Offshoring and the Global Sourcing of Talent: Understanding the New Frontier of Internationalization

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ABSTRACT: Companies in high-cost developed economies are increasingly migrating white-collar activities at offshore low-wage locations. Recent researches confirm that firms are progressively sourcing abroad higher-skilled technical, engineering and scientific jobs. The purpose of this study is to investigate why and how companies currently offshore product development activities. We develop hypotheses on the motivations behind this higher-skilled offshoring and on the peculiar internationalization process followed. We test them on a fine-grained database containing 262 offshore implementations initiated by 71 Western European companies. The results obtained confirm that the actual process of product development offshoring presents remarkable theoretical novelties that differentiate it from previous waves of internationalization.

KEYWORDS: Offshoring; Global Sourcing; Product Development; Internationalization Process
Companies in high-cost developed economies are increasingly migrating white-collar activities at offshore locations. The recent progresses achieved in telecommunications technology have sensibly reduced the costs of operating remotely (Zaheer and Manrakhan, 2001). Low-cost emerging economies have thus rapidly turned into accessible and competitive alternative destinations for relocating specific value activities (Farrell, 2004; Karmarkar, 2004). This recent trend has soon attracted wide media coverage and political concern (Engardio, Bernstein, and Kripalani, 2003; Hamm, 2007; Hubbard, 2006; Taylor, 2006). The more pessimistic analysts have pointed at the migration abroad of white-collar jobs as the beginning of an ill-fated service revolution that will socially and economically hamper developed economies (Levy, 2005). The more optimistic ones have instead focused on the rising opportunities available to Western companies to boost their profits, and to their Western workers to upgrade their capabilities in order to remain competitive in a globalized labor market (Farrell, 2005).

What is currently generating particular interest and concern is the fact that companies are increasingly sourcing abroad higher-skilled technical, engineering and scientific jobs (Lewin and Peeters, 2006a, 2006b). While initially offshoring was basically restricted to the migration abroad of contact centers, administrative and IT functions, now it is increasingly including the shift abroad of product development activities such as R&D, product design and engineering services. Considered by conventional wisdom as the critical value-generating activities of most enterprises, their current relocation represents a major geography-related change in the organization of corporations (Venkatraman, 2004). After an initial period of limited consideration, international management (IM) scholars are now progressively directing their research efforts to the emerging phenomenon of offshoring (Doh, 2005; Farrell, Laboissière, and
Rosenfeld, 2006; Parkhe, 2007). Nonetheless, given its early stage and the difficulty of collecting exhaustive information from offshoring companies, very few are the studies that thoroughly address the recent practice of product development offshoring and its theoretical underpinnings.

In this paper we argue that the current process of internationalization followed by firms offshoring innovation work presents important theoretical novelties. An extensive IM literature, most of it based in the stages model of internationalization (Johanson and Vahlne, 1977), examines the rationale behind the international expansion of firms and the key variables influencing such process. In this study we seek to extend this literature to incorporate insights into how the recent practice of product development offshoring currently takes place. We make this extension because firms offshoring innovation work today are redistributing their value activities worldwide in a way that is radically different from the relocation of international activities that characterized previous waves of internationalization (Venkatraman, 2004).

The purpose of this study is therefore to investigate why and how firms currently offshore product development activities. We deliberately focus on the actual relocation of knowledge-intensive functions requiring technical talent because it represents the latest and most innovative evolution of offshoring (Lewin and Peeters, 2006b). It is also the one change in the international organization of corporations that is expected to have the most significant impact on the global realignment of qualified jobs (Karmarkar, 2004). We develop hypotheses on this specific international redistribution of activities and test them on a fine-grained database containing 262 offshore implementations initiated by 71 Western European companies.

This study contributes to the existing literature on two levels. First, we examine the motivations behind the current offshoring of product development activities and show that companies relocate higher-skilled knowledge-intensive functions with the only objective to
access talent and thus expand their pool of capabilities (Chung and Alcacer, 2002). In this
decision labor cost arbitrage is not a relevant driver, contrary to the generalized perception
according to which the migration to offshore locations of ICT-enabled functions has the search
for efficiency and cost reduction as its only *raison d'être* (Aron and Singh, 2005). We speculate
on the current shortage of technical talent in Western Europe as a possible determinant of these
results.

The second contribution is relative to the process model currently followed by firms
sourcing abroad higher-skilled talent. The dominant stages model of internationalization
(Johanson and Vahlne, 1977) suggests that firms gradually increase their international
commitment. As a result of the large amount of uncertainty linked to their international
operations, firms tend to increasingly build on their international investment experience in two
main aspects: starting from culturally and geographically close countries for then moving to
more distant ones, and following a staged investment path that begins with exporting and ends
with a wholly-owned production facility (Davidson, 1980). We argue that the global competitive
landscape is changing and that firms are now following innovative dynamic models when
internationalizing their activities. The recent technological progresses have significantly
modified the evaluation of distances and the related costs of operating remotely. As a result, the
offshoring of product development activities is not any longer the product of a linear staged
model. Firms look at cultural and geographical distances differently from the past. International
experience and firm size are not any longer reliable predictors of high-value foreign investments.
Companies continuously search for agile and flexible innovation processes. The recent
technological progresses have given them the opportunity to disaggregate their value chain and
redistribute single activities leveraging diverse skills and capabilities across dispersed locations.
(Santos, Doz, and Williamson, 2004). This study wants to open the debate on these issues, critically evaluating why and how firms internationalize their value-generating activities today.

We proceed as follows. The next section introduces the term offshoring and its most recent developments. Then we develop hypotheses relative to the rationale behind product development offshoring and the internationalization process used. Next are the methods and results. Finally, we highlight the major findings obtained, discuss future research, and conclude.

DEFINING OFFSHORING

Offshoring can be defined as the practice undertaken by companies of migrating activities at offshore locations outside their countries of origin (Venkatraman, 2004). Figure 1 offers a schematic representation of the definition of the term.

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Insert Figure 1 about here
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Clearly, offshoring per se does not represent anything new in the international business scenario. Western companies have in fact started migrating manufacturing work and blue-collar jobs long ago. What is more recent is the shift abroad of a series of white-collar business processes that only until few decades ago could be executed only at home (Dossani and Kenney, 2006). The recent technological developments have in fact given companies new opportunities to create value by globally relocating individual activities where they can be most efficiently executed (Zaheer and Manrakhan, 2001; Zaheer and Zaheer, 2001). While functions like call-center customer support or transaction processing have been traditionally performed at home, the recent technological advances have made it possible for companies to relocate them offshore. Foreign
locations, like India or China, have been selected on the basis of their capacity to offer well-trained workers that can perform those tasks as well, if not even better, and at more competitive wages than the corresponding white-collar workers at home. The term business process offshoring has thus been increasingly used to refer to the practice of moving ICT-enabled back-office business processes to offshore locations, usually low-cost (Dossani and Kenney, 2003).

Started as a relocation of fairly commoditized functions, companies have soon discovered the potential of these unexploited pools of talents (Farrell, 2004). Thus, they have rapidly started offshoring more complex and knowledge-intensive activities. Figure 2, summarizing insights from recent researches (Dossani & Kenney, 2003, 2006; Lewin and Peeters, 2006a, 2006b), documents the rapid inclusion of product development activities (e.g., R&D, product design and engineering services) in the offshoring wave.

This finding is consistent with other researches by Dossani and Kenney (2007), Henley (2006) and Levy (2005). These studies corroborate that North American and Western European companies, which are responsible for most of the offshoring worldwide (Agrawal, Farrell, and Remes, 2003; Marin, 2006), are increasingly moving abroad higher-skilled knowledge-intensive activities. Parallel to these works, other streams of IM literature are increasingly focusing on the management of geographically distributed virtual teams (Metiu, 2006; Hinds and Bailey, 2003; Hinds and Mortensen, 2005) and on the consequential creation of 24-hour knowledge factories (Gupta and Mukherji, 2007), where high-talent professionals work on the project around the clock taking advantage of the different time zones of their respective offshoring locations.
The increasing offshoring of higher-value activities is also confirmed by several anecdotal
evidences regularly published in the general press (Anderson, Cienski, and Condon, 2006;
Wighton, 2006). The purpose of this study is to focus precisely on these knowledge-intensive
product development activities and to investigate why and how firms currently offshore them.
For a matter of convenience, in the further development of the paper we will refer to the
offshoring of product development activities simply with PDO.

**HYPOTHESES DEVELOPMENT**

An extensive IM literature examines the rationale behind the international expansion of
firms and the key variables influencing such process. Over time scholars have been proposing,
testing and expanding models describing the internationalization process of firms. Out of this
vast amount of works two sub-streams can be identified. One focuses on the motivations that
drive the decision to invest abroad. The other is more process-oriented and thus concentrates on
the foreign investment path followed by firms and on the key variables that influence it. We will
keep these two streams separate when developing our hypotheses relative to what matters for
PDO.

**The Motivations for Product Development Offshoring**

IM scholars have identified five major motivations that can possibly drive firms to
initiate international investments: resource seeking, market seeking, efficiency seeking,
knowledge seeking and competitive pressure (Nachum and Zaheer, 2005). Resource and market
seeking can be contextualized as the more traditional motivations, mostly explaining the first
wave of internationalization that predominantly interested manufacturing activities
(Venkatraman, 2004). With the improvements of transportation infrastructures, companies began
expanding abroad in search, on one side, for tangible resources that were either missing or too expensive at home and, on the other side, for new markets where to produce and sell their products (Dunning, 1993). The recognition of transnational intra-firm integration as a potential source for competitive advantage (Fayerweather, 1969) led to the increasing inclusion of efficiency seeking as an alternative motivation for foreign investments (Kobrin, 1991).

Concentrating on the strategic interdependences of firms, other researchers emphasized the role of external competitive pressures as determinants for international expansion (Graham, 1998; Knickerbocker, 1973; Yu and Ito, 1988). The recent recognition of knowledge as a key determinant for the very existence of the multinational firm (Kogut and Zander, 1993; Santos et al., 2004) has opened the way to an increasing number of studies showing that the search for new capabilities can also significantly motivate international investments (Chung and Alcacer, 2002; Kuemmerle, 1999).

Recent studies have already advanced hypotheses regarding the main drivers behind the actual wave of offshoring (Lewin et al., 2007; Nachum and Zaheer, 2005; Pisani, 2007). Their findings prove that resource and market seeking are clearly not significant motivations behind the current offshoring of business process (Nachum and Zaheer, 2005; Pisani, 2007). Companies relocating white-collar activities abroad are not in search of tangible resources, such as lands or minerals, or new geographic areas where to produce and sell their products. Focusing on PDO and the search of new markets, we can thus hypothesize that the search for local customers does not represent a key driver behind the offshoring of innovation work. Hence, in line with previous findings, we posit:

Hypothesis 1. Market seeking is not a significant motivation behind the decision to offshore product development activities.
Labor cost differentials have always been recalled as the major motivation behind the impressive rise of offshoring directed to low-cost economies (Agrawal et al., 2003; Aron and Singh, 2005). Previous studies corroborate in fact that efficiency seeking is the determinant driver behind the relocation abroad of white-collar activities (Nachum and Zaheer, 2005; Pisani, 2007). However, these studies do not differentiate between lower and higher-skilled offshored activities. In other words, no distinction is made between the relocation of fairly commoditized activities, like administrative functions, and more knowledge-intensive activities, like product development tasks requiring specific technical talent. Building on such distinction, Lewin et al. (2007) argue that, while for the migration of IT, administrative and other back-office functions labor cost arbitrage remains a fundamental driver, it does not play a role when relocating abroad innovation work. Accessing global talent pools and reducing costs are in fact defined as two different offshoring strategies that companies pursue in distinct circumstances. Accessing talent is connected to the achievement of growth objectives, especially for those companies heavily relying on product development innovation as engine of their growth, while cost savings is linked to companies replacing high-cost workers with lower-cost ones (Lewin et al., 2007).

Building on their argument (Lewin et al., 2007), we hypothesize that labor cost differentials do not drive the decision to initiate PDO. The decision to offshore knowledge-intensive innovation work has to do with the search of new resources that allow the upgrade of the existing pool of capabilities (Kuemmerle, 1999). Cost cannot play a pivotal driver, as the access of new knowledge often represents a key factor for the survival and growth of the entire enterprise. As Santos et al. (2004) confirm, global innovation processes have cost reduction only as secondary benefit. Their main advantage lays in fact in the capacity of leading to a greater number of higher-value innovations. Furthermore, it is also worth stressing that cost arbitrages,
especially for knowledge-intensive activities, are extremely difficult to preserve. As a matter of fact, popular offshore destinations often experience escalating wages and remain subject to the ordinary fluctuations of their local currencies (Farrell, 2006; Waters, 2007). Therefore, we hypothesize:

**Hypothesis 2. Efficiency seeking is not a significant motivation behind the decision to offshore product development activities.**

The relocation of innovation work is generally linked to the search of new knowledge (Cantwell, 1989). Firms investing abroad for a knowledge seeking motivation are searching for new resources in order to upgrade their own existing pool of capabilities. These firms will primarily value locations close to sources of relevant knowledge. The chosen locations generally offer a competitive mix of high-skilled labor, greater R&D intensity and a consistent production of new patents in the region (Almeida and Kogut, 1999; Chung and Alcacer, 2002; Kuemmerle, 1999). The local presence in these areas is required in order to access the specific knowledge resources. As a proportion of knowledge remains tacit and difficult to codify, close and frequent interactions are necessary in order to acquire it (Kogut and Zander, 1993; Martin and Salomon, 2003). Local proximity is thus interpreted as an important facilitator in the effort of acquiring the desired capabilities.

PDO offshoring is clearly motivated by the search for new knowledge. The decision to relocate abroad product development activities such as R&D, product design or engineering services, implies the desire to access new capabilities that can help improving the innovation processes of the company. Firms initiating PDO thus highly value the presence of a competitive and diverse pool of technical talent in the offshoring region. The possibility to hire new technical talent offshore can become particularly necessary in presence of a corresponding shortage at home. Lewin et al. (2007) document that this is precisely the case for U.S.. The cut back in H1B
visa of 2003 has created a shortage of talented higher-skilled employees in the country. A similar investigation relative to some of the key members of the European Union (e.g., United Kingdom, Netherlands and Spain), confirms that the supply of Master and PhD graduates in Mathematics, Science and Technology has never consistently exceeded demand over the past years. Figure 3 illustrates the market for talent in these countries. The graph shows how the situation radically changes when considering the recent enlargement of the European Union.

This finding highlights that in some Western European countries there has been a shortage of technical talent. As shown by the graph, Eastern European countries have offered a nearshore solution to address such shortage (Anderson et al., 2006; Marin, 2006). Other developing economies have offered a more remote option to solve it. India, currently the leading recipient of offshored service jobs, represents the most illustrative example. Thanks to its prior development of software sector, its relatively favorable institutional environment and the presence of a developed education system, it has consistently offered over years a vast pool of English-speaking well-educated labor force (Dossani and Kenney, 2003, 2007; Lewin and Peeters, 2006a, 2006b). We thus hypothesize the search of technical talent as one of the key drivers behind the international relocation of product development activities.

Hypothesis 3. Knowledge seeking is a significant motivation behind the decision to offshore product development activities.

Companies can decide to offshore product development functions also as a reaction to competitors’ moves. The decision to imitate a competitor’s foreign investment strategy has the main objective of not losing sight of rivals’ activities and thus not giving them unproblematic
access to new markets and/or low-cost resources (Karnani and Wernerfelt, 1985; Knickerbocker, 1973; Nachum and Zaheer, 2005). Companies following their competitors can also take advantage of the positive externalities generated by the industry pioneers in the offshore destinations. These arguments seem particularly pertinent when analyzing the decision to offshore product development activities. For instance, to negate competitors a trouble-free exploitation of the vast pool of technical talent abroad can be one of the major reasons for following competitors in the global sourcing of talent. In the past decade companies hunting for talent offshore have in fact tended to invest in the same handful of regions in India, Eastern Europe and Russia. Cities like Bangalore, Prague and Moscow have rapidly become hot spots for foreign investments in knowledge-intensive activities (Farrell, 2006). Only recently, companies have started diversifying geographically their offshore investments, opting for alternative locations away from the current hot spots. This is happening mainly as a consequence of the significant escalating wages and increasing turnovers that are nowadays characterizing the more popular destinations (Waters, 2007). Thus, we can posit that industry considerations represent relevant variables in determining the global sourcing of talent initiated by Western companies.

Hypothesis 4: Competitive pressure is a significant driver behind the decision to offshore product development activities.

The Process of Product Development Offshoring

An extensive literature based in the stages model of internationalization (Johanson and Vahlne, 1977) examines the international expansion process of firms. The model, also named the Uppsala stage model, has its theoretical base in the behavioral theory of the firm (Cyert and March, 1963). Rooted in uncertainty reduction and experiential learning, it hypothesizes that firms incrementally increase their commitment in their foreign operations. This staged process interests the value chain of the company and its partial relocation in foreign countries (from
export to sales offices to production facilities to full value-chain subsidiary), its mode of
operations (from arm’s length transaction through partnerships with locals to wholly-owned
operations), and its geographical distribution (from more familiar to less familiar countries)
(Westney and Zaheer, 2001). The model has been extensively tested. Several studies focused on
the incremental commitment hypothesized in the model and tested whether international
experience is a reliable predictor of the international commitment of firms. Johanson and
Wiedersheim-Paul (1975), Juul and Walters (1987), Chang (1995), and Chang and Rosenzweig
(2001) confirmed that inexperienced firms make limited resource commitments in early
expansion operations and that such firms tend to commit more in their successive international
investments. However, various other studies (Nordstrom, 1991; Sullivan and Bauerschmidt, 1990;
Turnbull, 1987; Welch and Loustarinen, 1988) found exceptions to the general rule of increased
commitment characterizing the successive stages of the model.

Other scholars concentrated on testing the geographical implications of the model, which
predicts that companies tend to invest first in proximate countries for then moving to less
familiar ones. Geographic, cultural, linguistic and institutional factors have been considered in
defining the relative proximity of regions. While Barkema, Bell and Pennings (1996), Davidson
(1980, 1983), and Denis and Depelteau (1985) found empirical support for this hypothesis, other
studies (Benito and Gripsrud, 1992; Engwall and Wallenstål, 1988; Sullivan and Bauerschmidt,
1990) could not confirm that firms start investing in countries culturally closer to the home
country.

Over time scholars have extended the model in order to incorporate relevant factors and
thus improve its empirical validity. Among other issues, the level of competition of the host
country (Vahlne and Nordström, 1993), the changes in government regulation (Sullivan, 1984),
the cultural entry barriers (Kwon and Hu, 1995), the initial firm size (Oviatt and McDougall, 1994) and the political environment (Delios and Henisz, 2003) have been included in the stages model of internationalization. Although the quantitative empirical evidence has not always been supportive (Kalnins, 2007), the Uppsala stage model remains an intuitively appealing model (Delios and Henisz, 2003) that qualitative work has proved to be very insightful when understanding the decisions relative to firms’ international expansion (Sullivan and Bauerschmidt, 1990). Its overall relevance and extensive usage are confirmed by the fact that it has been cited 502 times in the Institute for Scientific Information’s (ISI) Web of Knowledge database as of November 2007.

In this section we argue that the current process of internationalization followed by firms offshoring innovation work presents important theoretical novelties when compared to the Uppsala stage model of internationalization. Companies offshoring innovation work today are redistributing their value activities worldwide in a way that is radically different from the relocation of international activities that characterized previous waves of internationalization (Venkatraman, 2004). We thus hypothesize that, while some of the insights of the Uppsala stage model still hold, others need to be reassessed in order to model properly the current wave of international expansion.

First of all, we argue that the current process of internationalization is not any longer as linear as hypothesized by the stage model. The recent technological progresses have sensibly reduced the costs of operating remotely (Zaheer and Manrakhan, 2001; Zaheer and Zaheer, 2001). Companies competing in turbulent environments have entered into processes of accelerated internationalization that led them to a rapid relocation of strategic functions at offshore locations (Gottfredson, Puryear, and Philips, 2005). The notion of born global firm has
been increasingly used in the mainstream IM literature to define the “business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries” (Oviatt and McDougall, 1994: 31). The capacity to succeed of these born global firms is based on their innovative and entrepreneurial usage of those technological progresses that have dramatically increased the speed, quality and efficiency of international communications and on their superior organizational capabilities to manage and coordinate knowledge-based resources (Oviatt and McDougall, 1994; Knight and Cavusgil, 2004).

Previous international experience may not be any longer a reliable predictor for the international commitment of firms. According to the stage model, the relocation of product development activities should represent the final step in the process of foreign expansion. Only after having gained significant experience in foreign countries, beginning with the more familiar ones, a firm is confident enough to decide to shift abroad its key value-generating activities. Contrary to this argument, we posit that nowadays previous international experience may not play a significant role in the decision to source abroad knowledge-intensive assets. The globalization of economic activities and the recent changes in the costs of distance have sensibly altered the entire rationale for foreign investment. An increasing number of young and agile firms characterized by high levels of flexibility and by a natural positive predisposition towards innovativeness (Knight and Cavusgil, 2004; Lewin and Massini, 2003) are perfectly positioned to exploit from their inception the rising opportunity to source, locate and organize human capital on a global scale. Hence, we posit:

Hypothesis 5. In the process of offshoring product development activities international experience is not a significant factor as it was for previous foreign expansion strategies.
The reduction of the costs of distance determined by the introduction of new information technologies has also altered the perception of geographic distances. While in the past familiar countries were chosen also on the basis of their physical proximity, the significant improvements in the transportation sector on one side and in the communication technologies on the other have radically altered the perception of distance. The introduction of broadband technologies has enabled the creation of authentic information assembly lines where information can be easily and efficiently standardized, stored, sent and elaborated in remote locations (Karmarkar, 2004). The improvement of the transportation sector has greatly facilitated the relocation of resources and employees around the world.

The improved accessibility to offshore locations has also altered the perception of cultural distances. Multinational firms are increasingly managed by multicultural teams whose members are used to act in highly heterogeneous cultural environments. Teams that span multiple geographic and cultural boundaries have in fact become prevalent in many industries. As a result, multinational multicultural distributed teams have become an integrative part of numerous organizations (Connaughton and Shuffler, 2007). The increasing standardization of technical knowledge and the predominance of the English language in a number of technical fields have played important roles in facilitating efficient interactions among individuals with different cultural backgrounds. It is worth stressing that cultural differences continue to matter, especially in low-wage economies, where only a small percentage of university graduates are suitable for jobs in Western multinationals (Farrell et al., 2006). However, we argue that in the decision to offshore product development activities cultural issues are not as significant as they were in the past for foreign expansion strategies. Given a sufficient supply of technical talent prepared to work at international standards in the offshore environment, we hypothesize that
cultural differences do not represent a major factor in determining the PDO process. The use of distributed multinational teams is particularly appealing to innovation activities that can benefit from the greater variety of perspectives inherent within a culturally diverse group (Milliken and Martins, 1996). Several studies in the organization behavior literature confirm in fact that cultural heterogeneity positively impacts the performance of teams, especially for identifying problem perspectives and generating solution alternatives (Cox, Lobel, and McLeod, 1991; Elron, 1997; McLeod and Lobel, 1992; Watson and Kumar, 1992; Watson, Kumar, and Michaelsen, 1993). Hence, formally:

Hypothesis 6. In the process of offshoring product development activities geographic and cultural distances are not significant factors as they were for previous foreign expansion strategies.

What continues to matter in the definition of a firm’s international expansion strategy is the public policy environment of the offshore country. The ability of a host government to credibly commit to a set of policies is key for companies willing to enter the country (Kobrin, Basek, Blank, and La Palombara, 1980). It has in fact been proven that in those countries where policy credibility is low, firms tend to minimize commitments or even avoid investment there (Henisz and Delios, 2001). As a matter of fact, a high uncertainty in the policy-making structure of a country creates difficulties in collecting and organizing the information needed for a successful venture and greatly reduces the level of regulative safeguards guaranteed to foreign investors. In those environments, often defined as politically hazardous, policies are extremely volatile in response to exogenous shocks, to changes in the identity of policy-makers and to the direct lobbying of host country local competitors or incumbents. A recent study (Delios and Henisz, 2003) confirms that political hazards matter in the stage model and should thus meaningfully incorporated when studying the process of internationalization of firms.
In line with such findings, we argue that the policy environment deeply influences the PDO process of firms. The political stability of the offshore country is critical in securing a healthy regulative environment where to safely relocate the most critical knowledge-intensive activities. The host country’s legal regulations have in fact been considered among the strongest environmental pressures faced by foreign companies in the offshore country (Rosenzweig and Singh, 1991). We expect firms investing in PDO to be particularly sensitive to the potential lack of an appropriate intellectual property protection in the offshore country. Policy uncertainty on this particular issue could in fact deeply jeopardize the entire PDO investment. Hence, we hypothesize:

Hypothesis 7. In the process of offshoring product development activities the policy uncertainty of the offshore country continues to be a significant factor as it was for previous foreign expansion strategies.

Finally, we argue that the stage model still holds when predicting that, as firms increase their commitment in the foreign country, they will tend to increasingly internalize their operations (Johanson and Vahlne, 1977; Westney and Zaheer, 2001). We posit that this is especially the case for PDO, which focuses on the relocation of strategic knowledge-intensive activities whose externalization present intrinsic hold-up problems (Trefler, 2005). An extensive literature based on the transaction-cost based theory of the firm (Buckley and Casson, 1976; Hennart, 1982; Williamson, 1975) has studied the different costs of organizing international interdependencies through captive offshoring or offshore outsourcing. In particular, several studies have addressed the potential risks of opportunistic behaviour in the case of offshore outsourcing (Aron, Clemons, and Reddi, 2005; Brynjolfsson, Malon, Gurbaxani, and Kambil, 1994; Clemons, Reddi, and Row, 1993; Trefler, 2005). Those risks are of particular concern especially when externalizing product development activities. Local external providers can in
fact opportunistically exploit the know-how shared by the buyer as a legitimate part of the contract, for example by reverse engineering critical proprietary processes (Aron et al., 2005).

Kogut and Zander (1993), although criticizing the transaction cost model, arrive at the same conclusion when stating that multinationals arise out of their superior efficiency as organizational vehicles by which to transfer knowledge across borders, especially when it is tacit, hence less codifiable and teachable. The existence of multinationals is thus conceived as a result of their specialization in the creation and internal transfer of knowledge. Captive offshoring is thus confirmed to be the only reasonable way of relocating knowledge-intensive activities abroad. Therefore, we posit:

_Hypothesis 8. When offshoring product development activities firms organize their international interdependencies through captive offshoring and not through offshore outsourcing._

**METHODS**

**Setting and Data Source**

To test the hypotheses we use data collected through the Offshoring Research Network (ORN) project, an international research program launched by Duke University in 2004. In 2004 and 2005 the project focused on surveying the offshoring practices of U.S. based companies. In 2006, the survey was extended to involve six European Universities to broaden the research to Europe.\(^1\)

The key unique features of the ORN project are the following. First, its contextual commonality and the centralized online administration lead to a high degree of comparability across surveys collected in the different countries involved. Second, the level of the analysis is the specific offshore implementation and not the company’s broad experience with offshoring. This results in

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\(^1\) Partner Universities include Copenhagen Business School, Otto Beisheim School of Management, RSM Erasmus University, IESE Business School, Manchester Business School, and Solvay Business School.
an extremely fine-grained and unique database, which enables grasping key differences across individual implementations, even when initiated from the same company. Furthermore, the survey includes not only companies that are already offshoring, but also those that are considering offshoring but have not started yet. For the purposes of this study, we use data from the 2006 ORN surveys of three European countries, namely United Kingdom, Netherlands and Spain. The selection of these three countries out of the six available is due to the accessibility and comprehensiveness of their corresponding records at the moment of the analysis. After eliminating single incomplete surveys, a total of 262 implementations executed by a total of 71 companies are left.

**Measures**

The dependent variable of this study is PD<sub>i</sub>, which is a dummy that scores 1 when implementation <i>i</i> involves a product development activity (e.g., R&D, product design and engineering services) and 0 otherwise. The operationalization of the independent variables is as follows:

**Market seeking.** To operationalize the market seeking motivation we use the answers to the survey question in which respondents were asked to rate, using a five point likert scale, how the access to new markets for products and services mattered as strategic driver for their offshore implementation.

**Efficiency seeking.** To operationalize the efficiency seeking motivation we use the answers to the survey question in which respondents were asked to rate, using a five point likert scale, how the labor cost savings mattered as strategic driver for their offshore implementation.

**Knowledge seeking.** To operationalize the knowledge seeking motivation we use the answers to the survey question in which respondents were asked to rate, using a five point likert
scale, how the access to qualified personnel mattered as strategic driver for their offshore implementation.

**Competitive pressure.** To operationalize the competitive pressure motivation we use the answers to the survey question in which respondents were asked to rate, using a five point likert scale, how competitive pressure mattered as strategic driver for their offshore implementation.

**International experience.** To operationalize the level of international experience of a firm pursuing implementation \( i \) we proxy it with the total number of implementations of the company. The higher this number, the more the company is committed in foreign markets.

**Cultural and geographic distances.** To operationalize cultural distance we use the answers to the survey question in which respondents were asked to rate, using a five point likert scale, how cultural differences with employees in offshore location were considered a risk for their implementation. The relevance of geographic distance is operationalized using four dummies relative to four key offshoring destinations (India, China, Latin America and Eastern Europe). Each dummy scores 1 when the implementation is relocated to the corresponding region and 0 otherwise.

**Policy uncertainty.** To operationalize policy uncertainty we use the answers to two survey questions. In the first, respondents were asked to rate, using a five point likert scale, how the political instability of the host country was considered a risk for their offshore implementation (POLICY1). In the second, respondents were asked to rate, using a five point likert scale, how the lack of intellectual property protection in the host country was considered a risk for their implementation (POLICY2).

**Offshoring model.** To take into account the offshoring model we use a dummy that scores 1 when the implementation is done through a captive subsidiary and 0 otherwise.
We also include a series of control variables for the size of the companies surveyed, their country of origin (dummies included for United Kingdom, Netherlands and Spain) and their main industry categorization (dummies included for telecommunications, IT and service providers).

**Model**

To test our hypotheses we run the following logit model:

\[
PD_i = \beta_0 + \beta_1 \text{MARKET}_i + \beta_2 \text{EFFICIENCY}_i + \beta_3 \text{KNOWLEDGE}_i + \beta_4 \text{COMPETITION}_i \\
+ \beta_5 \text{INTEXP}_i + \beta_6 \text{CULTURE}_i + \beta_7 \text{POLICY}_1_i + \beta_8 \text{POLICY}_2_i + \beta_9 \text{MODEL}_i \\
+ \beta_{10} \text{SIZE}_i + \delta \text{DCOUDESTINATION}_i + \gamma \text{DCOUORIGIN}_i + \eta \text{DINDUSTRY}_i + \epsilon_i
\]

Table I reports the variables used, their descriptive statistics and correlation coefficients.

-----------------------------------
Insert Table I about here
-----------------------------------

Most correlation coefficients are low and none of them presents harm in assuming independency among the independent variables. To deal with the very few missing values of the dataset, we estimate them using available observations, by testing a model based on all observations for which there were no missing values, and using it to estimate them (Nachum and Zaheer, 2005).

Since the dependent variable is dichotomous, we make use of the logit model. The coefficients of the independent variables offer a very straightforward interpretation. Each unit increase of the independent variable \(X\) multiplies the odds favoring \(PD = 1\) by \(e^{\beta_X}\) if all the other variables stay the same. Thus, the resulting coefficients are very useful in determining whether the independent variable in question is relevant (e.g., statistically significant), what is the nature (e.g., positive or negative) of the relationship under scrutiny and what is its intensity (e.g., the
bigger the coefficient the bigger the influence of the variable on the probability that PD scores 1). Furthermore, as most of the independent variables share the same scale, it is possible to compare their magnitudes (Kennedy, 2003). Table II reports the estimation results. The levels of significance of the individual coefficients, the result of the $\chi^2$ test, and the Pseudo R2 are also reported.

RESULTS AND DISCUSSION

Hypothesis 1, that market seeking is not a significant motivation behind the decision to offshore product development activities, received strong support in the analysis. The coefficient of the market seeking motivation is in fact small and not significant at 5% level. It is thus confirmed that PDO is not driven by the search of new markets where to sell the company’s products. This finding is perfectly in line with the results obtained in other studies (Nachum and Zaheer, 2005; Pisani, 2007).

Hypothesis 2, that efficiency seeking is not a significant motivation behind the decision to offshore product development activities, received strong support in the analysis. The coefficient relative to the labor cost savings operationalization is very small and not significant at 5% level. PDO is thus not driven by labor cost differentials. This is an important finding that contradicts the generalized perception for which the current offshoring of business processes has the search for efficiency and cost reduction as its only raison d’être (Aron and Singh, 2005). This finding well complements the results of previous studies. With the introduction of the fine-grained
difference between lower and higher-skilled offshored activities we are in fact able to prove that, although cost reduction matters for most offshoring initiatives (Nachum and Zaheer, 2005; Pisani, 2007), it does not play a role when relocating abroad innovation work. It is worth noting that, in the descriptive statistics, efficiency seeking reports the highest mean across all strategic drivers. However, its coefficient in the model is insignificant. This finding also supports the results obtained by Lewin et al. (2007), who focus on the U.S. sample of the ORN project and find that firms do not take into account cost considerations when offshoring innovation work.

Hypothesis 3, that knowledge seeking is a significant motivation behind the decision to offshore product development activities, received strong support in the analysis. The coefficient of the knowledge seeking motivation is in fact positive and significant at 5% level. This result confirms that, when implementing PDO, companies search for technical talent abroad. While for the migration of non product development activities labor cost arbitrage remains a fundamental driver, the findings obtained here prove that for PDO what matters is the desire to access new talent and thus expand the company’s pool of capabilities. This study cannot demonstrate that Western European companies are sourcing talent abroad as a direct response to the current shortage of higher-skilled employees at home; however, the data provided earlier in the paper suggest that the current shortage of talent in Western Europe certainly plays a role in this trend.

Hypothesis 4, that competitive pressure is a significant motivation behind the decision to offshore product development activities, received no support in the analysis. The coefficient relative to the competitive pressure operationalization is negative and not significant. Although hypothesized as relevant, competitive pressure does not play a significant role in the decision to offshore innovation work. Other studies have failed to bring any kind of empirical support to this hypothesis (Nachum and Zaheer, 2005; Pisani, 2007). One possible explanation is
that while competitive considerations are obviously dominant when offshoring lower-skilled activities whose superior efficiency is based on arbitrage opportunities, they become less relevant when relocating abroad innovation work. The decision to offshore the key value-generating activities of the firm may not be primarily driven by comparative considerations regarding competitors. As confirmed in this study, such decision is mostly based on the internal recognition of the need to acquire new capabilities. As a result, we believe further investigation is necessary to understand how competition matters in the decision to offshore product development work.

Hypothesis 5, according to which in the process of offshoring product development activities international experience is not a significant factor as it was for previous foreign expansion strategies, received strong support in the analysis. The coefficient relative to the international experience of firm is negative and significant. This implies that less experienced firms have higher probability to be the ones that initiate PDO. This finding strongly corroborates our hypothesis that the linear stage model of internationalization does not predict well the current wave of global sourcing for talent. The results clearly show that an increasing number of firms characterized by high levels of flexibility and a natural positive predisposition towards innovativeness (Knight and Cavusgil, 2004) decide to accelerate their process of internationalization and relocate innovation work before acquiring a significant international exposure. The process of internationalization adopted by companies is changing and this finding is the proof that the redistribution of value-generating activities pursued today is different from the one that characterized previous waves of internationalization (Venkatraman, 2004).

Hypothesis 6, for which in the process of offshoring product development activities geographic and cultural distances are not significant factors as they were for previous foreign
expansion strategies, received strong support in the analysis. The coefficient relative to cultural
differences is negative and significant. This means that the higher the concern relative to
potential cultural differences with employees in the offshore location the lower the probability
that the implementation involves a product development activity. In other words, the smaller the
fear relative to cultural issues, the higher the commitment on offshoring, in this case through the
relocation abroad of critical knowledge-intensive activities. Those companies ready to bet on the
potential benefits that the greater variety of perspectives inherent within a culturally diverse
group (Milliken and Martins, 1996) can offer are the ones that more likely offshore innovation
works. The use of distributed multinational teams has become an integrative part of many
organizations (Connaughton and Shuffler, 2007). Companies open towards cultural
heterogeneity use these globally distributed teams to improve their innovation processes through
PDO. The perception of geographic distance has also changed. The companies surveyed are
based in Western Europe, precisely in United Kingdom, Netherlands or Spain; however, Eastern
Europe is not at all the most chosen offshore destination for the critical relocation of product
development activities. Companies primarily select India and China for their PDO. The
coefficients of the dummies relative to these two countries are in fact higher and more
statistically significant than the one corresponding to Eastern Europe. In other words, contrary to
the prediction of the stages model of internationalization, geographical proximity is not taken
into account when implementing PDO.

Hypothesis 7, according to which in the process of offshoring product development
activities the policy uncertainty of the offshore country continues to be a significant factor as it
was for previous foreign expansion strategies, received mixed support in the analysis. The
coefficient of the first operationalization of policy uncertainty, the one referring to the political
stability of the offshore country, is negative and not significant at 5% level. The coefficient of the second variable, the one relative to the risk of a potential lack of intellectual property protection in the offshore environment, is instead positive and significant. Firms doing PDO are thus very much worried with the regulative safeguards guaranteed to foreign investors. The decision to relocate the key knowledge-intensive activities of the firm clearly requires a reliable regulative host environment in which intellectual protection is fully guaranteed. The results obtained in this study confirm that the risk of having local offshore companies or foreign competitors trying to steal important proprietary processes because of a lack of intellectual property protection in the host country represents a great deterrent against PDO.

Political stability should also represent an important variable that companies willing to invest in PDO look at (Delios and Henisz, 2003). However, the findings obtained do not corroborate the relevance of political stability in the PDO process. One potential explanation derives from the high concentration of offshore activities in India and China. As most of the relocation is directed to these two fairly stable countries, the political hazard of the host region is often not perceived as a primary concern.

_Hypothesis 8, which predicts that when offshoring product development activities firms organize their international interdependencies through captive offshoring and not through offshore outsourcing, received strong support in the analysis._ The coefficient of the dummy relative to the offshoring model used is in fact positive and significant. Therefore, the findings obtained confirm that those firms organizing their international interdependencies through captive subsidiaries are most likely the ones doing PDO. The creation and international transfer of knowledge is best executed inside the boundaries of the firm (Kogut and Zander, 1993). Offshore outsourcing is thus considered by companies a less reliable model when relocating
knowledge-intensive activities. As already shown in other researches (Aron et al., 2005), the risks of opportunistic behaviour is of particular concern when externalizing product development tasks. The result obtained here confirms that companies look at captive offshoring as the most efficient way of relocating innovation work at offshore locations.

The results relative to the control variables used also offer some interesting insights. The variable accounting for the size of the companies involved has a significant coefficient of zero. This means that bigger firms do not manifest any higher propensity to initiate PDO than smaller ones. It is worth stressing this result because established models of internationalization have often hypothesized that bigger firms were more likely to expand internationally (Chandler, 1986; Dunning, 1981). The high positive correlation found between the size and the international experience of firms (0.61) would seem to confirm this kind of argument. However, the results obtained clearly show that these two variables do not have a significant role in the process of relocating abroad innovation work. While in the past large experienced companies were commonly considered the best candidates for managing complex international activities, nowadays smaller, younger and more agile firms seem to be also at the forefront of the internationalization process (Oviatt and McDougall, 1994). Regarding the other control variables, the ones relative to the industry categorizations are not significant, while the ones relative to the countries of origin of the companies surveyed are both positive and significant. For instance, Spanish companies seem to have a higher propensity than the Dutch ones to initiate PDO.

This study is not exempt of limitations. First of all, both dependent and independent variables come from the same survey. In order to limit the potential common method bias, we used as dependent variable a fairly objective information provided by the respondents. As a matter of fact, for each implementation it was asked to specify out of a list provided the kind of
activities being relocated offshore. The dummy used as dependent variable assigns 1 to the R&D, product design and engineering services categories and 0 otherwise. We reckon that the level of subjectivity in answering this question is very limited. We cannot double check the entries obtained using an alternative source of data as the implementation level is so specific that no other publicly available database offers the same detailed information. However, we feel confident that the query was very straightforward and there was very little room for ambiguity in understanding the question and providing the information asked.

Another limitation has to deal with the lack of information regarding other important Western European countries. While for Germany we had to exclude the data because of many missing data, in the case of France and Italy the survey has not been launched yet. The information collected in these countries will be extremely useful for testing the hypotheses formulated in this study, offering a more complete analysis of the European context. The commonality of the survey used presents a great advantage when it comes to compare results and understand similarities across regions relative to the current offshore wave. As a matter of fact, our focus on European companies present interesting considerations when compared to the results of another study (Lewin et al., 2007) that is also investigating the offshoring of product development activities in the U.S. by using data from the same ORN project. Although their model presents differences from the one used in our study, some of their results interestingly confirm key findings obtained here. The access to talent, that is our operationalization for the knowledge seeking motivation, is also the key driver behind PDO in the U.S. sample; labour cost savings is confirmed not to have a significant role behind the relocation of innovation work. Furthermore, U.S. companies also vastly prefer captive solutions when offshoring product development activities; finally, also for the U.S. sample international experience and size are not
good predictors of PDO propensity when compared to other factors. Thus, Western companies seem to be following a similar pattern when pursuing their offshore initiatives relative to knowledge-intensive activities. The importance of these results is to show that the process model currently followed by firms sourcing abroad higher-skilled talent presents important commonalities across regions and it is significantly different from the relocation of international activities that characterized previous waves of internationalization. Future research should concentrate on the important theoretical novelties that underlie the actual offshoring wave, incorporating insights and extending established models. Our research has hopefully opened the way to a prolific stream of studies that will critically reassess the dominant models of internationalization to understand up to which point they are useful in representing the current international relocation of value activities undertaken by Western firms.

CONCLUSION

Companies in high-cost developed economies are increasingly migrating white-collar activities at offshore locations. Recent studies consistently show that enterprises are progressively sourcing abroad higher-skilled technical, engineering and scientific jobs. This trend is taking place in U.S. as well as in Western Europe (Dossani and Kenney, 2007; Henley, 2006; Levy, 2005; Lewin and Peeters, 2006a, 2006b). The purpose of this paper is to investigate why and how Western firms currently offshore product development activities. Our main argument is that the process of offshoring innovation work today radically differs from previous waves of internationalization. Thus, we develop hypotheses on the drivers and on the process followed by companies currently relocating abroad higher-skilled knowledge-intensive activities
and test them on a fine-grained database containing 262 offshore implementations initiated by 71 Western European companies.

This study contributes to the existing IM literature on two grounds. First, it shows that the actual offshoring of knowledge-intensive activities has the search for talent as its only driver. Contrary to the general perception for which offshoring is gaining in popularity as a mean to take advantage of labor cost differentials, the results obtained clearly show that Western companies, when doing PDO, are seeking for new talent to expand their pool of capabilities and not for a way to cut labor costs. This finding corroborates the hypothesis that accessing global talent pools and reducing costs are two different offshoring strategies that companies pursue in different circumstances (Lewin et al., 2007). While for the vast migration of IT, administrative and other back-office functions labor cost arbitrage remains a fundamental driver (Nachum and Zaheer, 2005; Pisani, 2007), it does not play a role when relocating higher-skilled innovation work.

The second contribution of this study is relative to the process model currently followed by firms doing PDO. While the dominant model of internationalization (Johanson and Vahlne, 1977) predicted that firms gradually increased their international commitment basing on their international investment experience and thus on their increasing magnitude of operations in less familiar environments, we show that the current process of offshoring follows a significantly different pattern. While some of the insights of the stages model still hold nowadays, others need to be reassessed. For instance, international experience is not any longer a reliable predictor for understanding the level of international commitment of a company. Younger, relatively inexperienced firms that are characterized by high levels of flexibility and propensity to innovation (Knight and Cavusgil, 2004) are leveraging on the current technological progresses to source, locate and organize human capital on a global scale. Cultural differences are also not any
longer source of major concern for those firms willing to create geographically distributed teams of talented professionals. Moreover, our findings show that the size of the company does not influence the complexity of the international activities as it did in the past (Chandler, 1986). On the other side, according to an extended version of the stages model (Delios and Henisz, 2003), the policy uncertainty of the offshore environment continues to play a major role in shaping the offshoring of innovation work. Companies involved in the creation and transfer of knowledge across borders also continue to choose captive models in order to best organize their complex international interdependencies.

A final and important note on how we should interpret these findings in terms of policy implications for the Western labor market. Developing regions, above all India and China, are increasingly becoming competitive sources of talent for Western companies. High-cost developed regions need to focus on the creation and retention of talent at home if they want to remain competitive in the production of innovation work. The generalized perception that higher-skilled knowledge-intensive jobs are being relocated offshore for an arbitrage opportunity on labor cost differentials is dangerously misleading. This study proves that cost is not considered by companies when relocating abroad product development activities. Those companies that invest in a global source of talent do so with the aspiration to create new knowledge and not to merely substitute workers at home. In other words, the offshoring of higher-skilled talent initiated by Western companies should not be simplistically classified as negative for the home economies. It should be rather considered an important opportunity to update and improve the capability to innovate at home. Companies continuously search for agile and flexible innovation processes. The recent technological progresses have created the strategic
opportunity to access efficiently unexploited sources of knowledge abroad. Offshoring is nothing else but “the inevitable next step in the process of globalization” (Farrell et al., 2006: p. 32).
REFERENCES


### TABLE I

Descriptive Statistics and Correlation Coefficients of the Independent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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</thead>
<tbody>
<tr>
<td>1. MARKET b</td>
<td>7.10</td>
<td>5.14</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. EFFICIENCY b</td>
<td>12.56</td>
<td>3.97</td>
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<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. KNOWLEDGE b</td>
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<td>1.00</td>
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<td></td>
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<tr>
<td>5. INTEXP</td>
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<td>11.02</td>
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<td>1.00</td>
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<td>-0.09</td>
<td>0.17</td>
<td>1.00</td>
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<tr>
<td>8. POLICY2 b</td>
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<td>0.39</td>
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<td>0.31</td>
<td>0.06</td>
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</tr>
<tr>
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<td>0.16</td>
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<td>-0.14</td>
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<td>0.05</td>
<td>0.03</td>
<td>0.06</td>
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</tbody>
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N = 262. Correlations greater than .12 or less than -.12 are significant at $p < .05$

b Linear additive transformation of 1-5 score. E.g. A score of 3 out of 5 point Likert scale is transformed as $1 + 2 + 3 = 6$

c Dummy = 1 for captive implementations, 0 otherwise

d Number of company employees

### TABLE I (continued)

<table>
<thead>
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<th>Variable</th>
<th>8</th>
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<th>10</th>
<th>11</th>
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<tr>
<td>3. KNOWLEDGE b</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>6. CULTURE b</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. POLICY1 b</td>
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<td></td>
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<td></td>
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<td></td>
<td>1.00</td>
</tr>
<tr>
<td>8. POLICY2 b</td>
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<tr>
<td>12. DLATAM</td>
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### TABLE II

**Estimation Results**

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<th>Variables</th>
<th>Model Coefficients</th>
<th>P-Value</th>
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<td>0.68</td>
</tr>
<tr>
<td></td>
<td>KNOWLEDGE</td>
<td>0.14*</td>
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<td></td>
<td>COMPETITION</td>
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<tr>
<td><strong>Process Variables</strong></td>
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<td>0.003</td>
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<tr>
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<td>CULTURE</td>
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<td>0.008</td>
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<td>0.13</td>
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<tr>
<td></td>
<td>POLICY2</td>
<td>0.28***</td>
<td>0.000</td>
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<td></td>
<td>MODEL</td>
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<tr>
<td></td>
<td>DEASTEUROPE</td>
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<td>0.06</td>
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<td>DLATAM</td>
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</tr>
<tr>
<td></td>
<td>DINDIA</td>
<td>1.72**</td>
<td>0.003</td>
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<td></td>
<td>DCHINA</td>
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<td>0.015</td>
</tr>
<tr>
<td><strong>Control Variables</strong></td>
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<td>0.011</td>
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</table>

*Country of origin*

| DSPAIN                  | 2.54**    | 0.001             |
| DNETHERLANDS           | 1.82**    | 0.009             |

*Industry categorization*

| DTELECOM               | 0.18      | 0.81              |
| DIT                    | -0.37     | 0.67              |
| DSERVPROV              | 1.21      | 0.19              |
| **Constant**           | -5.85***  | 0.000             |

| Prob. > χ² | 0.00      |
| Pseudo R2   | 0.3840    |
| Number of observations | 262       |

† p < 0.1  
* p < .05  
** p < .01  
*** p < .001
FIGURE 1

Offshoring Definition

Location Decision

<table>
<thead>
<tr>
<th>Domestic</th>
<th>Abroad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep-in-House</td>
<td>Captive Offshoring</td>
</tr>
<tr>
<td>Domestic Outsourcing</td>
<td>Offshore Outsourcing</td>
</tr>
</tbody>
</table>

Firm Boundary Decision

Insourcing

Outsourcing

Offshoring
FIGURE 2
Offshoring Activities

Global Sourcing of Talent

1960s 1990s Now

Time

Offshored Activities

Manufacturing Manufacturing Manufacturing Manufacturing Manufacturing

IT IT IT

Administrative Administrative Administrative Administrative

Contact Centers Contact Centers

Product Development

2 Main sources: (Dossani & Kenney, 2003, 2006; Lewin & Peeters, 2006a, 2006b)
Technical talent refers here to the yearly number of graduates (Master and PhD level) in Mathematics, Science and Technology. Data comes from EuroStat.

The demand of graduates is computed starting from the supply of 1998 and using the annual GDP growth rate as a proxy for its annual growth. The supply of graduates is simply the number of graduates adjusted for the corresponding annual GDP growth. Supply data were not available for 2005 and 2006 and were therefore estimated using the internal growth rate experienced in previous years.