, for example, an underestimation of the value of its assets in its current asset portfolio, either at home or abroad (i.e., assets in subsidiaries), may preclude the firm benefiting from asset substitution or reverse knowledge integration, whereas an overestimation may result in a waste of resources and time. For extra-firm recombination, lack of such FSA_R will lead to selecting inappropriate partners or acquisition targets that are believed to possess complementary assets in need but do not. Assessing the value and limitation of its assets will become much more complex and challenging in the network recombination not only due to increased multiplicity of organizational and environmental contexts (Verbeke et al., 2009) but also due to increased fuzziness in the boundaries of the MNE for ownership and control (Narula et al., 2019). Given the limited managerial resources, it is particularly important for network recombination to allocate the appropriate levels of headquarters attention across the portfolio of subsidiaries and countries (Bouquet & Birkinshaw, 2008).

6.2. Seizing: Mobilizing and obtaining necessary complementary assets

Seizing refers to the mobilization of resources to address the (sensed) opportunities in the dynamic capabilities framework. This involves making the appropriate investments in the right technologies or markets and selecting the right business models and firm boundaries (Teece, 2007). Once an opportunity is sensed, a firm needs to invest in obtaining complementary assets while maintaining its current competences, and then, when the firm perceives that the opportunity is ripe, it should invest in the particular assets or markets most likely to realize the opportunity (Augier & Teece, 2009).

In the context of asset recombination, if sensing is about the search for what complementary assets a firm needs to upgrade its asset portfolio, seizing is then about the search for where to find the necessary complementary assets and how to obtain them. Therefore, we argue that determining the

right mode of obtaining and mobilizing the complementary assets constitutes an essential part of FSA_R for seizing.

Determining the right mode of seizing concerns two important factors. First, firms must understand and consider the nature of complementary assets that they want to seize, such as transferability and replicability. Especially in the case of knowledge assets, codifiability and complexity play an important role (Kogut & Zander, 1992). Although MNEs are regarded as efficient mechanisms to transfer and replicate knowledge assets across borders, it does not mean they do not suffer from endemic imperfections. For intra-firm recombination, at the very least, there can be transmission losses (Mudambi, 2002). The willingness of knowledge senders and recipients also plays an important role in knowledge flows within the MNE (Mudambi, Piscitello, & Rabbiosi, 2014). In the case of extra-firm recombination, modularity and divisibility of complementary assets matter to the decision for the mode of obtaining assets from external actors (Hennart, 2009). Managing and implementing intra- and inter-organizational knowledge flows across locations are crucial FSA_T, but here we claim that making decisions among different modes of managing such knowledge flows is relevant with FSA_R to appreciate the level of their FSA_T and the contingencies associated with the nature of complementary assets.

Second, absorptive capacity is an important element of FSA_R especially for seizing. Absorptive capacity is generally referred to as the firm capability to recognize the value of new external information and to apply it to commercial ends (Cohen & Levinthal, 1990). Many studies have reconceptualized absorptive capacity as a broad set of skills needed to deal with and modify the tacit component of transferred knowledge (Mowery & Oxley, 1995) or as the capacity to learn and solve the problems (Kim, 1997). Building on the dynamic capability framework, absorptive capacity can be divided into 'potential capacity' that enables firms to acquire and assimilate new complementary assets and 'realized capacity' that refers to the ability to exploit the complementary assets for creating value and profit by applying it to commercial ends (Zahra & George, 2002). The distinction between potential and realized absorptive capacity is sensible because firms can acquire and assimilate complementary assets, but they might not be able to exploit them to create value. In the context of asset recombination, potential absorptive capacity that captures the firm's ability to assimilate

complementary assets is particularly relevant with the firm's FSA_R for seizing (Lane & Lubatkin, 1998), while realized absorptive capacity to exploit the absorbed complementary assets and create value concerns the firm's FSA_R for transforming that we will discuss in the next section.

In the context of network recombination, the decision for the optimal seizing mode is much more complex. Network recombination often requires multiple actors with different modalities to jointly contribute to a collective outcome. Headquarters needs to consider the multiplicity of various subsidiaries and external partners at home and abroad that control part of the MNE's overall asset portfolio, simultaneously employing multiple seizing modes contingent on different contributions made by each actor (Rugman, Verbeke, & Yuan, 2011).

6.3. Transforming: Recombining complementary assets into the firm's asset portfolio

Transforming refers to the continuous renewal of asset portfolio and organization structure as the firm grows and as markets, technologies, and environments change (Teece, 2007). In the dynamic capabilities framework, transforming concerns leveraging and exploiting complementary assets that have been seized (or absorbed) to generate profits and performance outcomes, for instance, through innovation and new product developments (Helfat et al., 2007; Zahra & George, 2002). In the context of asset recombination, we argue that transforming is about exploiting and integrating complementary assets in the firm's FSA portfolio, which completes one set of asset recombination following sensing and seizing. Therefore, transforming ultimately leads to a new, augmented FSA portfolio.

Dynamic capabilities thinking has always stressed the role of entrepreneurial management especially in the MNE context (Augier & Teece, 2007; Pitelis & Teece, 2010; Teece, 2012; 2014; Zahra et al., 2006). Although entrepreneurial management might sound paradoxical in the context of large organizations like MNEs, as we have come to associate entrepreneurship with start-up firms, Teece (2016) addressed that in the era of managerial capitalism, any activities involved with implementing new combinations of assets to satisfy customer needs are fulfilling the role of entrepreneurs even if they are from the dependent employees of a firm (i.e., managers) (Schumpeter, 1934). As a matter of course, the entrepreneurial function required in the MNE context should not be thought of as confined to new start-up firm activities (Augier & Teece, 2007).

Entrepreneurial managers play an important role in asset recombination. Although managers in the firm may have differential access to existing information relative to those in other firms (Kirzner, 1973), entrepreneurial managers may discern the possibilities of a new or improved combination based on persistently interpreting and learning across the same technologies and markets that are also available to managers in other firms (Teece, 2016). In established firms, such entrepreneurial activities can be supported by organizational routines, for instance, regular scanning for external new technologies and continuous R&D activities (Eisenhardt & Martin, 2000; Newey & Zahra, 2009). However, in many cases, entrepreneurial competence and leadership skills of the top management play a decisive role because entrepreneurial activities in a large organization are closely allied to the decision maker's information selection and processing skills, and their subjectivity of risk perceptions (Casson, 2005; Shackle, 1979).

Transforming can be achieved in many different ways. Sometimes it can be done by simply reinterpreting, modifying, and bundling complementary assets with existing FSAs in a new different manner. Sometimes it requires specific skills and capabilities to combine two incongruous sets of assets to arrive at a new schema. Zahra and George (2002) stressed that such combination of incongruous assets involves a process of 'bisociation' that distinguishes the creative act from routine skills and that integrates two self-consistent but habitually incompatible frames of reference into a unified code of greater universality (Koestler, 1964). This is a complex process that requires the entrepreneurial mindset and actions of the management (McGrath & MacMillan, 2000; Zahra & George, 2002).

Therefore, an essential part of FSA_R for transforming involves searching and determining the most promising paths of integrating complementary assets into the existing FSA portfolio to achieve asset augmentation while turning down absurd ones. Determining and pursuing the most promising way of transforming essentially requires entrepreneurial management skills because transforming processes often require approvals for non-routine activities within the MNE as well as strong volitions to replace some existing FSAs with high potential new assets (Verbeke, 2009). In the established firm, departing from strong routines that have been regarded as critical assets is challenging and may not be supported especially in a complex organizational setting, like network recombination, in which inertial pressures

become stronger (Hannan & Freeman, 1984). Furthermore, transforming should maintain evolutionary fitness. That is to say, transforming should be aligned with the long-term strategy of the firm as well as anticipated opportunities and challenges for present (and future) business models (Helfat et al., 2007; Teece, 2007). In short, the transforming process requires FSA_R to lead the firm to escape from unfavorable path dependencies while convincing the members of the organization as well as partner firms of the rightness of a new path toward asset augmentation.

7. Conclusions

This study expands and fleshes out how asset recombination happens in the MNE context. We define three different types of asset recombination, namely intra-firm, extra-firm, and network, based on the source of complementary assets and organizational boundaries. We build on the dynamic capabilities framework to disaggregate the process of asset recombination into continuous and sequential sensing, seizing, and transforming activities. We address that asset recombination requires a specific set of FSA_R to resolve specific contingencies associated with different processes as well as different types of recombination.

At the center of both the IB and dynamic capabilities literature is the pursuit by both new and established firms to continuously create and upgrade FSAs to sustain competitiveness in the complex and volatile global business environment (Grøgaard et al., 2011; Luo, 2000; Narula & Lee, 2020; Narula & Verbeke, 2015; Pitelis & Teece, 2010; Teece, 2014). Dynamic capabilities in the MNE context must be more amplified and leveraged (Teece, 2014) because MNEs can better access global inputs required for FSA augmentation based on their strong position to tap into complementary assets from multiple local contexts in a coordinated manner (Meyer et al., 2011; Teece, 2009; Verbeke, 2009). More importantly, modern MNEs seek to capture co-created value by engaging with various actors in the network including subsidiaries, customers, suppliers, partners, and regulators at home and across borders (Pitelis & Teece, 2018; Schotter et al., 2017).

The challenge of applying the dynamic capabilities thinking to the IB context has lain in explicitly incorporating multinational and/or cross-border aspects. The dynamic capabilities approach mainly focuses on the firm dimension but it has not explicitly considered the country dimension and the firm–

country interactions, which are essential for the value creation and FSA upgrade of MNEs (Matysiak et al., 2018). In particular, there has been a paucity of knowledge about how MNEs can actually upgrade their FSA portfolio by recombining complementary assets inside and outside the firm boundary at home and abroad, and what capabilities are required to do so. Although the IB literature has discussed the concepts of asset recombination and the associated recombinant capabilities, the concepts have not been adequately fleshed out, especially concerning different sources of complementary assets. This study is an attempt to fill part of this research gap and contribute to our theoretical understanding of asset recombination by distinguishing three different types of asset recombination in various MNE contexts and by fleshing out the concept of recombinant capabilities or FSA_R.

We project the dynamic capabilities framework beyond conventional approaches by bridging it with the mainstream IB thinking of FSAs. The dynamic capabilities literature argues that what keeps firms competitive over time are dynamic capabilities, which enable firms to sense and seize opportunities and threats in fast-moving environments through the continuous reconfiguration of their internal and external competences (Helfat et al., 2007; Teece, 2007; Teece et al., 1997). This paper intends to give more specificity to this idea. These days, no firms can confidently predict that they will not face dramatic changes in their external environments. The pace of globalization and technological shift often places significant pressure on firms to adapt. Major adaptations and/or transformations pose great difficulties due to the extent of change required. Thus, firms need to continuously renew themselves and upgrade their asset bases to keep pace with external environment changes (Agarwal & Helfat, 2009). We argue that it is asset recombination that enables firms to continuously reconfigure their internal and external competences and that drives firms to maintain competitiveness and sustainably grow. Firms can upgrade or better utilize their FSA portfolio through various types of recombination of complementary assets with the firm's existing FSAs. However, asset recombination does not occur in a vacuum but requires FSA_R. We advocate that FSA_R is a higher-order FSA that bolsters the firm's future competitive advantages through asset recombination, being distinguished from FSA_A and FSA_T that offer competitive advantages in the present. In a sense, FSA_A and FSA_T enable firms to do things right for the present as with ordinary capability, while FSA_R allows firms to

do the right thing for the future as such dynamic capabilities (Teece, 2014). That is, FSA_R enables firms to do the right asset recombination, whereas FSA_A and FSA_T support firms to do the asset recombination right. This study extends previous studies that discuss the concept of FSA_R by examining different sets of FSA_R associated with sensing, seizing, and transforming activities of asset recombination.

Our discussion opens up several avenues for future research. First, each of the three processes of asset recombination and the corresponding FSA_R deserve more specific attention, particularly focusing on the role of various organizational and contextual contingencies. For instance, previous studies have examined the role of social capital in the firm's sensing capabilities for new product developments (Zhang & Wu, 2013) and the role of scouting units in the firm's external knowledge sourcing (Monteiro & Birkinshaw, 2017). Boundary spanning functions at the individual level and the organizational level also play important roles in identifying and acquiring complementary assets from different sources (Schotter & Beamish, 2011; Schotter et al., 2017). Sensing and seizing capabilities can be especially important in the emerging market context as weak institutions often result in poor information exchange that hinders efficient identification and acquisition of appropriate knowledge (Tang, 2010). We believe that the roles of such organizational and contextual factors also differ across the different types of asset recombination. Future studies that examine the various contingencies and interactions of different processes and types of asset recombination will provide a deeper insight into asset recombination as the driver of sustainable competitive advantages.

Second, future research that further extends the conceptualization of FSA_R may also advance our understanding of asset recombination. The distinction between FSA_A and FSA_T has greatly advanced our understanding of how MNEs exist and govern their assets across different national markets (Dunning, 1988). However, they do not clearly explain the entrepreneurial asset recombination associated with international expansion, which is assumed to be conducted by successful MNEs (Grøgaard et al., 2011). In this study, we attempt to flesh out the concept of FSA_R by linking it with various processes and types of asset recombination. IB literature has always concerned with managing complex interdependencies, meaning bundling of the MNE's FSAs with a variety of complementary

assets from a range of markets (Narula & Verbeke, 2015). A more careful look into the properties of the FSA_R will help us better understand the continuous FSA bundling or FSA upgrading of the MNE.

Third, FSA_R is the product of the firm's past managerial decisions and experience. The development and use of FSA_R reflect organizational learning and entrepreneurial management capabilities to understand the external environment and link accessible resources to address opportunities and/or threats (Verbeke & Yuan, 2010). Future studies should delve into the development of FSA_R and examine how firms govern the learning processes in relation to asset recombination. Scholars also need to focus further on embodying entrepreneurial management, especially in large, complex organization settings such as MNEs, which organizes the recombination process and determines the most promising path of asset recombination.

Finally, successful MNEs are most likely to utilize all three types of asset recombination simultaneously. However, conducting different types of recombination may involve duplication or conflicts, particularly when they happen in different loci of the MNE. Therefore, firms need to orchestrate their activities associated with various asset recombination aimed at value creation and capture (Pitelis & Teece, 2018). Future studies need to delve into how MNEs can orchestrate or simultaneously manage these different types of recombination efficiently by minimizing duplication and conflicts within the MNE. A longitudinal case study would be useful to examine the process and relevant issues associated with such orchestration.

In sum, recognizing the intellectual proximity between the dynamic capabilities thinking and the recent IB discussion on the nature of FSAs in the MNE context, this paper contributes to a more nuanced understanding of dynamic capabilities in the MNE context and provides a clearer picture of asset recombination. We hope this paper brings us a step closer to understanding how MNEs can integrate and recombine their internal and external assets to maintain competitiveness and sustainably grow in rapidly changing business environments.

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Figure 1. Asset portfolio of the firm

	Location-bound	Non-location-bound
FSA_T	- Management of stand-alone resources linked to location advantages such as a network of retail locations leading to a dominant market share (Verbeke, 2009) - Managerial know-how of local business activities, such as knowledge of best local practices, markets, and institutions (Collinson & Narula, 2014)	- Managerial capability to control and coordinate international activities (both intra- and inter-firm transactions) (Dunning & Rugman, 1985; Rugman, 1981) - Organizational capability to transfer intra-firm knowledge across borders (Kogut & Zander, 1993) - Transforming location-bound FSAs into non-location-bound FSAs (Rugman & Verbeke, 2001)
FSA_A	The proprietary ownership of or exclusive privileged access to specific (income generating) assets that cannot be easily transferred and exploited across national borders (Rugman & Verbeke, 1992), such as: - physical assets (plant) - local brands - local distribution networks	The proprietary ownership of or exclusive privileged access to specific (income generating) assets that can be exploited globally (Dunning, 1988), such as: - technology - patents - international brands - trademarks

Figure 2. Complementary assets available to MNEs

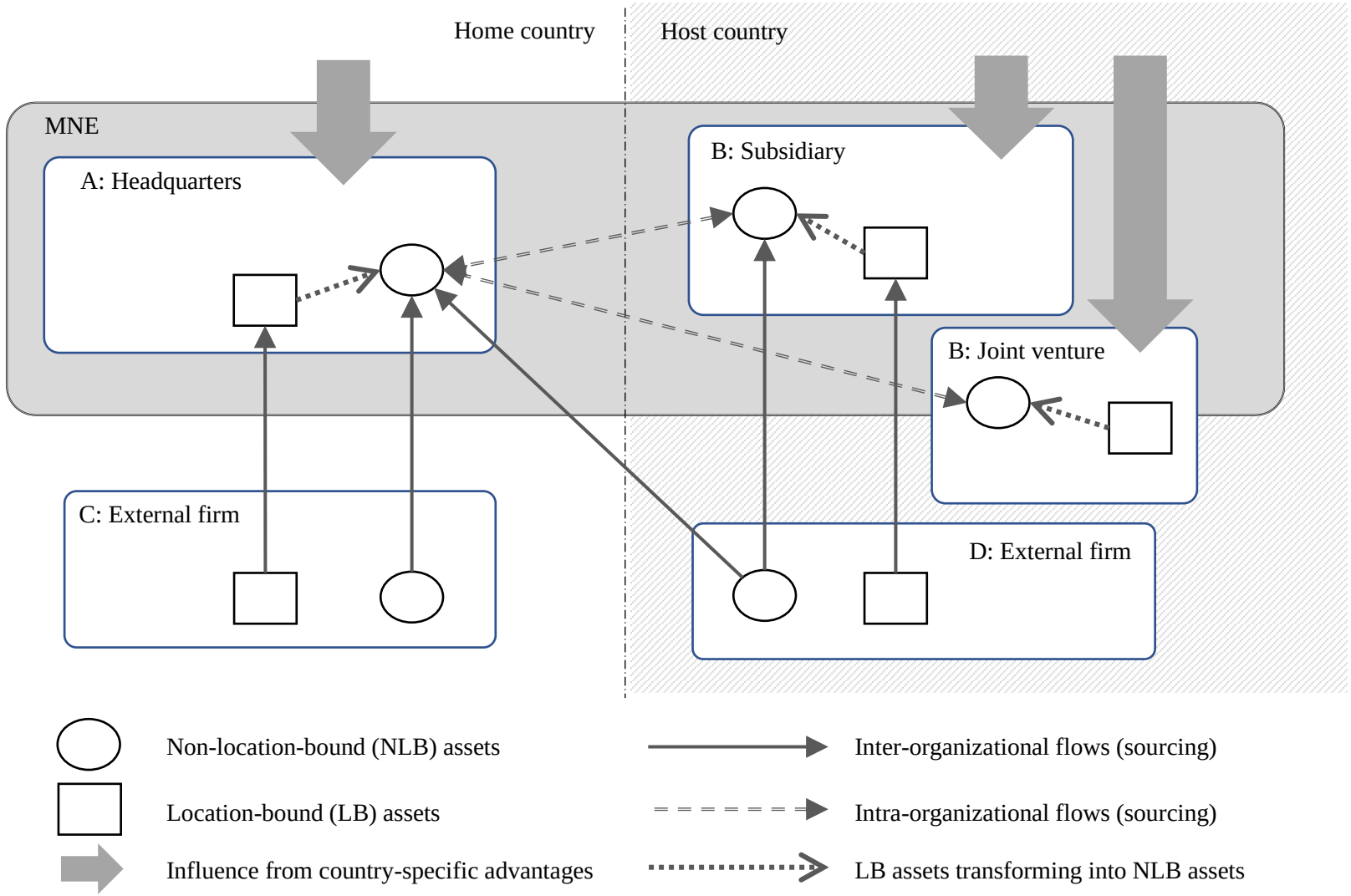

Figure 3. The process of asset recombination and the associated FSA_R