TECHNOLOGICAL CAPABILITIES AND THE DECISION TO OUT-SOURCE R&D SERVICES

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Technological capabilities and the decision to outsource R&D services.

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ABSTRACT

This paper is aimed at making a contribution to the emerging literature acknowledging the role of firm capabilities and contractual hazards in governance choices. We argue that the propensity to outsource R&D services increases with the accumulated technological capabilities as well as with the adoption of an international strategy of local responsiveness. We find support for our hypotheses using survey data from a sample of 182 high-tech firms from the European Union and the US.

Keywords: Technological capabilities, intellectual property rights, R&D outsourcing

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INTRODUCTION

Transaction cost economics posits that the characteristics of each transaction determine whether such transaction is going to be organized internally or outsourced (Coase, 1937; Williamson, 1975, 1985). For this reason, the study of outsourcing decisions has been traditionally conducted at the transaction level (Hill, 1990; Masten *et al*., 1991; Monteverde, 1995; Williamson, 1975, 1985). However, since the application of newer theoretical approaches to this topic, like the resource based theory and the knowledge-based views of the firm, the focus has shifted to also highlight the role of firm capabilities (Williamson, 1999; Rotharemel et al., 2006, Parmigiani, 2007). In this regard, a literature has emerged combining these different insights in order to analyze governance decisions (Das and Teng, 2000; Tsang, 2000). Above all, these papers show how to fully exploit and develop those firm resources related to a firm's competitive advantage, those activities related to them tend to be integrated by the firm (Agyres, 1996; Leiblein and Miller, 2003; Nickerson and Silverman, 2003). However, the recent work of Mayer and Salomon (2006) found that the possession of valuable technological capabilities can also lead to outsource technological areas, as firms having such valuable technological capabilities are better prepared to identify, negotiate and monitor external providers of technology and technological services.

One of the areas in which the importance of outsourcing has risen in previous years is the field of R&D services. 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). Firms are increasingly outsourcing, either through arms' length contracts or strategic alliances, some of the R&D services integrating their innovation process to externalized providers located worldwide, not only to reduce costs but also to access external technological knowledge *(*Bunyaratavej et al, 2007; Kotabe and Murray, 2004; Lewin and Peeters, 2006). Thus, the dividing line between those R&D services that are better kept at home and those that are better outsourced has become blurred (UNCTAD, 2005). However, despite this growing propensity to outsource R&D services, our own survey data show that some firms still maintain all of their R&D services in-house. Taking all of this into account, in this paper we analyze to what extent firms' technological capabilities together with the firms' need for external resources influence a firm's decision to outsource R&D services. There is an interesting literature dealing with firm R&D boundaries decisions (Arora et al. 2000, Fosfuri, 2006, Nicholls-Nixon and Woo, 2003, Pisano, 1990, Rothaermel *et al*., 2006 and Ulset 1996). However, to the best of our knowledge, no studies have still addressed the relationship between firm's technological capabilities and its propensity to outsource R&D services. In this regard, we extend Mayer and Salomon's (2006) insight to the field of R&D services. Specifically, we argue (1) that those firms with more technological capabilities will tend to outsource R&D services in those contexts in which intellectual property rights protect effectively a firms' proprietary knowledge, and (2) that ceteris paribus those firms with a higher local responsiveness attitude will be more likely to outsource R&D services.

Empirically, we test our hypotheses using original international firm-level survey data on R&D services outsourcing conducted on a sample of firms competing in R&D intensive industries. The data was collected during the period August 2006 to February 2007. Our final sample includes

182 firms, where 74 of them declared not being outsourcing any R&D service (40% of our sample) and 108 firms that were outsourcing at least one R&D service (60% of our sample).

THEORETICAL BACKGROUND AND HYPOTHESES

When facing the decision to outsource R&D, firms analyze the trade-off that exists between, on one hand, the benefits stemming from taking advantage of external knowledge and capabilities and/or from low labor costs and, on the other hand, the risks associated with opportunism on the side of the external contractor. Although the attributes of each transaction influence both the costs and benefits of outsourcing, these costs and benefits are also affected by two firm's characteristics. First, firm's technological capabilities influence the ability of a firm to select and monitor an external supplier, reducing thus transaction costs (Mayer and Salomon, 2006). Second, the need of external resources will increase the propensity to outsource, as this need increase the comparative benefits of outsourcing (Jacobides, 2005). Thus, we develop the influence of these two factors applying the insights of Transaction Cost Economics (TCE) and the Knowledge Based View of the Firm (KBVF). Specifically, we argue that firms having valuable technological capabilities would not have incentives to perform all of the activities of their R&D process in house, and more especially in high-tech industries. In these industries competitive pressures to build a larger and broader portfolio of related products in order to gain and maintain a competitive advantage led firms to rely in external suppliers to organize some R&D services (Nicholls-Nixon and Woo, 2003). By doing so, they can concentrate on those parts of the process in which they can exploit their competitive advantage. These firms will be also well prepared to avoid contracting hazards as technological capabilities allow them to select capable suppliers and to better monitor their behaviour (Mayer and Salomon, 2006). However, in relation to this, we argue that this propensity to rely on external suppliers will be reduced in those

contexts where the firm cannot protect their proprietary knowledge due to the existence of a weak protection of intellectual property rights in its country of origin. We also argue that the need for external resources will increase a firm's propensity to outsource services. Specifically we argue that firms needing to adapt their products to multiple markets will have a higher propensity to outsource. These arguments are developed in the following paragraphs.

Technological capabilities

Firms having sound technological capabilities are better prepared than the rest of the firms to outsource R&D services. Initially it could be expected that the more technological resources and capabilities a firm has, the less likely it will need to search for external sources of innovation. However, these capabilities can be leveraged if some specific parts of the R&D process are outsourced to an external firm (Rothaermel et al., 2006). We have to be aware that the innovation process, like many other business functions (Gottfredson et al., 2005), is integrated by different and technologically separable stages or services that can be classified in a continuum from very strategic or "core" to the firm to those being less strategic or "non-core" to the firm. For this reason, many firms are partially integrated and simultaneously outsource some activities in the R&D process (Afuah, 2001; Harrigan, 1984). Some firms even follow a concurrent sourcing strategy, i.e. they simultaneously make and buy the same good or service (Parmigiani, 2007). As a result of this, we expect that firms competing in high tech industries will need to look for efficient ways of relocating and organizing its different R&D services worldwide (Swamidass and Kotabe, 1993). This would imply that, when possible and available, these firms will prefer to outsource their R&D services to best-in-world providers in order to maintain its competitive advantage. Furthermore, we expect that the likelihood of outsourcing R&D services will be increased the more technological capabilities the firm has. Firms having valuable technological

advantages can leverage their own resources if they concentrate their R&D efforts performing in house only those activities directly related to their advantages, relying the remaining activities on external suppliers. The benefits from such concentration are justified taking into account that firms usually do not accomplish the same efficiency levels across all the stages within the R&D process (Fosfuri and Roca, 2002; Pavitt, 1999) and that the external providers have complementary capabilities and can benefit form economies of scale and scope unavailable for the firm. Obviously firms lacking valuable technological resources could also benefit from external sources of R&D services. However, they may not have the ability to select, negotiate and monitor the behaviour of their external suppliers (Mayer and Salomon, 2006). The accrued technological capabilities are critical in order to identify criteria to select and monitor the best provider, as well as to reach an acceptable agreement regarding the price and other terms of the contract. Thus, firms lacking valuable technological resources and capabilities are expected to face higher information asymmetry problems due to their difficulties in correctly assessing their potential providers and, as a result, they may be subject to higher hazards of opportunistic behaviour. On the contrary, firms having valuable technological capabilities can take advantage of them to better select negotiate and monitor the best external suppliers (Mayer and Salomon, 2006). As a result, the lower the value of the technological capabilities of a firm the higher the information asymmetry that may exist between the firm and an external supplier. This information asymmetry may lead to ex-ante and ex-post transaction costs (Akerlof, 1970; Hoetker, 2005; Klein et al., 1978). Thus, these firms lacking valuable technological resources will be less prepared to select an appropriate partner, leading them to face some adverse selection problems, and besides they will be worse prepared to monitor their performance. Consequently, we expect that:

Hypothesis 1: As firm's technological capabilities increase, its propensity to outsource R&D services also increases.

The role of Intellectual Property Rights (IPR)

As shown in previous studies (Gatignon and Anderson, 1988; Henisz, 2000; Henisz and Williamson, 1999) the contractual hazards originated from a transaction —hold-up hazards, risks of technological leakage or expropriation hazards— are not independent from the institutional environment that surrounds the transaction. In this regard, it is important to distinguish two types of transaction costs: contractual and appropiability hazards. Although governance capabilities stemming from technological resources may reduce contractual hazards, they cannot reduce easily appropriability hazards (Mayer and Salomon, 2006). The protection of firm specific knowledge is highly dependent to the effectiveness of the level of protection of intellectual property rights, which vary across countries. As a result, in high technology industries and due to the specific nature of the technological knowledge, the protection of intellectual property rights is expected to be crucial as a lack of protection of the firm's technological knowledge may imply for the firm high risks of imitation by competitors that may lead to an erosion of the firm competitive advantage. Thus, there may be situations where firms having valuable technological resources may decide not to outsource due to the lack of protection of intellectual property rights, despite the fact that they would be prepared to identify available providers that may perform efficiently some of the R&D services. In these cases the risk of technological leakage or expropriation would prevent the firm to use an external provider. Consequently, the higher the protection granted by the IPR system, the lower the transaction costs the firm will have to incur in order to protect itself from the risk of opportunism by a third party. So, it can be hypothesized that:

Hypothesis 2: A strong protection of intellectual property rights will increase the propensity to outsource R&D services of firms having more valuable technological resources.

The need to achieve local responsiveness within the firm's international corporate strategy

Firms may decide to outsource some of their R&D services to a third party either to exploit their technological knowledge (efficiency reasons) or to explore or acquire new one (knowledge reasons). In this regard, from the point of view of the KBVF, internal organization is the default mode for organizing R&D activities. The critical factor in explaining technology transfer across firms is the willingness to gain access to external knowledge, not transaction costs (Grant, 1997; Kogut and Zander, 1993; Madhok, 1997; Malhotra, 2003). For this reason, firms may be willing to outsource R&D services not only in non core activities in which they do not exploit their knowledge base but also when new sources of knowledge are needed or when the required capabilities are not available in house (Jacobides 2005). In relation to the R&D function, the dispersion of technological knowledge implies a greater need for firms to engage in finding new sources of knowledge. Consequently, it can be expected that when firms face the need to adapt products or processes to local requirements because customer needs appear to be so different across regions firms may need to be more open to external sources of technological knowledge. For example, new product development in a transnational context (i.e. those cases in which local adaptations are critical to the success of the innovation) requires the joint use of knowledge dispersed in multiple countries (Mudambi, 2002; Subramaniam and Venkatraman, 2001). Thus, for those MNE having the need to adapt their new products to multiple local environments, R&D outsourcing agreements with providers located in the different local markets the firm is operating,

may serve as a mechanism to gain access to the local knowledge necessary to adapt their products or processes to the local requirements. Furthermore, R&D outsourcing agreements with providers in the local markets may serve as a mechanism to identify the potential for new products and services or faster and better access to new technologies. Therein, it can be expected that those firms having pressures to be national responsive (Bartlett and Ghoshal, 1989) would have more incentives to outsource as they need to access local knowledge in order to adapt their products or processes to those local markets. Consequently, it can be hypothesized that:

Hypothesis 3: Firms following an international strategy based in achieving local responsiveness will have a higher propensity to outsource R&D services than the rest of the firms.

METHODS

Data and Sample

The data used in this paper stems from an international survey on R&D services outsourcing conducted on a sample of firms competing in R&D intensive industries. We sent a questionnaire to firms headquartered in the US or in the European Union (EU) with more than 100 employees and whose first 2-digit SIC code was one of the 5 defined in the OECD classification as technology intensive industries (OECD, 1997): SIC 28, 35, 36, 37 and 38. This is an interesting setting to study this phenomenon if we consider that efficiently managing R&D plays a crucial role in the competitive strategy of these industries. The stratified sample was selected from both the domestic and the international version of the Dun & Bradstreet Million Dollar Database, which spans all industries providing information on companies with $1 million or more in sales

or more than 20 employees. After following the principles of the Total Design Method (Dillman, 1978) 182 responses were received (101 from the EU and 81 from the US) reaching a response rate of 5%. It must be noted that, cross-national mail surveys aiming at an industrial population generate very low response rates, similar to the one obtained in this study (see for instance Yip and Dempster, 2005). In addition, in an international context there are virtually no alternatives to mail surveys if more than a couple of countries are included (Harzing, 2000). The 182 responses obtained are representative of the real population in terms of the distribution by sector, country of origin and size. Due to the different sizes and industries comprehended in our targeted population, the questionnaire was mailed to firm CEOs with request to pass it on to the head of R&D or technology if necessary. We also make the questionnaire available on the internet. The returned questionnaires were filled out by senior managers: largely by presidents, VPs, heads of R&D or heads of the technology or engineering departments.

Our final sample includes 74 firms that declared not being outsourcing any R&D service (40% of our sample) and 108 firms that were outsourcing at least one R&D service (60% of our sample). The distribution of outsourcing firms by sector of activity is the following (see table 1):

Insert table 1 about here

By region of origin, we have 101 firms from the EU and 81 firms from the US. Consequently, the distribution by country is as follows: US (81), Austria (2), Belgium (2), Czech Republic (1), France (9), Germany (24), Ireland (2), Italy (32), Poland (3), Portugal (1), Spain (9), Sweden (3),

The Netherlands (1), and UK (12). The methodology of our survey is described in more detail in the Appendix "Research Methodology".

Dependent variable and method of analysis

In order to test our hypotheses we use a probit model. The make vs. buy literature has often employed binary choice models to analyze the relationship between a set of covariates and the make vs. buy decision (Mayer and Salomon, 2006; Pisano, 1990; Poppo and Zenger, 1998) and given a dichotomous variable, a logit or probit model is the preferred estimation technique (Kennedy, 1998). In this case we used the probit model as its maximum-likelihood estimation procedure is particularly appropriate for dealing with the qualitative data employed in this study.

The dependent variable ("OUTSOURCING") is a binary one and represents whether the firm outsource, or not, any of the R&D services either to providers located at the home country or abroad. For this purpose, after making an exhaustive literature review of academic papers, reports, and firms' websites we managed to create a list of different R&D services or stages that we found were usually integrating firms' innovation processes. This list was revised by a consulting firm and several R&D managers that helped us to better define the service list. After their reviews, our final list comprehends 12 different R&D services (see Appendix for a detailed list of the R&D services). Thus, in our questionnaire we asked respondents to indicate which of them were outsourced or not. The dependent variable equals 1 if the firm does outsource one or more of the R&D services, while equals 0 if the firm does not outsource any of them. In the probit model, a positive sign of the coefficient indicates that the effect of the variable on probability of outsourcing is positive, while a negative sign indicates that the effect on probability of outsourcing is negative.

Independent variables

Our independent variables were constructed as follows.

PATENTS: As an indicator of the firm's valuable technological resources and capabilities we use the number of patents that has been assigned to the firm until 12/31/2006, as a measure of its technology competences and resources. Because experience and capabilities are developed and accumulated over time, this variable counts the number of patents that has been assigned to the firm. To build this variable we gathered the data recorded in the United States Patent Trademark Office (UPSTO). This information was obtained from the web page http://www.upsto.gov

DUMMY IPR: This dummy variable is obtained from the index of protection of intellectual property rights (IPR) developed by Ginarte and Park (1997) and updated by Park for the year 2000. This index has been widely used in the literature and it assigns a value from 0 to 5 to each country depending on its national patent legal system (value 5 indicating maximum protection). The relative superiority of this index compared to other alternative measures is due to the fact that this index describes more in detail the standards of the intellectual property rights what leads to a greater variability of the index both among countries and time. We took the value of the index for the country of origin of the firm as their home country is usually the first option to outsource. In order to facilitate the interpretation of this variable, especially when multiplied by the number of patents, we decided to include this index as a dummy variable that takes value 1 if the IPR_i of the firm home country is equal or higher that the median value of the IPR of the home countries of the firms in the whole sample (i.e. IPR>= 4.52), and 0 otherwise. This is an indicator of the strength of intellectual property rights.

LOCAL RESPONSIVENESS: To capture the local responsiveness attitude of the firms' corporate strategy, we developed this dummy variable that takes a value 1 if the firm is a MNE with a multidomestic or transnational international corporate strategy and 0 otherwise. This variable was developed using the technique and the four questionnaire items developed by Harzing (2000) to empirically test Bartlett and Goshal's (1989) typology of multinational firms. These items measure the importance in the firm's corporate strategy of competing, on one hand, on a global or a local basis, and on the other hand on achieving economies of scale or achieving local responsiveness.

OTHER MNEs**:** Dummy variable that takes a value 1 if the firm is a MNE following a corporate strategy not classified as multidomestic or transnational, and 0 otherwise. Domestic firms act as a reference for these two last variables.

Control variables

In order to account for firm heterogeneity, we also introduced other control variables that may also affect the propensity to outsource R&D services. Specifically, we have included the following control variables:

R&D CENTRALIZATION: We classified firm's R&D organization into 4 archetypes according to the typology developed by Von Zedwitz and Gassmann (2002) by which they classify firms into 4 archetypes (national treasure, market-driven, technology-driven and global) according to their motivation to either access local markets and clients, or their motivation to access local science and technology. Different strategies require different decisions thus because the level of

internationalization of the firm R&D activities may influence its ability to access new sources of technological knowledge or its ability to achieve economies of scale, this variable controls for firm international configuration of R&D activities. Consequently, we control for those firms that concentrate their R&D activities at their home country, versus other configurations, using a dummy variable that takes a value 1 if the firm concentrates its R&D activities in its home country and 0 otherwise.

FIRM SIZE: In order to control for the firm size we used firm sales during 2005 in dollars. We also ran models using the number of employees as an alternative measure of firm size and we obtained the same results.

FIRM ORIGIN: Dummy variable that takes a value 1 if the firm region of origin is the European Union and 0 if it is the US.

FIRM INDUSTRY: We introduced dummies to control for the industry the firm operates (SIC 28, SIC 35, SIC 36, SIC 37, SIC 38).

Table 2 presents the descriptive statistics and the correlations between independent and control variables. In general, there are no high correlations. Except from the correlation between the dummy variables LOCAL RESPONSIVENESS and OTHER EMNs (r= -0.56) and between the control variable FIRM ORIGIN and DIPR (r= -0.50). Given these high correlations we mean-centered the relevant continuous variable PATENTS before calculating the interactions.

Insert table 2 about here

RESULTS

Table 3 reports the results from probit regressions using five different specifications: control variables only (model 1), independent variables only (model 2), control and independent variables (model 3), control and independent variables with interaction effects for technological resources with the level of protection of IPR (model 4). We also estimate an additional mode (model 5), including the interaction between the LOCAL RESPONSIVENESS variable and PATENTS*DUMMY IPR. Specifically, the table shows the value of the regression coefficients, their standard error and an indication of their significance level for each model. The results are consistent across specifications.

Insert table 3 about here

As can be seen in Table 3, the results of the estimations confirm our hypotheses. It can be observed that in accordance with Hypothesis 1, the PATENTS variable presents a positive sign and is statistically significant in models 2 and 3. Thus, this confirms that the likelihood of outsourcing an R&D service increases the more valuable technological resources the firm has. The net effect of PATENTS in models 4 and 5 is dependent on the value of DUMMY IPR. When the IPR protection system is weak (DUMMY IPR=0) the net effect of PATENTS is negative and significant, showing that firms having valuable technological capabilities are reluctant to outsource R&D services in order to protect them. However, when IPR the protection system is strong (DUMMY IPR=1) the net effect of PATENTS is positive and significant

(according to a t-test significant at $p<0.05$) showing that firms having valuable technological capabilities are willing to outsource R&D services in those cases in which they can protect them. This result confirms hypothesis 2.

Finally, hypothesis 3 is also confirmed. Our dummy variable LOCAL RESPONSIVENESS presents a statistically significant and positive sign across specifications. Note that because we introduced two of the three dummy variables associated with corporate strategy (domestic firms are omitted), estimated coefficients for these variables measure the degree to which the impact of this variable on the probability to outsource R&D services is significantly different (higher or lower) than that the omitted variable (Kennedy, 1998). In this case, we introduced also the dummy variable OTHER EMNs, and omitted those firms being domestic. This indicates that multinational firms pursuing an international corporate strategy where being locally responsive is very important are more likely to outsource R&D services compared to domestic firms. In this regard, in model 5, we also introduced the interaction of this variable LOCAL RESPONSIVENESS with the variable PATENTS*DUMMY IPR (PATENTS*DUMMY IPR* LOCAL RESPONSIVENESS). We introduced this interaction because we expected that for this type of firms the level of protection of IPR at the firm home country not to be significant. In fact, model 5 shows this interaction to be non-significant. This can be explained because for those multinational firms with a high local responsive attitude, such as those pursuing a multidomestic or transnational international corporate strategy, the level of protection of IPR in their respective home countries will not be so determinant due to their higher exposure to international markets as they can choose between provider located in different countries. Thus, because these firms are more open to international markets and they will be more able to select worldwide suppliers,

they may be more affected by the protection of IPR across the different countries the firm is operating and not so much by the protection of IPR in its home country.

Regarding the control variables introduced none of them seem to be statistically significant across models. However it is interesting to point out that, though being non significant, R&D CENTRALIZATION, that has a negative and significant coefficient in model 1, loses its significance after including the independent variables. This result means that internal capabilities and not the size of the R&D department are critical to explain R&D service outsourcing decisions.

DISCUSSION AND CONCLUSION

Our paper is aimed at making a contribution to the emerging literature acknowledging the role of firm capabilities and contractual hazards in governance decisions (Leiblein and Miller, 2003; Mayer and Salomon, 2006). Our work thus makes an attempt to apply these insights to a recent and emerging phenomenon such as the outsourcing of R&D services. On one hand, we expected that in those contexts in which a firm can protect their technologies, the possession of valuable technological capabilities increase the likelihood to outsource R&D services. And, on the other hand, we also expected that those firms having a local responsiveness attitude will have a higher likelihood to outsource R&D services than the rest of the firms. Our empirical results have confirmed these hypotheses.

In this regard, we find that, within technology intensive industries, a firm's technological resources together with their international corporate strategy influence R&D outsourcing decisions. Specifically, on one hand, we find that valuable technological capabilities improve a

firm's ability to govern transactions, increasing the likelihood to outsource R&D services. This can be explained because these "governance capabilities" allow firms to better select and monitor external providers, thus reducing contractual hazards. This finding is consistent with Mayer and Salomon (2006) work. However, we find that this positive relation would not hold in those situations were there is a weak protection of intellectual property rights. Consequently, this suggests that in this institutional context, the high appropriability hazards resulting from a weak protection of intellectual property rights will prevail over the reduction of contractual hazards the firm can achieve as a result of their governance capabilities. As a result, we find that those firms with more technological capabilities will tend to outsource R&D services in those contexts in which intellectual property rights protect effectively a firms' proprietary knowledge.

On the other hand, we have analyzed the impact of a firms's international strategy on the R&D outsourcing decision. In this regard, we find that those firms having a local responsiveness attitude, i.e. those firms adopting a multidomestic or a transnational corporate strategy (Bartlett and Ghoshal, 1989, Harzing, 2000) will have a higher propensity to outsource R&D services compared to other firms. Thus, we find that those multinational firms pursuing a multidomestic or transnational international corporate strategy are more likely to outsource R&D services. This finding suggests that the dispersion of technological knowledge may imply a greater need for firms to engage in finding new sources of knowledge. Consequently, the establishment of R&D outsourcing agreements with providers in the local markets may serve as effective mechanism to identify the potential for new products and services or faster and better access to new technologies.

Our study is limited in several aspects. First, our dependent variable does not distinguish between types of R&D services being outsourced. As not all the R&D services within the innovation process have the same strategic importance, it would be interesting to distinguish the R&D outsourcing decision by type of R&D service being outsourced. We also obtained a low response rate, although our respondent firms are representative of the whole population consulted. Finally, we analyzed a firm's technological capabilities globally by identifying only the cumulative number of patents.

Bearing in mind these limitations, we can affirm that there still exist aspects related to the propensity to outsource R&D that deserve the attention of researchers. In this regard, the rise of R&D services outsourcing have coincided with a trend by multinational enterprises to reallocate some of their R&D activities to emerging countries, what is referred as *offshoring (*Bunyaratavej et al, 2007; Kotabe and Murray, 2004; Lewin and Peeters, 2006). However, due to the novelty of this phenomenon, there is a lack of empirical studies that can shed light on its magnitude. Thus, our study attempts to make a contribution to try to identify the distinctive features of R&D services outsourcing. In particular, different ways exist to extend the results of our study. First, to carry out empirical studies that take into account the type of R&D service outsourced (core or non-core) and the location of the R&D service provider. A second way to develop the study would be to analyze separately the impact on R&D outsourcing of the different types of technological advantages a firm may have. Finally, future research might analyze not only the propensity to outsource R&D, but also the effectiveness of outsourcing agreements as well as the relationship between R&D *offshoring* and the *offshoring* of production activities.

TABLE 1

Distribution of outsourcing firms by industry.

FIRMS	SIC 28	SIC 35	SIC 36	SIC 37	SIC 38	Total
Do not outsource R&D	18	28	16	5	7	74
Do outsource R&D	27	30	24	11	16	108
Total	45	58	40	16	23	182

TABLE 2

Descriptive statistics and correlation matrix.

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. OUTSOURCE	0,593	0,493														
2. PATENTS	0,003	236,733	0,13													
3. DUMMY IPR	0,764	0,426	0,15	0,07												
4. LOCAL RESPONSIVENESS	0,484	0,501	0,15	0,08	-0,03											
5. PATENTS*DUMMY IPR	6,789	229,556	0,14	0,97	0,02	0,06										
6. PATENTS*DUMMY IPR*LOCAL RESPONSIVENESS	9,857	161,393	0,10	0,68	0,03	0,06	0,70									
7. OTHER MNEs	0,253	0,436	-0,01	-0,11	0,03	-0,56	-0,10	-0,04								
8. R&D CENTRALIZATION	0,495	0,501	-0,17	-0,21	-0,10	-0,28	-0,19	-0,13	-0,07							
9. FIRM SIZE (in million $)	475	2320	0,10	0,29	0,06	0,12	0,25	0,15	-0,07	-0,17						
10. FIRM ORIGIN	0,555	0,498	-0,11	-0,19	-0,50	-0,17	-0,17	-0,12	0,11	0,09	-0,12					
11. SIC 28	0,247	0,433	0,01	0,09	-0,16	0,03	0,10	0,19	-0,04	-0,08	0,01	0,13				
12. SIC 35	0,319	0,467	-0,11	-0,04	0,02	-0,17	-0,02	-0,05	0,17	-0,04	-0,08	0,02	-0,39			
13. SIC 36	0,220	0,415	0,01	-0,03	0,11	0,12	-0,02	-0,10	-0,13	0,11	-0,06	-0,09	-0,30	-0,36		
14. SIC 37	0,088	0,284	0,06	-0,06	0,04	0,05	-0,06	-0,08	-0,05	0,08	0,22	-0,07	-0,18	-0,21	-0,16	
15. SIC 38	0,126	0,333	0,08	0,02	0,02	0,00	-0,03	0,01	0,01	-0,05	-0,01	-0,03	-0,22	-0,26	-0,20	-0,12

TABLE 3

Estimates of probit models proposed.

OUTSOURCING	***Hi***	***Model 1***	***Model 2***	***Model 3***	***Model 4***	***Model 5***
PATENTS	H1 (+)		0.001	0.001	-0.003	-0.003
			(2.21)**	(1.95)*	(1.81)*	(1.81)*
DUMMY IPR			0.435	0.435	0.579	0.580
			(1.93)*	(1.65)*	(2.17)**	(2.17)**
PATENTS*DUMMY IPR	H2 (+)				0.004	0.004
					(2.64)***	(2.56)**
LOCAL RESPONSIVENESS	H3 (+)		0.553	0.448	0.493	0.492
			(2.39)**	(1.75)*	(1.88)*	(1.89)*
OTHER MNEs			0.359	0.314	0.328	0.328
			(1.36)	(1.13)	(1.17)	(1.17)
PATENTS*DUMMY IPR*LOCAL RESPONSIVENESS						-0.000
						(0.03)
R&D CENTRALIZATION		-0.391		-0.197	-0.179	-0.179
		(1.97)*		(0.90)	(0.82)	(0.82)
FIRM SIZE		0.000		0.000	0.000	0.000
		(0.70)		(0.46)	(1.11)	(1.11)
FIRM ORIGIN		0.000		0.025	0.060	0.060
		(1.07)		(0.10)	(0.25)	(0.25)
SIC28		-0.229		-0.233	-0.296	-0.296
		(0.66)		(0.57)	(0.83)	(0.83)
SIC35		-0.432		-0.454	-0.524	-0.524
		(1.32)		(1.15)	(1.54)	(1.55)
SIC36		-0.187		-0.290	-0.363	-0.364
		(0.53)		(0.71)	(0.99)	(1.00)
SIC37		0.011			-0.095	-0.096
		(0.03)			(0.21)	(0.21)
SIC38				-0.038		
				(0.08)		
Constant		0.768	-0.434	-0.023	-0.145	-0.144
		(2.44)*	(1.70)	(0.04)	(0.30)	(0.30)
N		182	182	182	182	182
Log pseudo-Likelihood		-117.64	-116.34	-114.57	-112.60	-112.60
Percentage of cases correctly classified		67.03%	62.64%	65.38%	64.29%	64.29%

Robust z statistics in parentheses

* significant at 10%; ** significant at 5%; ***significant at 1%

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.

Agyres, N. 1996 ‘Evidence on the role of firm capabilities in vertical integration decisions’, Strategic Management Journal, 17: 129-150.

Akerlof, G.A. 1970 ‘The market for lemons: Qualitative uncertainty and the market mechanism’, Quarterly Journal of Economics, 84: 488-500.

Arora, A., Arunachalam, V. S., Asundi J. and Fernandes R. 2000 ‘The Indian software services industry’, Research Policy, 30 8:1267-1287.

Bartlett C. A. and Ghoshal S. 1989 ‘Managing Across Borders: The Transnational Solution’, Harvard Business School Press: Boston, MA.

Bunyaratavej, K., Eugene D. Hahn and Jonathan P. Doh 2007 ‘International offshoring of services: A parity study’, Journal of International Management, 13 (1) pp. 7-21. International Outsourcing of Services: Expanding the Research Agenda

Coase, R. E. 1937 ‘The Nature of the Firm’. Economica, 4: 386-405.

Das, T.K., Teng, B. 2000 ‘A resource-based theory of strategic alliances’, Journal of Management, 26 (1), pp. 31-61.

Dillman, D. A. 1978. Mail and telephone surveys: The total design method. New York, NY: John Wiley & Sons

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: 139-152

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.

Ginarte, J.C. y W.G. Park 1997: "Determinants of patent rights: A cross-national study", Research Policy, 26, pp. 283-301

Gottfredson , M., Puryear, P. and Phillips S. 2005 ‘Strategic sourcing: From periphery to the core, Harvard Business Review, Feb. 05, pp. 132-139.

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.

Harzing, A. 2000 An Empirical Analysis and Extension of the Bartlett and Ghoshal Typology of Multinational Companies, Journal of International Business Studies, Vol. 31, No. 1. 1st Qtr., 2000, pp. 101-120

Harzing, A. 2000 ‘Cross-National Industrial Mail Surveys Why Do Response Rates Differ between Countries?’, Industrial Marketing Management , Volume 29, Issue 3, Pages 243-254.

Henisz, 2000 ‘The Institutional Environment For Multinational Investment’, Journal Of Law, Economics And Organization 16 2: 334-64

Henisz W. J. and Williamson, O. E. 1999 ‘Comparative Economic Organization Within and Between Countries’, Economics and Politics, 1: 261-276

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. and Rothaermel, F.T. 2003 ‘The performance of incumbents firms in the face of rapid technological innovation’. Academy of Management Review, 28: 257-274.

Hoetker, G. 2005 ‘How much you know versus how well I know you: Selecting a supplier for a technically innovative component’, Strategic Management Journal, 26: 75-96.

Jacobides, M. G. 2005 ‘Industry change through vertical disintegration: How and why markets emerged in mortgage banking’, Academy of Management Journal, vol. 48, No. 3, June: pp. 465-498

Kennedy, P. 1998 ‘A Guide to econometrics’, fourth ed. The MIT Press, Cambridge, MA.

Klein, B., Crawford, R. G. and Alchian, A. A. 1978 ‘Vertical Integration, Appropriable Rents, and the Competitive Contracting Process’, Journal of Law and Economics 21October: 297-326.

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.

Kotabe and J.Y. Murray. 2004 Global sourcing strategy and sustainable competitive advantage, Industrial Marketing Management 33 (2004), pp. 7–14

Leiblein, M.J. and Miller, D.J. 2003 ‘An empirical examination of transaction- and firm-level influences on the vertical boundaries of firms’, Strategic Management Journal, 24: 839-859.

Lewin, A. and Peeters C. 2006 ‘Offshoring Work: Business Hype or the Onset of Fundamental Transformation?’, Long Range Planning, 39, 221-239.

Madhok A. 1997 ‘Cost, value and foreign market entry mode: the transaction and the firm’, Strategic Management Journal 181: 39-61.

Malhotra, N. 2003 ‘The Nature of Knowledge and the Entry Mode Decision’, Organization Studies, Vol. 24, No. 6, 935-959

Masten S, Meehan JW and Snyder EA. 1991 ‘The costs of organization’, Journal of Law, Economics, and Organization 7: 1-25.

Mayer K.J and Salomon R.M. 2006 ‘Capabilities, contractual hazards, and governance: Integrating resource-based and transaction cost perspectives’, Academy of Management Journal, 49: 942-959.

Monteverde, K. 1995 ‘Technical dialog as an incentive for vertical integration in the semiconductor industry’, Management Science, 41 10: 1624-1638.

Mudambi, R. 2002 ‘Knowledge management in multinational firms’, Journal of International Management, Volume 8, Issue 1, 2002, Pages 1-9.

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.

Nickerson, J.A. and Silverman, B.S. 2003 ‘Why firms want to organize efficiently and what keeps them from doing so: Inappropriate governance, performance and adaptation in a deregulated industry’, Administrative Science Quarterly, 48: 433-465.

OECD, 1997 ‘Revision of the High Technology Sector and Product Classification’, Paris, 4-jun-1997.

Parmigiani, A.E. 2007: Why Do Firms Both Make and Buy? An Investigation of Concurrent Sourcing, Strategic Management Journal, Vol. 28, pp. 285-311.

Pavitt, K. 1999 ‘Technology, Management and Systems of Innovation’, Cheltenham: Edward Elgar.

Pisano, G. 1990 ‘The R&D Boundaries of the Firm: An Empirical Analysis’, Administrative Science Quarterly, 35: 153-176.

Poppo, L. and Zenger, T. 1998 ‘Testing alternative theories of the firm: transaction cost, knowledge-based, and measurement explanations for make-or-buy decisions in information services’, Strategic Management Journal, 19 9: 853-877.

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.

Subramian M.and Venkatraman N., 2001 ' Determinants of transnational new product development capability: Testing the influence of transferring and deploying tacit overseas knowledge, Strategic Management Journal, 22: 359–378

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

Teece, D. 1986 'Profiting from technological innovation: implications for integration, collaboration, licensing and public policy', Research Policy, 15: 285-305.

Tsang, E. W. K. 2000 'Transaction cost and resource-based explanations of joint ventures: a comparison and synthesis', Organization Studies, 21 (1): 215-242

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.'

Von Zedwitz, M. And Gassmann 2002 'Market versus technology drive in R&D internationalization: four different patterns of managing research and development', Research Policy, 31, 4, pp. 569-588.

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. 1999 ‘Strategy research: Governance and Competence Perspectives’, Strategic Management Journal, 20: 1087–1108

Yip G. and Dempster, A. 2005 ‘Using the internet to enhance global strategy’, European Management Journal, vol.23, 1, pp. 1-13.

APPENDIX A

Research Methodology

Our main research method was to collect data from high-tech companies in US and the European Union (EU) using a specially designed questionnaire.

Questionnaire

A five-page questionnaire was developed on the following issues:

- Company's corporate strategy.
- Company's level of R&D internationalization and R&D strategy.
- Company's R&D outsourcing practices: what R&D services they outsource and where, why they do so and why not, and their level of satisfaction with these agreements.
- Other company data.

The questionnaire was pre-test on 7 R&D managers located in several countries. Based on their suggestions we made some modifications. Due to the international nature of the targeted population, the questionnaire was translated into 4 languages: English, French, Spanish, and German.

Firm interviews

In order to better understand the R&D outsourcing phenomenon and develop a more comprehensive questionnaire, we also conducted interviews with the heads of Technology and Innovation of a large US-based multinational company.

Sample

The targeted population was companies headquartered in the US and the European Union with more than 100 employees and whose first 2-digit SIC code was one of the 5 defined in the OECD classification as technology intensive industries: (28) chemicals and allied products, (35) transportation equipment, (36) computers and electronics, (37) industrial machinery, and (38) analysis and measurement equipment. The stratified sample was selected from both the domestic and the international version of the *Dun & Bradstreet Million Dollar Database*, which spans all industries providing information on companies with $1 million or more in sales or 20+ employees. After these searching criteria, the database threw a list of 3529 US firms and a list of 3375 EU firms. From these lists, we randomly selected from the stratified samples 2000 firms from the US and 2000 from the EU.

Due to the different sizes and industries comprehended in our targeted population, the questionnaire was mailed to firm CEOs with request to pass it on to the head of R&D or technology if necessary. We also make the questionnaire available on the internet. The returned questionnaires were filled out by senior managers: largely by presidents, VPs, heads of R&D or heads of the technology or engineering departments.

A total of 105 completed surveys were received from the first mailing in July 2007. A second mailing was sent 3 months later and a further 33 surveys were received. A number of 303 mailings were returned as undeliverable (197 for the US and 106 for the EU). We also made follow-up telephone calls to those firms in those countries or sectors for whom we had a lower response rate in order to get a representative sample of our targeted population. After this follow-

up process 44 extra questionnaire replies were collected. Thus, we obtained a final sample of 182 usable responses (81 for the US and 101 for the EU) and after deducting the undeliverable addresses, our responses rates were as follows: 4.5 % for the US and 5.33% for the EU. It must be noted that, cross-national mail surveys aiming at an industrial population generate very low response rates, however in an international context there are virtually no alternatives to mail surveys if more than a couple of countries are included (Harzing, 2000). Besides, when the questionnaire is aimed to be completed by top managers this response rate is expected to decrease. In fact we can find similar response rates in recent studies such as the one of Yip and Dempster (2005). In relation to this, we called some of our non-respondents and we asked them to indicate the reason for not wanting to do so. According to them managers are subject to such a competitive pressure and short deadlines that they do not find the time to reply questionnaires. Besides, firms, and more particularly top managers, are receiving so many questionnaires per month that most of the companies have decided to establish the policy to not allow employees to reply any of them. Firms are thus subject to a "questionnaire fatigue" (Harzing, 2000). Furthermore, the complexity of the topic object of our study negatively influences response rates. As a consequence, even that the response rate may appear a bit low, and thanks to the selective follow-up telephone contacts, the 182 responses obtained are representative of the real population in terms of the distribution by sector, country of origin and size.

We compared the responses of the sample that responded to the first mailing and those that responded the second one in order to check whether responding companies might be significantly different from non-responding ones. We found no significant differences in means of 95% confidence level between early and late respondents in terms of firm size or the decision to outsource R&D. So, we can conclude there is unlikely to be significant non-respondent bias.

Sample characteristics

Firm nationality: The distribution by country of our final sample is as follows (see table A1):

Insert table A1 about here

Firm size: The size in annual revenues of the firms ranged from $1.32 million to $28.6 billion with a mean of $475 million. While the size in total number of employees of the firms ranged from 100 to 182500 employees with a mean of 2576 employees.

R&D spending over sales and International sales: R&D spending over sales ranged from 1% to 30%, with a mean of 5.41%. While on average, international revenues accounted for 48% of total firm revenues, with a standard deviation of 28%.

Type of R&D services analyzed

The R&D services comprehend in our list are basic or fundamental research, applied or experimental research, development of new products or new or improved processes, product design, design of technology processes and engineering system architectures services, software development, scientific and technical support consulting services, software implementation services, testing and analysis services, and training and recruitment of R&D personnel services. Our results show that 108 out of 182 do outsource R&D services (60% of our sample). If we analyze how many R&D services out of the 12 services in our list they do outsource, we find that 22 firms (21% of the outsourcing firms) outsource just 1 R&D service, 18 firms (17%) 2 services,

15 firms (14%) 3 services, 8 firms (7%) 4 services, 14 firms (13%) 5 services, 5 firms (5%) 6 services, 6 firms (6%) 7 services, 2 firms (2%) 8 services, 4 firms (4%) 9 services, 1 firm (1%) 10 services, 2 firms (2%) 11 services, and 10 firms (10%) outsource all the 12 R&D services listed.

TABLE A1

Sample distribution by country of origin

Home country of Firm	*Number of respondents*	*(% of the total sample)*
Austria	2	*1.1%*
Belgium	2	*1.1%*
Czech Republic	1	*0.5%*
France	9	*4.9%*
Germany	24	*13.2%*
Ireland	2	*1.1%*
Italy	32	*17.6%*
Poland	3	*1.6%*
Portugal	1	*0.5%*
Spain	9	*4.9%*
Sweden	3	*1.6%*
The Netherlands	1	*0.5%*
UK	12	*6.6%*
Total Europe	101	*55.5%*
USA	81	*44.5%*
Total Sample	182	*100%*

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