

**GOVERNANCE DECISIONS IN THE R&D PROCESS: AN
INTEGRATIVE FRAMEWORK BASED ON
TCT AND KNOWLEDGE VIEW OF THE FIRM**

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Governance Decisions in the R&D Process: An Integrative Framework Based on TCT and Knowledge View of The Firm.

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ABSTRACT

In this paper we analyze boundary decisions in the R&D value chain. To do so, we develop a theoretical framework based on TCT that maintaining the assumption of minimization of production and transaction costs integrates the contributions of other alternative paradigms. Specifically, we argue that: (i) the main drivers of outsourcing in emerging countries would be the R&D service labor intensity and the degree to which firm-specific knowledge is required to perform the service, and (ii) whereas asset specificity is not necessarily an obstacle to organize these services through alliances, firm-knowledge specificity would lead to integration of the R&D service.

Keywords: R&D offshoring; Firm boundaries; firm-specific knowledge

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Governance Decisions in the R&D Process: An Integrative Framework Based on Transaction Costs and Knowledge View of the Firm

In view of increased competitive pressures, shorter product life cycles, and the need to innovate more at lower costs firms are compelled to search for new ways to organize their value chain activities. Firms are thus continuously redefining their boundaries. Firm boundary decisions have been traditionally studied through the lens of transaction cost theory (TCT) (Masten *et al.*, 1991; Monteverde, 1995; Williamson, 1975, 1985). However, the challenging evidence associated with the worldwide diffusion of new outsourcing practices, like advanced subcontracting in the automobile industry, has driven researchers to analyze this phenomenon using alternative —although somewhat complementary— paradigms like the knowledge-based view of the firm (KBVF) (Grant, 1997; Kogut and Zander, 1993; Madhok and Tallman, 1998; Malhotra, 2003; Moran and Ghoshal, 1996) or the relational view (RV) (Dyer and Singh, 1998). Although these paradigms question some of the predictions of TCT, the underlying hypothesis of this paradigm —the minimization of production and transaction costs— remains valid (Barney and Ouchi, 1986). Like advanced subcontracting, the outsourcing phenomenon of R&D services is another example of a boundary decision that does not perfectly fit with TCT. Due to the fact that firms are both increasingly fragmenting their product development activities and outsourcing some of these stages to external specialized providers (UNCTAD, WIR 2005), we analyze the governance mode decision related to R&D services. For the purpose of this paper, we define R&D services as those related to the design and development of new or improved products and processes. Examples of this kind of services are basic research services, applied or experimental research services, software development, design and development of products or processes, prototyping, engineering, or testing. The interest in studying this phenomenon lies in the fact that

in R&D services the main attributes related to opportunistic behavior —asset specificity and transfer of tacit knowledge— are usually present. Consequently, there would be no incentives to outsource them. However, the reality is that due to the growing complexity and multidisciplinary nature of the innovation process, and thanks to IT advances that allows for the codification and modularization of knowledge, the same outsourcing phenomenon that has taken place decades ago with firms' production activities is now happening in relation to the different stages in the firms' R&D value chain (Fosfuri and Roca, 2002; Pavitt, 1999). On the other hand, we can see how multinational corporations (MNCs) are increasingly creating strategic alliances in R&D with firms in emerging countries —for instance, pharmaceutical companies that are collaborating with biotech firms in India seeking to cut the cost of bringing new products to the market. Thus, the dividing line between those R&D services that can be performed in emerging countries and those that must be located at home or in developed as opposed to developing countries, has become blurred (UNCTAD, WIR 2005). In making these governance decisions, firms often trade-off economizing on transaction costs vs. accessing external knowledge and enhanced flexibility, while many firms are partially integrated and simultaneously outsource some activities (Harrigan, 1984; Afuah, 2001). These firms seek to identify the most effective balance in both organizing alternatives to leverage their benefits and mitigate their costs (Rothaermel et al., 2006). Consequently, we argue that in order to analyze this trade-off between minimizing costs vs. accessing external knowledge and, thus, to try to explain firm R&D boundary decisions, TCT arguments are better complemented with other knowledge based paradigms such as the KBVF and the RV.

It is interesting to consider that when deciding the most efficient governance mode for a R&D service, the firm faces two distinctive but interrelated decisions: (i) the governance structure preferred for the service, and (ii) the location preferred to perform it. These two

decisions need to be jointly analyzed because when considering the optimal governance form for an activity, besides the contractual costs that arise due to the nature of the activity, the firm has to consider the hazards that are originated directly from the location of that activity within a specific political system (Kobrin, 1987; Hill, Hwang and Kim, 1990; Henisz and Williamson, 1999). Specifically, we analyze to what extent the service will be performed in-house or through some strategic alliance with another firm. We will also analyze if the service is going to be performed in an emerging country or not. To do so we will develop a theoretical framework that maintaining the assumption of production and transaction costs integrates the contributions of other alternative paradigms. We argue that the main drivers for outsourcing in emerging countries would be the labor intensity of the service and the degree to which specific knowledge from the firm is required to perform the activities. We also argue that whereas asset specificity is not necessarily an obstacle to organize these services through alliances, firm-knowledge specificity would lead to integration of the R&D service.

FIRM BOUNDARY DECISIONS IN THE R&D PROCESS

The study of the determinants of firm boundaries has always been a mainstream topic in the economic literature (Coase, 1937; Williamson, 1975; Galbraith, 1977) as this decision appears to be critical for firm performance, especially in high-technology industries (Teece, 1986, 1992; Hill and Rothaermel, 2003). There is a wide literature dealing with the determinants of boundary decisions regarding backward integration into components (Russo, 1992; Walker and Weber, 1987) or forward integration into distribution channels (John and Weitz, 1988; Majumdar and Ramaswamy, 1994). However, there is less evidence regarding firm boundaries decision related to R&D functions. Some exceptions are Arora et al. (2000), Fosfuri, (2006), Nicholls-Nixon and Woo (2003), Pisano (1990), Rothaermel *et al.* (2006) and Ulset (1996).

The recent evidence of outsourcing of R&D services and technology alliances shows the benefits that may stem from taking advantage of external knowledge and capabilities. Thus, integrating internal and external sources of technological knowledge allows firms to build a larger and broader portfolio of related products in order to gain and maintain a competitive advantage (Nicholls-Nixon and Woo, 2003). Considering that firms pursue different R&D sourcing strategies choosing among internal organization and outsourcing in each stage of the process, in this paper we undertake the vertical boundary decision in relation to the R&D stages or services in the firm innovation process. To do so, we will develop an integrative theoretical framework based on transaction cost theory (TCT) (Williamson, 1975, 1985) together with some of the insights of alternative theory perspectives that can also address this topic such as the knowledge-based view of the firm (KBVF) (Kogut and Zander, 1992, 1993) and the relational view (RV) (Dyer and Singh, 1998), as we think that the integration of these perspectives will shed more light on this phenomenon.

A Transaction Costs Perspective

From the TCT point of view, a firm's vertical boundaries are determined by production and transaction costs (Masten et al., 1991; Monteverde, 1995; Williamson, 1975). Production costs—that include the direct costs of producing and delivering a product or service, and may reflect differences in scale or production capability—are determined by labor and capital requirements (Oster, 1999). Transaction costs theorists assume that external production costs are lower than internal production costs, since an external provider enjoys economies of specialization and scale that a firm does not enjoy producing the service internally (Hill, 1990; Monteverde, 1995; Monteverde and Teece, 1982; Williamson, 1975, 1985). As a consequence, TCT argues that markets will be the most efficient governance form for any transaction unless it

can be shown that external transaction costs are high. Transaction costs are mainly determined by asset specificity, the frequency of the transaction and uncertainty (Williamson, 1985). According to Kogut (1988) and Oxley (1997) in the specific context of strategic alliances —and R&D outsourcing can be considered as one type of strategic alliance— transaction costs stem from two types of opportunistic behaviour that may arise in them: (i) hold-up hazards caused by specific investments and (ii) appropriability hazards stemming from the loss of value of the firm's intangible assets, such as reputation or brand label, or technological knowledge due to potential spillovers. Thus, in the following paragraphs we analyze separately these two types of contractual hazards.

Hold-up hazards. According to TCT, firm-specific investments create what is called hold-up hazards. As transaction-specific assets are of lesser value if dedicated to alternative uses, partners in the transaction have incentives to appropriate the rents from these specialized investments through *ex post* contractual bargaining or threats of termination (Klein et al., 1978; Masten, 1984; Monteverde and Teece, 1982; Walker and Weber, 1984; Williamson, 1985). As a result, in order to induce firms to make such specific investments, the firms often have to establish and negotiate contractual safeguards. These safeguards serve the purpose of protecting specific assets and thus reduce the risk of opportunistic behaviour of the partners. However, negotiating these safeguards is likely to be costly and the more specific the assets the higher the transaction costs the firm has to incur when externalizing this transaction (Williamson, 1985). Thus it is expected that when the service considered does require investments in transaction-specific assets the firm will have to incur high transaction costs in order to partner with a suitable provider willing to make those investments. Consequently, firm-specific assets requirements will have a negative effect over externalization.

Appropriability hazards. On the other hand, transactions that require the transference of firm-specific knowledge create what is called appropriability hazards (Pisano, 1989, 1990; Oxley, 1997; Williamson, 1991). Appropriability hazards arise when firms cannot fully protect their rights regarding the intangible assets that they brought to the alliance. When taking into consideration R&D governance and location decisions, these appropriability hazards are often related to the potential capture of firm's technological knowledge by competitors. As many studies show, potential knowledge spillovers opportunities have emerged as a critical factor in explaining R&D location decisions (Belderbos, 2003; Cassiman and Veugelers, 2002; Shaver and Flyer, 2000). Thus, it is important to consider that the significance of this risk of potential knowledge spillover will vary depending on the absorptive capacity of the third party (Cohen and Levinthal, 1990) but also on the tacit nature of the knowledge being transferred. Because tacit knowledge is difficult to articulate is then more challenging to transfer and it is best transferred through close interaction. Consequently, tacit knowledge is then more difficult to be understood by third parties and, as a result, less subject to appropriation by competitors. Thus, in this regard, the more tacit is the firm's knowledge the smaller will be the risk of technological knowledge spillover to competitors. Besides, in the case of technology alliances, appropriability hazards comprise the risk of either party to lie, conceal information, or making an inappropriate use of the knowledge transferred. As a consequence, the transfer of knowledge that is specific to the firm can lead to the risk of one of the parties acquiring the other's know-how. Thus when transferring this kind of knowledge, firms may face the hazard of losing value of some of their strategic assets due to value erosion of firms' intangible assets (Kogut, 1988). As described by Oxley (1997) "appropriability hazards arise out of the unique trading characteristics of information and the consequent failures in the market for "know-how"...". Therefore, from a TCT perspective, because firm-specific knowledge presents a high level of tacitness, property rights over this

knowledge are very difficult to specify in contracts and, consequently transactions that require the transfer of firm-specific knowledge will be internalized. However, the significance of these transaction costs will depend on the uncertainty or political risk associated with the institutional environment where the transaction takes place (Henisz, 2000).

Alternative Theoretical Perspectives

More recently this primary argument of TCT, i.e. the assumption of opportunism, has confronted some criticism from a new theoretical perspective which is usually referred to as the knowledge-based view of the firm (KBVF) (Grant, 1997; Kogut and Zander, 1993; Madhok, 1997; Malhotra, 2003; Moran and Ghoshal, 1996). This perspective, instead of considering the firm as a contractual entity, conceptualizes it as a knowledge entity. Firms define a community in which there exists a body of knowledge regarding how to cooperate and communicate, which is developed and is evolving over time (Kogut and Zander, 1993). As a result, firms differ in their capabilities to understand and apply knowledge. From this perspective, the relation between firm-knowledge specificity and firm boundary choice has little to do with the risk of opportunistic behaviour and failure of markets. Instead, increasing firm-knowledge specificity, rather than triggering market failure, enhances the efficiency with which such activities are performed within the firm compared to markets. Within firms, increased firm-knowledge specificity generates shared knowledge, language, and routines that enhance the efficiency of coordination. In summary, according to this KBVF, the boundary decision is thus based on the difficulties in transferring knowledge across firms.

Apart from TCT perspective, in relation to the role of transaction-specific investments it is also interesting to consider another theoretical perspective which is referred to as the relational view of the firm (Dyer, 1996; Dyer & Singh, 1998; Madhok & Tallman, 1998; Kim & Mahoney,

2006). From this view, interfirm co-specialization may be a source of competitive advantage. Hence, a firm's critical resources may extend beyond firm boundaries and relation-specific assets are thus considered as a potential source of inter-organizational competitive advantage. The relational view argues that mutual benefits of collaboration include not only those resulting from *ex ante* resource complementarity but also those that might be generated due to *ex post* investments in relation-specific assets by either party (Bensaou and Anderson, 1999; Dyer and Singh, 1998) and through inter-organizational learning over time, which in turn may help both firms upgrade their competence (Lee and Chen, 2000). The potential benefits from specialization, however, will be dependent on the transactors capability to develop safeguards which can control opportunism at relatively low cost such that the gains from specialization are not outweighed by the cost (Dyer, 1997). Thus, from this perspective, the establishment of a trustful relationship between transactors plays a fundamental role. On one hand, trust enhances firms to get involved in the relationship and to be willing to make relation-specific investments and, on the other hand, provides incentives for value-creation initiatives, such as sharing knowledge or combining complementary resources (Dyer, 1997). Thus, trust helps to reduce the risk of opportunistic behaviour in the relationship (Barney and Hansen, 1994).

Hence, in order to predict the firm governance mode decisions in the R&D process we consider both propositions based on TCT together with insights from the KBVF and the RV of the firm as we argue that an integrative model is more useful to address this issue, due to the fact that basing inter-organizational decisions on transaction costs alone could undermine the realization of collaborative benefits and hence the transaction value of inter-firm collaborations (Dyer, 1997; Madhok and Tallman, 1998). We believe that this consideration is even more valuable in an innovative context where the benefits from inter-organizational collaboration can

be a very important source of competitive advantage as it fosters creativeness and knowledge sharing.

THE ROLE OF LABOR COSTS IN THE CHOICE OF GOVERNANCE FORM IN THE R&D PROCESS

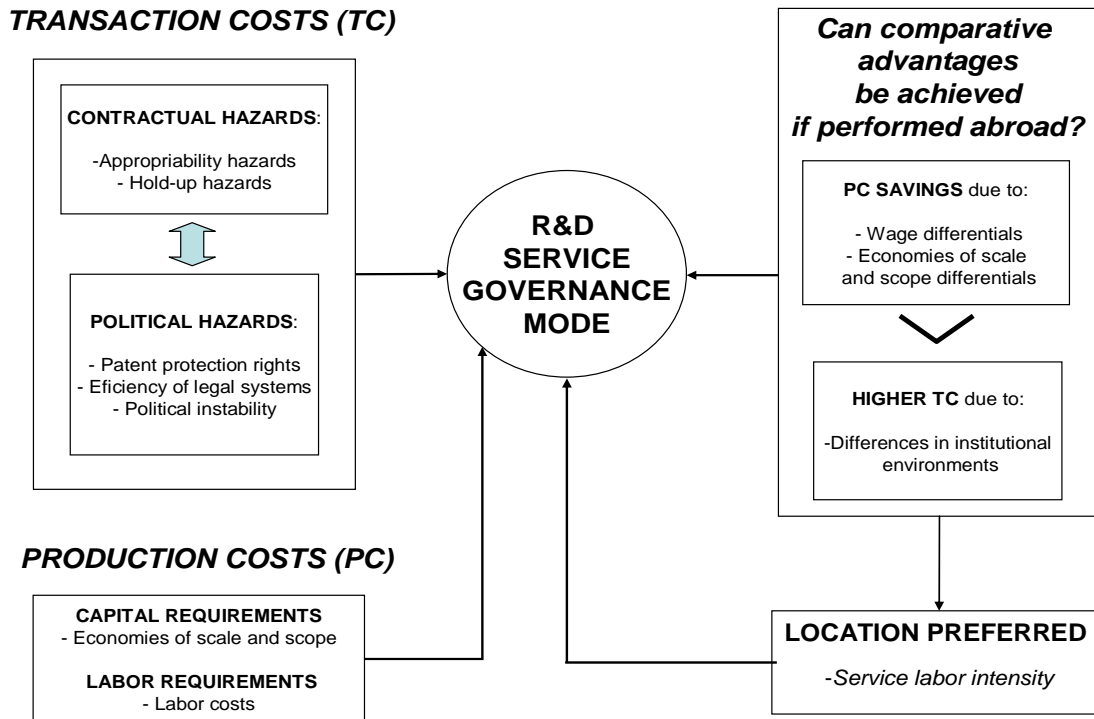
When considering the most suitable governance form for an activity, besides the contractual costs that arise because of the nature of the activity, the firm has to face hazards that originate directly from the location of that activity within a specific political system (Kobrin, 1987; Hill, Hwang and Kim, 1990; Henisz and Williamson, 1999). Researchers examining international R&D are increasingly attuned to the importance of host country institutions on MNC R&D location and investment decisions (Patel and Vega, 1999; Pearce, 1999; Taggart, 1991) and have attempted to demonstrate how such institutions may influence international business entry decisions and outcomes (Delios and Henisz, 1999; Henisz, 2000; Henisz and Williamson, 1999). As shown in previous literature (Gatignon and Anderson, 1988; Henisz, 2000; Henisz and Williamson, 1999) the contractual hazards originated from a transaction — hold-up hazard, risk of technological leakage or expropriation hazard— are not independent from the institutional environment that surrounds the transaction. The State —given its monopoly power on legal coercion and its implicit presence in every economic transaction— poses a threat to MNCs through policy shifts in taxation or regulation, through outright or de facto expropriation, or by permitting opportunistic exploitation of assets by local firms (Doh, Jones and Teegeen, n.d.). As a consequence, in order to mitigate their exposure to these political risks, and depending on the significance of these hazards in the host country, firms may alter their governance choices depending on the place where the service is performed. Thus, our starting

point is that firms make their governance choices taking into account both transaction and production costs:

- Transaction costs depend on hold-up and appropriability hazards and vary internationally depending on the institutional environment (patent protection rights, the efficiency of judicial systems and policy instability, and so on).
- Production costs depend on scale and scope considerations and vary internationally according to labor costs differences.

According to this, MNCs locate their production activities in those countries in which the activity is performed at the lowest cost possible using the governance structure that also minimizes the production costs (Buckley, 1988). The actual environment, where advances in IT have reduced transaction costs across national borders together with the emergence of a global market of qualified providers even in emerging countries, enhances MNCs to disperse their activities worldwide in order to take advantage of comparative advantages. In relation to R&D services, the recent development of specialized and qualified providers in emerging countries implies that significant savings on production costs can be achieved due to labor costs differentials. Thus, the governance of R&D services depends on a series of trade-offs between labor costs and cross-country variations in transaction costs associated with hold-up and appropriability hazards. We analyze in this section these trade-offs (see Figure 1). We also assume, according to KBVF, that when entering into a transaction with an external firm that requires an investment in specific knowledge related to the firm, not only external transaction costs may be high, but also external production costs, as there are important costs associated to the codification and transfer of the knowledge.

FIGURE 1
A model of R&D governance decision trade-offs



The growing trend to locate several activities of the value chain in emerging markets is explained by cross-industry differences in labor costs (Swamidass and Kotabe, 1993). In fact, firms are increasingly fragmenting their product development activities and they are increasingly outsourcing some of these stages to external specialized providers (UNCTAD, WIR 2005), most of them located in emerging countries. Especially interesting is the growing outsourcing of R&D services which we define as those services related to the design and development of new or improved products and processes. Service production costs are determined by its labor and capital requirements (Oster, 1999). Consequently, production costs differentials take into consideration productivity differences that may arise due to the type of technology or machinery used, wages, or the level of qualification of the manpower. In this regard, we argue that the significance of costs reductions that can be achieved through locating in low-wage countries will

be largely determined by the labor intensity of the service considered. A service is considered to be labor intensive when the cost of producing it is largely determined by wage costs. Hence, the higher the labor intensity of the service the larger the production costs savings that can be achieved if performing the service in a low-wage country. Thus, the service labor intensity will be the main determinant of production costs and ultimately determine its preferred location¹.

However, whereas the decision to locate these services in emerging countries can be explained by low labor costs, transaction cost variations across countries may change the optimal governance structure for these services due to differences in transaction costs associated with asset specificity and appropriability hazards. As previously stated, governance decisions are not only about choosing the level of ownership preferred over the service but also about its location that will ultimately determine the more efficient governance mode for the service. Thus, because both decisions are interrelated, when considering the governance mode for a service firms face a wide set of alternatives such as: (1) perform it internally at home; (2) perform it internally abroad within a foreign subsidiary; (3) outsource it to a provider located at home; (4) outsource it to a provider located abroad; or (5) other hybrid governance modes such as the establishment of strategic alliances or the creation of a joint venture with a service provider. Herein, we argue that the governance mode preferred ultimately will be determined by transaction-specific investments, firm-specific knowledge together with the institutional environment and the labor intensity of the service. In the following paragraphs, we analyze the expected outcomes of governance choices according to these attributes.

¹Note that in order to develop our theoretical model the level of qualification of the manpower is not going to influence the firms' decision of where to locate their R&D services as we are assuming that all of the potential providers have the qualification required to perform them. The level of qualification of the manpower will be considered then as constant.

FIGURE 2: Contexts for governance choices for R&D services.

R&D SERVICE REQUIREMENTS		FIRM-SPECIFIC KNOWLEDGE	BOTH FIRM-SPECIFIC KNOWLEDGE AND TRANSACTION SPECIFIC ASSETS	TRANSACTION SPECIFIC ASSETS	NEITHER FIRM-SPECIFIC KNOWLEDGE NOR TRANSACTION SPECIFIC ASSETS
LABOR INTENSITY (if high, significant production costs savings can be obtained if locating in low-wage countries)	YES				
	NO				

Note that given these different contexts (see Figure 2), in order to develop our theoretical predictions, we will assume that MNCs in developed countries will always prefer as their default option to perform R&D services either at home or in an OECD country, thus, seeking locations with similar institutional environments where they will have to incur lower transaction costs compared to other countries where we expect they will face higher political hazards. Therefore, we expect that whatever the level of ownership preferred over a given service — i.e. internal vs. external modes— MNCs will consider as their first option to locate them either at home or in an OECD country unless when comparative advantages can be achieved by locating somewhere else, i.e. emerging countries. We argue that MNCs will have incentives to perform the service in emerging countries only in those cases where the R&D service considered is labor intensive. Thus, if the service labor intensity is high, service production costs will be mainly determined by

labor costs. Consequently, significant production costs savings can be obtained if locating in low-wage countries, savings that in these cases may outweigh the higher transaction costs MNCs have to incur because of higher political hazards that may arise due to institutional differences.

Neither Firm-Specific Knowledge nor Transaction-Specific Investments Required

When asset specificity is low, internal production costs are higher than external production costs (Besanko, Dranove and Shanley, 2002; Williamson, 1985). This is because as asset specificity falls, an outside supplier's component approaches a commodity product that can be sold to many other firms, giving it a scale advantage over an internal supplier who does not enjoy such benefits of specialization and scale. On one hand, if providing the service does not require investments in firm-specific assets, then the risk of the other part being opportunistic is going to be low as the switching costs will be also low and thus the firm does not face a small bargaining problem (Klein, 1996; Klein et al., 1978; Williamson, 1985). As a result, the transaction costs the firm has to incur when outsourcing this kind of services to an external provider will be low. For this kind of standardized services it is expected that there will be a larger pool of global providers. As a result, thanks to ITC advances the firms can access this global market and can choose 'best-in-world' suppliers. International outsourcing thus allows for a wider search and more competition among suppliers leading to higher levels of efficiency (Quinn and Hilmer, 1994). In this line, Fawcett and Scully (1998) stated that by sourcing globally from the best suppliers available, firms can increase the value of the products that they produce while simultaneously reducing the cost of the final delivered product. In summary, under these conditions, it is easy for firms to switch trading partners with little penalty because other providers offer virtually identical products.

In addition, if the required knowledge to perform the service is not firm-specific— the knowledge is codified and standardized— then it will be easily transferable to a third party and consequently its transferring costs will be low. Thus, external outsourcing to a third party is also the most appropriate alternative from the point of view of the KBVF. One reason why firms are increasingly outsourcing some of the services of the R&D process is the growing modularity of the R&D process (Fosfuri and Roca, 2002). In these cases the process of innovation is divided into independent activities in such a way that several firms can participate in it without the need to work as a team with any other or even without being aware of what the other firms are doing. They just have to meet some general specifications in their activities. Thus, because external production costs will be lower than internal ones and the firm will not enjoy an advantage in the internal transference of this knowledge, we expect this kind of R&D services to be externalized through arm's-length transactions. As a consequence of both low contractual and political hazards associated with the externalization of this kind of services, we expect firms to outsource them to wherever there are providers with the qualifications required to adequately perform it, independently of the labor intensity of the service. However, although we expect that we may find this kind of services outsourced to providers located worldwide, we expect that, depending on the service labor intensity, firms will have more or less incentives to outsource them in an emerging country. If the service is not labor intensive, its production costs will be mainly determined by its capital requirements. Consequently, the location of the service will be determined by providers' differentials in productivity due to their investment in new technologies or scale of operation (in this case wage differentials would be a minor determinant). As a result, this kind of services is more likely to be outsourced either to domestic providers or to providers located in other developed markets in the OECD as it is expected that providers at these locations

will be more technologically advanced compared to those in emerging countries. Taking this into account, we propose the following hypothesis:

Hypothesis 1. When providing the R&D service does not require either firm-specific knowledge or investments in transaction-specific assets and it is not labor intensive, then the service is expected to be outsourced to either domestic providers or providers in developed markets (OECD).

Consequently, on the other hand, the more labor intensive the service the more incentives the firm will have to outsource it to a provider in an emerging market. If the service labor intensity is high, that means that the service production costs will be largely determined by labor costs. So external production costs differentials will be largely determined by wage differentials. That means that considering this kind of R&D services where no specific investments are required, the firm decision of where to outsource them will be mainly determined by country wage differentials as the production costs savings due to lower wages are supposed to be larger than the transaction costs the firm has to incur due to differences in the institutional environments (cultural and political system differences). Consequently, in this case we propose that:

Hypothesis 1A. When providing the R&D service does not require either firm-specific knowledge or investments in transaction-specific assets and it is labor intensive, then the service is expected to be outsourced to providers in emerging markets (offshored).

Firm-Specific Knowledge Required but No Transaction-Specific Investments

According to KBVF, considering that the firm's know-how is materialized in its organizational routines (Nelson and Winter, 1982), that that knowledge is usually of a tacit nature, and that it differs from one firm to another —routines are firm-specific— we will expect that if a service to be performed requires firm-specific knowledge then that service will be always internalized because of the firm efficiency relative to markets in transferring this kind of knowledge. Firm-specific knowledge is embedded in the organizational routines of the firm and is thus difficult to isolate and transfer to external parties. As pointed out by Cantwell (1991), each time a knowledge-based capability is transferred to an external firm it loses part of its value as the external firm cannot replicate the original capability easily and perfectly. In summary, KBVF arguments imply that whenever an activity to be performed requires firm-specific knowledge, the internal production costs are expected to be lower than the external production costs because the firm is more efficient at transferring this kind of knowledge than a third party. As a consequence, there would be no reason to externalize this kind of services. Furthermore, from the point of view of the TCT the same conclusion is reached although with a different argument. TCT argues that knowledge that is specific to the firm and is uncodified is more difficult to protect as it is more difficult to effectively define property rights over it (Pisano, 1989). As a consequence, this difficulty puts the firm at risk of the so-called appropriability hazards (Kogut, 1988; Oxley, 1997). That means that considering this kind of services, the MNC decision of where to perform them within the company will be determined by subsidiaries or units' differentials in productivity due to the level of technology investment or scale of operation, or their access to unique resources or networks. Consequently:

Hypothesis 2. When providing the R&D service does require firm-specific knowledge but does not require investments in transaction-specific assets and the service is not labor intensive, then the service is expected to be performed either in firm domestic subsidiaries or firm foreign subsidiaries in developed markets (OECD).

Note that, because we are developing our model following the rationale of minimization of both transaction and production costs, the requirement of other specific investments would not change our prediction as these investments would increase both external production and transaction costs. This is so because, as it was already stated, and according to KBVF, when entering into a transaction with an external firm that requires the transfer of firm-specific knowledge, not only external transaction costs may be high, but also external production costs, as there are important costs associated to the codification and transfer of this knowledge. Thus, while firm-specific knowledge requirements may result an obstacle to externalization, investments in transaction-specific assets may not be the necessary the case.

Once again, we will now consider the scenario where this R&D service is labor intensive. If the service labor intensity is high, that means that labor costs represents a major part of the service total production costs, thus the service production costs will be largely determined by labor costs. So production costs differentials will be largely determined by wage differentials and consequently the firm's decision of where to provide them will be ultimately determined by country wage differentials. This implies that the firm will have strong incentives to provide this kind of services in a low-wage country. However, when considering the most suitable governance form besides the contractual costs that arise because the nature of the service considered, the firm has to face hazards that originate directly from the location of that activity within a specific political system (Kobrin, 1987; Hill, Hwang and Kim, 1990; Henisz and Williamson, 1999). As a

result, on one hand the firm will have a strong incentive to locate in an emerging country because of the potential internal production costs savings that can achieve due to wage differentials. But, on the other hand, locating in an emerging country implies that the firm will be exposed to a risky institutional environment. However, this weaker institutional environment will not be damaging for the firm as far as the service is performed within a whole owned subsidiary². Then, we expect that:

Hypothesis 2A. When providing the R&D service does require firm-specific knowledge but does not require investments in transaction-specific assets and the service is labor intensive, then the service is expected to be performed through a foreign subsidiary in an emerging country.

Transaction-Specific Investments Required but Firm-Specific Knowledge is not.

As stated before, from KBVF firms are social communities that serve as a more efficient mechanism for the transference of knowledge that is specific to the firm compared to markets (Kogut and Zander, 1992, 1993). As a result, whenever providing the service does not require

² Note that in this paper in order to develop our theoretical framework we are considering as decision makers MNCs. Thus, we are making the assumption that MNCs will be experienced enough to deal effectively with these differences in the institutional environments while taking advantage of wage differentials. In this regard, it is interesting to point out that for those firms of smaller size or those with less or no international experience this last hypothesis 2A may not hold (Cantwell, 1989, 1995; Hymer, 1960). On one hand, and in relation to the internal demand levels of the R&D service considered, smaller firms may not be able to achieve an internal demand enough to justify the establishment of a foreign subsidiary to perform these services. And, on the other hand, firms lacking international experience may find entering emerging markets through the establishment of a subsidiary too risky.

firm-specific knowledge, then the external production costs are expected to be lower than the firm's production costs because the firm will not enjoy an advantage over a third party in transferring this kind of standardized knowledge. If externalizing this kind of services, the firm can thus benefit from the external provider specialization and at the same time the transferring costs of the knowledge required to perform the service are supposed to be low because the knowledge is going to be easily transferable to a third party. Then, if vertical integration is not efficient, an alternative is the market or contract. As stated before, from the point of view of TCT, an explanation for why market transactions are not chosen rests on potential exploitation of one party when assets are dedicated to the relationship and there is uncertainty over redress. As a result, in the case considered that the service requires investments in firm-specific assets and these investments are usually costly and risky for the investors we can leave aside integration as economically infeasible and market transactions as too fraught with opportunistic risk, so the comparison will be between a joint venture and a long-term contract (Kogut, 1988; Williamson, 1975). This is so because in this situation it is expected that the firm will face several difficulties in finding a provider willing to make those investments because it posits what in TCT is called the small number bargaining problem that occurs when one of the contracting parties has invested in assets that are costly to transfer to alternative uses, i.e. firm-specific assets, making the investor vulnerable to opportunistic recontracting (Klein, 1996; Klein et al., 1978). So, one efficient mechanism to solve these problems and reduce the risk of opportunism is to establish a long-term agreement with the provider. This long-term contract will serve as a safeguard mechanism from the risk of opportunistic behavior of both parties. According to TCT, compared to the fact that the transaction is provided only on a one time basis, the fact that the transaction is provided frequently lowers the incentive to behave opportunistically. This is so because if one part behaves opportunistically the loss of business or future rents deriving from terminating a long-term

contract will be greater (Klein et al., 1978; Williamson, 1985). Thus, with repeated transactions in a stable environment, one can expect on one hand contracts to become self-enforcing because of reputation effects, and on the other hand, hold-up and moral-hazard problems to be attenuated by the evolution of norms of reciprocity and cooperation (Axelrod, 1984; Sugden, 1986). Then, as a result:

Hypothesis 3. When providing the R&D service does not require firm-specific knowledge but does require investments in transaction-specific assets and it is not labor intensive, then the service is expected to be outsourced through long-term contracts to either domestic providers or providers in developed markets (OECD).

From a knowledge perspective, it can be argued that the establishment of a long-term contract with a provider while acting as a protection to the opportunism of the other part will also increase the willingness of both parties to cooperate and to improve and continue their agreement, then enhancing organizational learning and firms' productivity.

However, if we now consider the scenario where this R&D service, that although does not require firm-specific knowledge, does require transaction-specific investments, and is labor intensive we expect that its preferred governance form may change. As stated before, if the service labor intensity is high, then the service production costs will be largely determined by labor costs. That means that significant production costs savings can be obtained if the service is provided in low-wage countries, so the firm has strong incentives to locate the provision of that service in those economies. However, if the service requires transaction-specific investments, then the transaction costs the firm would have to incur when outsourcing to an external provider

would be too high because of the uncertainty and risk associated with emerging markets. This is due to the fact that the policy instability that usually exists in these countries may provide a loophole for the local service provider to behave opportunistically due to the restricted capacity of the foreign firm to enforce their rights (Henisz, 2000). Because as stated by TC theorists, joint ventures have two properties that are particularly distinctive when compared to long-term contracts: joint ownership and control rights, and the mutual commitment of resources. As a result, the situational characteristics best suited for a joint-venture are high levels of uncertainty over specifying and monitoring performance, in addition to a high degree of asset specificity. This is so, because a joint venture addresses these issues by creating a superior monitoring mechanism and alignment of incentives to reveal information, share technologies, and guarantee performance (Kogut, 1988). In fact, one way to achieve this alignment is the rules of sharing costs and/or profits and the mutual investment in dedicated assets, i.e. assets which are specialized to purchases or sales from a specific firm. In summary, as stated by Kogut (1988: 321) “the critical dimension of a joint venture is its resolution of high levels of uncertainty over the behavior of the contracting parties when assets of one or both parties are specialized to the transaction and the hazards of joint cooperation are outweighed by the higher production or acquisition costs of 100 percent ownership”. Taking this into account, in this transactional situation we expect that between a long-term contract or a joint venture the firm will prefer the latter as the uncertainty it will face due to institutional differences with providers in emerging markets, i.e. economic or political instability, cultural and social differences, will be too high to be efficiently managed through a long-term contract. This is so because a joint venture often serves the purpose of assigning management tasks to local partners who are better able to manage the local labor force and relationships with suppliers, buyers, and governments (Franko, 1971; Stopford and Wells, 1972). Thus, a joint venture, compared to other governance forms, helps to

resolve the foreign partner's problems ensuing from cultural factors, though at the cost of sharing control and ownership (Kogut and Singh, 1988). Then, in summary, if the service requires investing in transaction-specific assets and the firm wants to benefit from wage differentials then the service is expected to be governed through the creation of a joint-venture with a local provider. A joint venture will then act as a protection from an opportunistic behavior from the other party. Taking this into account, we propose that:


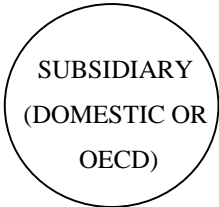
Hypothesis 3A. When providing the R&D service does not require firm-specific knowledge but does require investments in transaction-specific assets and is labor intensive, then the service is expected to be governed through the creation of a joint-venture with a local provider in emerging markets.

It is interesting to point out that the creation of a joint venture can be expected as the preferred option within this transactional situation from other theoretical perspectives. For example, from a knowledge perspective, a joint venture can be a way to access local knowledge and access new markets therefore improving the firm's competitive position *vis-à-vis* rivals. For example, following Nelson and Winter (1982) a firm may decide to joint venture in order to retain the capability —or what they call 'remember-by-doing'— of organizing a particular activity while benefiting from the superior production techniques of a partner. From a relational view, the firms' ultimate objective in the make or buy decisions will be determined by maximization of total value not just costs minimization. Thus, it is considered that the benefits stemming from inter-firm collaboration are not only those resulting from *ex ante* resources complementarity but also those that can be obtained *ex post* due to the realization of relation-specific investment (Dyer and Singh, 1998) and through inter-organizational learning, which may

help both parties to improve their competencies. As a result, from this perspective, a hybrid governance form such as a joint venture to provide a service that requires firm-specific investments and where there exist mutual trust between parties, apart from enhancing productivity, may be a source of new knowledge for the firm, and an opportunity of learning from the local market the firm may be unaware of. Then, if considering R&D services, strategic partnerships such as joint ventures may be seen as an efficient way to access complementary assets. As argued by Teece (1992: 20) strategic alliances may provide an attractive organizational form where the environment is characterized by rapid innovation and geographical dispersion in the sources of know-how as they enable firms to explore new technological developments more rapidly than would be possible independently.

Thus, our prediction model of R&D service governance form based on the role of specificity — both firm-specific knowledge and transaction-specific investments required to perform the service— and the labor intensity of the service considered can be illustrated as the following (Figure 3):

**FIGURE 3: INTEGRATIVE FRAMEWORK OF R&D SERVICE GOVERNANCE FORMS PREFERRED
BASED ON TRANSACTIONAL CHARACTERISTICS**

R&D SERVICE REQUIREMENTS		FIRM-SPECIFIC KNOWLEDGE	BOTH FIRM-SPECIFIC KNOWLEDGE AND TRANSACTION SPECIFIC ASSETS	TRANSACTION SPECIFIC ASSETS	NEITHER FIRM-SPECIFIC KNOWLEDGE NOR TRANSACTION SPECIFIC ASSETS
LABOR INTENSITY	YES			JOINT VENTURE (EMERGING)	OUTSOURCING (EMERGING) <i>OFFSHORING</i>
	NO			LONG TERM OUTSOURCING AGREEMENTS (DOMESTIC OR OECD)	OUTSOURCING (DOMESTIC OR OECD)

EXTENSIONS OF THE MODEL

In this article we have proposed a model for predicting the preferred governance form for a particular R&D service within the firm innovation process. Our model highlights the influence of what we consider are the main drivers of this choice: on one hand, the needs of firm-specific knowledge and specific investments and, on the other hand, the labor intensity of the service. While we believe that these are the main factors conditioning the preferred governance form, there are other variables that may moderate the predicted influence of the aforementioned factors. Although for the sake of brevity not all of them can be studied, we identify here two critical

dimensions that can be analyzed in order to incorporate other factors in our model. These two dimensions are: the firm's tolerance to strategic alliances and the impact of the easiness of coordination and control. Thus, herein, we analyze two factors that can exemplify these two dimensions: (i) the exploration/exploitation balance and (ii) the use of ITC advances.

As different motivations for going abroad require different strategies, the governance form preferred for a R&D service may vary depending on the firm's motivation to locate it in a particular location (Nachum and Zaheer, 2005). While firms' motivations to invest abroad have been traditionally based on the intention of firms to exploit their firm-specific advantages abroad (Hymer, 1960), the search for knowledge is now recognized as a major driver of foreign direct investment especially in high-technology industries (Kuemmerle, 1999; Chung and Alcacer, 2002; Wesson, 2004). Thus, knowledge-seeking investment is driven by firms' needs to access complementary resources, notably various kinds of knowledge, in order to upgrade their own capabilities or to develop new advantages. The globalization of markets, the location of specialized scientific and technological knowledge in limited regions (Almeida and Kogut, 1999; Rosenkopf and Almeida, 2001), together with the dynamism of markets, are driving companies to continually relocate their R&D activities worldwide to remain competitive. Hence, firms in order to maintain their competitive advantage no more can rely only on internal sources of innovation but also on external ones. This need for external resources increase a firm's tolerance for strategic alliances (Madhok, 1995, 1997). As a result, for some R&D services that because they require investments in transaction-specific assets are expected to be internalized, the firm may find instead a hybrid governance form or a strategic partnership with a local provider as a preferable option. Joint venturing with local providers or establishing long-term agreements with them may allow firms to access local specialized knowledge and benefit from knowledge spillovers and collective learning (Scott, 1998) that could not otherwise be obtained. For instance, from a

dynamic point of view, it can be expected that as a result from continuous externalization of specific R&D services by MNCs to limited regions—even to emerging countries— some of these regions will be able to upgrade their capabilities. Thus, in the near future, MNCs may not be attracted to locate some of their R&D services in emerging countries not only because of lower labor costs but also because of their skilled labor force. In fact, for instance, within India, Bombay, Bangalore, and Delhi have quickly emerged as the key locations for software development. Apart from the lower development costs obtained by exploiting wage differentials, the primary locational advantages of these cities comprise infrastructure including transportation and telecommunications infrastructure and access to a skilled pool of labour. Thus, when firms' investment motivations are knowledge-seeking the potential mutual benefits of inter-firm collaboration may outweigh the transactional costs the firms have to incur to safeguard from opportunism. Note that one important limitation of our model is thus assuming that emerging countries are always associated with low wages and with less technologically developed providers, which may not always be the case. In fact, the development of centers of excellence worldwide also in emerging countries implies that in some cases locating in emerging countries may not be driven only by lower wages but also by accessing specialized knowledge or technology.

Another factor that can be incorporated in our model is ITC advances and investments. Technological advances reduce the cost of distance, provide new ways to create value, and may change the motivations of cross-border activities (Nachum and Zaheer, 2005). IT reduces both control and coordination costs over distance and thus opens up a range of new possibilities for interaction over distance, both between MNCs and the market, and between subsidiaries of the same MNC (Christensen et al., 1998; Sampler, 1998). IT advances reduce the cost of transferring knowledge both within the firm and with external parties as they facilitate the transmission and

codification of knowledge. As a result, firm-specific knowledge that was previously difficult to transfer to third parties without losing value, with the use of new ITs part of this knowledge may be codified, standardized and digitized. Thus ITs allow the production of more services to be split up into smaller tasks that can be located elsewhere to take advantage of cost, economies of scale, quality or other factors. Hence, IT advances reduce the specificity of firms' knowledge and thus R&D services that were previously internalized because they were costly to transfer to third parties may now be externalized (Afuah, 2003). Furthermore, IT advances reduce firm searching costs thus reducing the small-number bargaining problem considered by TC theorists. For instance, with the emergence and diffusion of the internet, firms have access to providers that are located worldwide facilitating access to best-in-world providers and simultaneously providers also have access to potential customers so reducing the room for opportunism if investing in firm-specific assets (Afuah, 2003). Consequently, IT advances allow for services that were previously internalized because they implied high levels of specificity to be now externalized.

CONCLUSION

This paper argues that whereas the location of R&D services in emerging countries can be explained by low labor costs, transaction cost variations across countries may change the optimal governance structure for these services due to differences in transaction costs associated with hold-up and appropriability hazards. If the transaction of this service requires investments in transaction-specific assets choosing a location in an emerging country with a weak institutional environment will increase transaction costs. If the transaction requires the transfer of firm-specific knowledge, the location of the activity would not change the optimal governance structure, as internal organization is always the preferred mode as internal production costs are

lower (due to the difficulties in transferring firm specific knowledge outside the organization) and external transaction costs are higher. Finally, moving overseas might reduce the possibility of relying on trust as a governance mechanism, not only because of changes in the institutional environment, but also due to the lack of previous relationships with local firms. Within our model the effect of both knowledge-seeking motivations and IT advances on R&D boundary decisions has been also highlighted.

REFERENCES

- Afuah, A. (2001) 'Dynamic boundaries of the firm: are firms better off being vertically integrated in the face of a technological change?' *Academy of Management Journal*, 44: 1211-1228.
- Afuah, A. (2003) 'Redefining firm boundaries in the face of the internet: Are firms really shrinking?' *Academy of Management Review*, 28 (1): 34-53.
- Almeida, P. and Kogut, B. (1999) 'Localization of knowledge and the mobility of engineers in regional networks', *Management Science*, 45 (7): 905-917.
- Arora, A., Arunachalam, V. S., Asundi J. and Fernandes R. (2000) 'The Indian software services industry', *Research Policy*, 30 (8):1267-1287.
- Axelrod R. (1984) *The Evolution of Cooperation*. New York: Basic Books.
- Barney, J. B. and Ouchi W. G. (1986) *Organizational Economics*. San Francisco, CA: Jossey-Bass.
- Belderbos, R. (2003). 'Entry mode, organizational learning, and R&D in foreign affiliates: evidence from Japanese firms'. *Strategic Management Journal*, 24, pp. 235-259.
- Bensaou, M. and Anderson, E. (1999) 'Buyer-supplier relations in industrial markets: When do buyers risk making idiosyncratic investments?' *Organization Science*, 10 (4): 460-81.
- Besanko, D., Dranove, D., and Shanley, M. (2002) *Economics of Strategy*. (2nd ed.) New York: Wiley.
- Buckley, P. (1988) 'The limits of explanation: testing the internalization theory of the multinational enterprise', *Journal of International Business Studies*, XIX: 181-193.
- Cantwell, J. (1989) 'Technological innovations and Multinational Corporations'. Oxford: Basil Blackwell.
- Cantwell, J. (1991) 'The Theory of technological competence and its application to international production'. In D. McFridge (Eds.) *Foreign Investment, Technology, and Economic Growth*: 133-67. University of Calgary Press: Calgary.
- Cassiman, B. and Veugelers, R. (2002) '*American Economic Review*', vol. 92 Issue 4, p1169-1184.
- Christensen C., Suarez F. F. and Utterback, J. M. (1998) 'Strategies for survival in fast-changing industries'. *Management Science*: 44 (112): 207-220.
- Chung, W and Alcacer, J. (2002) 'Knowledge seeking and location choice of foreign direct investment in the United States', *Management Science*, 48: 1534-1554.
- Coase, R. E. (1937) 'The Nature of the Firm'. *Economica*, 4: 386-405.

- Delios A. and Henisz W.J. (2000) 'Japanese firms' investment strategies in emerging economies', *Academy of Management Journal*, 43: 305-323.
- Doh J.P., Jones J.K. and Teegen H.J. 'Foreign research and development and national innovation systems: An empirical study of host country influences'. Working paper. <http://www62.homepage.villanova.edu/jonathan.doh/InstitutionRandD.SMJ.doc>
- Dyer, J.H. (1996) 'Specialized Supplier Networks as a Source of Competitive Advantage: Evidence from the Auto Industry', *Strategic Management Journal*, 17 (4):271-291.
- Dyer, J.H. (1997) 'Effective interfirm collaboration: how transactors minimize transaction costs and maximize transaction value', *Strategic Management Journal*, 18 (7): 535-556.
- Dyer, J.H and Singh, H. (1998) 'The Relational View: cooperative strategy and sources of interorganizational competitive advantage', *Academy of Management Review*, 23: 660-679.
- Fawcett, J.I. and Scully, S.E. (1998) 'Worldwide sourcing: Facilitating continued success', *Production and Inventory Management Journal*, 39 (1):1-9.
- Fosfuri, A. (2006) 'The Licensing Dilemma: Understanding the determinants of the Rate of Technology Licensing', *Strategic Management Journal*, 27: 1141-1158.
- Fosfui, A. and Roca, E. (2002) 'Naturaleza y características del conocimiento tecnológico y limitaciones a la transferencia de tecnología', *Revista Europea de Dirección y Economía de la Empresa*, 11 (3): 139-152.
- Franko, L.G. (1971) *Joint Venture Survival in Multinational Corporations*, Praeger, New York.
- Galbraith, J. R. (1977), *Organization Design*. Addison-Wesley. Reading, MA.
- Gatignon, H. and Anderson, E. (1988) 'The Multinational Corporations Degree of Control over Foreign Subsidiaries: An Empirical Test of a Transaction Cost Explanation', *Journal of Law Economics and Organization*, IV (2): 305-336.
- Grant, R. (1997) 'Toward a knowledge-based theory of the firm', *Strategic Management Journal*, 17, Winter Special Issue: 109-122.
- Harrigan, K.R. (1984) 'Formulating vertical integration strategies', *Academy of Management Review*, 9: 638-652.
- Henisz W. J. and Williamson, O. E. (1999) 'Comparative Economic Organization Within and Between Countries', *Economics and Politics*, 1: 261-276
- Henisz, (2000) 'The Institutional Environment For Multinational Investment', *Journal Of Law, Economics And Organization* 16 (2): 334-64
- Hill, C. W. L. (1990) 'Cooperation, opportunism, and the invisible hand: Implications for transaction cost theory'. *Academy of Management Review*, 15: 500-513.
- Hill, C. W., P. Hwang and W. C. Kim. (1990), 'An Eclectic Theory of the Choice of International Entry Mode'. *Strategic Management Journal*, 11: 117 – 128
- Hill, C.W. and Rothaermel, F.T. (2003) 'The performance of incumbents firms in the face of rapid technological innovation'. *Academy of Management Review*, 28: 257-274.
- Hymer S.H. (1960) *The international operations of national firms: a study of direct investment*. PhD Thesis, MIT, published 1976, Cambridge MIT Press.
- John G. and Weitz B.A. (1988) 'Forward integration into distribution: an empirical test of transaction cost analysis', *Journal of Law, Economics and Organization*, 4: 337-355.
- Kim S.M. and Mahoney JT. (2006) 'Mutual commitment to support exchange: relation-specific IT system as a substitute for managerial hierarchy', *Strategic Management Journal*, 27 (5): 401-423.
- Klein, B. (1996) 'Why hold-ups occur: The self-enforcing range of contractual relationships', *Economic Inquiry*, 34: 444-463.

- Klein, B., Crawford, R. G. and Alchian, A. A. (1978) 'Vertical Integration, Appropriable Rents, and the Competitive Contracting Process', *Journal of Law and Economics* 21(October): 297-326.
- Kobrin S. (1987) 'Testing the bargaining hypothesis in the manufacturing sector in developing countries'. *International Organization*, 41: 609-638.
- Kogut B. and Zander, U. (1992) 'Knowledge of the firm, combinative capabilities, and the replication of technology', *Organizational Science*, 3, (3): 383-397.
- Kogut B. and Zander, U. (1993) 'Knowledge of The Firm And The Evolutionary Theory Of The Multinational Corporation', *Journal of International Business Studies*, 4th Qt.: 625-645.
- Kogut, B. (1988) 'Joint ventures: Theoretical and Empirical Perspectives', *Strategic Management Journal*, 9 (4): 319-332.
- Kuemmerle. (1999) 'The drivers of foreign direct investment into research and development: an empirical investigation', *Journal of International Business Studies*, 30 (1): 1-24.
- Lee, C. and Chen Y. T. (2000) 'Distributed Visual Reasoning for Intelligent Information Retrieval on the Web', *Interacting with Computers*, 12 (5): 445-468.
- Madhok A. (1997) 'Cost, value and foreign market entry mode: the transaction and the firm', *Strategic Management Journal* 18(1): 39-61.
- Madhok A. and Tallman, S. B. (1998) 'Resources, transactions and rents: managing value in interfirm collaborative relationships', *Organization Science*, 9: 326-339.
- Majumdar, S.K, and Ramaswamy, V. (1994) 'Explaining downstream integration', *Managerial and Decision Economics*, 15: 199-219.
- Masten S, Meehan JW and Snyder EA. (1991) 'The costs of organization', *Journal of Law, Economics, and Organization* 7: 1-25.
- Masten, S. E. (1984) 'The organization of production: evidence from the aerospace industry', *Journal of Law and Economics*, 27: 403-417.
- Monteverde, K. (1995) 'Technical dialog as an incentive for vertical integration in the semiconductor industry', *Management Science*, 41 (10): 1624-1638.
- Monteverde, K. and Teece, D. (1982) 'Supplier Switching Costs and Vertical Integration in the Automobile Industry', *Bell Journal of Economics*, 13: 206-13.
- Moran, P. and Ghoshal, S. (1996) 'Theories of economic organization: The case for realism and balance', *Academy of Management Review*, 21 (1): 58-72.
- Nachum, L. and Zaheer, S. (2005) 'The persistence of distance? The impact of Technology on MNE motivations for foreign investment', *Strategic Management Journal*, 26: 747-767.
- Nelson, R. and Winter, S. (1982) '*An Evolutionary Theory of Economic Change*', Harvard University Press, Cambridge, MA.
- Nicholls-Nixon C. and Woo C. (2003) 'Technology sourcing and output of established firms in a regime of encompassing technological change', *Strategic Management Journal*, 24 (7): 651-666.
- Oster, S. (1999) '*Modern competitive analysis*', New York: Oxford University Press.
- Oxley, J.E. (1997) 'Appropriability Hazards and Governance in Strategic Alliances: A Transaction Cost Approach', *Journal of Law, Economics and Organization*, 13 (2): 387-409.
- Patel P. and Vega M. (1999) 'Patterns of internationalization of corporate technology: location versus home country advantages', *Research Policy*, 28: 145-155
- Pavitt, K. (1999) '*Technology, Management and Systems of Innovation*', Cheltenham: Edward Elgar.

- Pearce, R. (1999) 'Decentralised R&D and strategic competitiveness: globalised approaches to generation and use of technology in multinational enterprises (MNEs)', *Research Policy* 28: 57-178
- Pisano, G.P. (1989) 'Using equity participation to support exchange: Evidence from the biotechnology industry', *Journal of Law Economics and Organization*, 35: 109-126.
- Pisano, G. (1990) 'The R&D Boundaries of the Firm: An Empirical Analysis', *Administrative Science Quarterly*, 35: 153-176.
- Quinn, B.J. and Hilmer, F.G. (1994) 'Strategic Outsourcing', *Sloan Management Review*, 34 (4): 43-55.
- Rosenkopf, L. and Almeida, P. (2001) 'Overcoming local search through alliances and mobility.', Working paper, The Wharton School.
- Rothaermel, F.T., Hitt, M.A. and Jobe, L.A. (2006) 'Balancing vertical integration and strategic outsourcing: effects on product portfolio, product success, and firm performance', *Strategic Management Journal*, 27 (11): 1033-1056.
- Russo, M.V. (1992) 'Power plays: regulation, diversification, and backward integration in the electric utility industry', *Strategic Management Journal*, 13 (1): 13-27.
- Scott, A. (1998) *Regions and the World Economy: The Coming Shape of World Production, Competition, and Political Order*, Oxford University Press: Oxford.
- Shaver, J.M. and Flyer, F. (2000) 'Agglomeration economies, firm heterogeneity, and foreign direct investment in the United States', *Strategic Management Journal*, 21 (12) pp. 1175-1193.
- Stopford, J. M. and Wells, L. T. (1972) *Managing Multinational Enterprise: Organization of the Firm and Ownership of the Subsidiaries*, Basic Books: New York.
- Sugden, R. (1986) *The Economics of Rights, Co-operation, and Welfare*, Oxford: Blackwell.
- Swamidass, P.M. and Kotabe, M. (1993) 'Component sourcing strategies of multinationals: An empirical study of European and Japanese multinationals', *Journal of International Business Studies*, 24 (1): 81-99.
- Taggart, J.H. (1991) 'Determinants of foreign R&D locational decisions in the pharmaceutical industry', *R&D Management*, 21 (3): 229-240.
- Teece, D. (1986) 'Profiting from technological innovation: implications for integration, collaboration, licensing and public policy', *Research Policy*, 15: 285-305.
- Teece, D. (1992) 'Competition, cooperation, and innovation: organizational arrangements for regimes of rapid technological progress', *Journal of Economic Behavior and Organization*, 18 (1):1-25.
- Ulset, S. (1996) 'R&D outsourcing and contractual governance: An empirical study of commercial R&D projects', *Journal of Economic Behavior and Organization*, 30, 1.
- UNCTAD (2005- WIR 05): *World Investment Report 2005: Transnational Corporations and the Internalization of R&D.*
- Walker, G. and Weber, D. (1984) 'A transaction cost approach to the make-or-buy decision', *Administrative Science Quarterly*, 29: 373-391.
- Walker G. and Weber D. (1987) 'Supplier competition, uncertainty and make-or-buy decisions', *Academy of Management Journal* 30: 589-596.
- Wesson, T.J. (2004) *Foreign Direct Investment and Competitive Advantage*, Edward Elgar: Cheltenham, U.K.
- Williamson, O.E. (1975) *Markets and Hierarchies: Analysis and Anti-Trust Implications*, Free-Press: New York.
- Williamson, O. E. (1985) *The Economic Institutions of Capitalism*, New York, NY, The Free Press.

Williamson, O. E. (1991) 'Comparative economic organization: The analysis of discrete structural alternatives', *Administrative Science Quarterly*, 36: 269-296.

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