# GOING FAR FOR SOMETHING CLOSE:

# UNVEILING THE INITIATION OF THE EXTERNAL KNOWLEDGE SOURCING PROCESS

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**ABSTRACT**

Multinational corporations frequently use subsidiaries distributed around the globe to identify new opportunities to access external knowledge. But what accounts for some opportunities to transfer external knowledge being acted upon and others not? Researchers typically observe only opportunities to transfer external knowledge that have been pursued by the in-sourcing firm (e.g., external patents that have been cited, research and development agreements that have been established, corporate venture investments that have been made). By also observing opportunities not acted upon, this paper sheds new light on why the initiation of the external knowledge sourcing process is are sometimes completed and sometimes not. More precisely, I suggest a new knowledge dimension, knowledge dissonance, and hypothesize that opportunities to transfer dissonant knowledge are less likely to be acted upon. Conversely, I propose that market provenness has the opposite effect on the likelihood that the initiation of an external knowledge transfer will be completed. I also hypothesize that process attributes will have a positive impact on the odds of the initiation of a transfer being completed. I test my hypotheses using a proprietary database on the initiation of 137 external knowledge-sourcing processes by one of the largest telecommunication services providers in the world. The hypotheses are largely supported.

## INTRODUCTION

The search for external knowledge is seen today as one of the key drivers of foreign direct investment (e.g., Almeida, 1996; Berry, 2006; Cantwell, 1989; Nachum and Zaheer, 2005). Research suggests that multinational corporations (MNCs) that source knowledge dispersed around the globe, for example, by identifying and accessing diverse competencies, innovative technologies, and lead market knowledge, innovate more effectively than their domestic rivals (Doz, Santos and Williamson, 2001: 5; Rodan and Galunic, 2004). Many scholars share the view that external knowledge sourcing, the knowledge process by which managers identify and gain access to relevant knowledge being created by other organizations, is a critical process that broadens a firm's knowledge base and fosters development of new knowledge through the combination of existing forms of knowledge (e.g., Kogut and Zander, 1992; Vermeulen and Barkema, 2001). Extant literature provides empirical evidence not only that external knowledge sourcing has increased considerably over the past ten to fifteen years, but also that firms that engage in external knowledge sourcing realize a number of innovation related benefits (e.g., Eisenhardt and Santos, 2002; Rosenkopf and Nerkar, 2001).

A striking feature of this stream of literature, however, is that although it helps us understand the motivations behind the search for external knowledge on a global basis, it does not shed much light on how MNCs start (or fail to start) the external knowledge sourcing process. Drawing a parallel to Szulanski's work on knowledge transfers within the firm (1996, 2000), I define this starting point in the external knowledge sourcing process as its initiation phase. This is the stage in which MNCs search for, recognize, and eventually act upon opportunities to transfer external knowledge. In most cases, completing the initiation of an external knowledge transfer (i.e. eventually acting on an opportunity to transfer external knowledge) involves bringing teams of managers or scientists from the cooperating organizations together, typically under a non-disclosure agreement, to begin discussing the

implementation of the transfer (Szulanski, 1996, 2000). But because the initiation of the external knowledge sourcing process almost inevitably occurs under some degree of irreducible uncertainty, a focal firm will often abort the transfer process before completing its initiation (Szulanski, 1996, 2000). There are thus instances in which an opportunity is identified, but not acted upon, and therefore the initiation of the transfer of external knowledge is not completed. Despite its criticality—completing its initiation is a necessary but not sufficient condition for the success of the external knowledge sourcing process as whole—why and when the initiation of external knowledge sourcing process is completed (or aborted) has yet to receive much scholarly attention.

The reality is that initiation of an external knowledge transfer is rarely observable. Most scholars seeking to describe this initial search process have thus far either relied on patent data (e.g., Almeida, 1996; Almeida and Kogut, 1999; Katila and Ahuja, 2002; Rosenkopf and Almeida, 2003) or focused on steps immediately subsequent to the initiation of the transfer, that is, the form of relationship that can potentially be established when an opportunity to transfer and exploit external knowledge has been identified and acted upon (Vanhaverbeke, Duysters and Noorderhaven, 2002).

Given that some opportunities to transfer external technologies are bound not to be acted upon, the questions that remain unanswered are obvious. Are there patterns that explain why some opportunities to transfer external knowledge are acted upon and others not? Are firms consistently not acting on certain types of opportunities to transfer external knowledge? I argue that existing research does not (and cannot) answer these questions because studies of external knowledge sourcing conducted thus far have not taken into account opportunities not pursued. I suggest that so far only opportunities to transfer external knowledge which initiation has been completed by the in-sourcing firm (evidenced, for example, by external

patents that have been cited, research and development agreements that have been negotiated, and corporate venture investments that have been made) have been observed.

Two questions thus guide my research. First, what knowledge and process attributes explain why some opportunities to transfer external technologies are acted upon and others are not? Second, what is the relative impact of those attributes on the likelihood of the initiation of a knowledge transfer being completed?

I address these questions by directly observing and measuring the initiation of 137 external knowledge sourcing processes in one of the world's largest telecommunication services providers. I used as my research setting subsidiaries created by this MNC with the express mandate (Birkinshaw, 1996; Birkinshaw and Hood, 1998) to search for external knowledge (viz. technology scouting units). I conducted more than 70 semi-structured interviews with *all* managers in that organization involved in technology scouting (hereafter called scouters), and was given access to a proprietary database with detailed information about 137 external technologies assessed by this MNC from January 2003 to December 2005. I complemented this database with a survey and information obtained from Venture Economics and the US Patent and Trademark Office (USPTO). My regression analyses were performed on this enhanced database.

Overall, the findings of this study confirm that business unit managers acted on few of the opportunities to transfer external technologies identified by scouters. The results further suggest that the likelihood of the initiation of a transfer being completed is significantly influenced by characteristics of the external technology as well as by process variables.[1]

More important, I developed and operationalized a new knowledge dimension, which I term "knowledge dissonance," and empirically demonstrate it to be a crucial element in

[1] In this paper, I examine only the transfer of *product* technologies, that is, the theoretical and practical knowledge, skills, and artifacts embodied in the outputs of an organization, in other words, its goods and services (Burgelman, Christensen and Wheelwright, 2004: 2; Schilling, 2010). I discuss the implications of my findings for the transfer of *process* technologies in the discussion section. Hereafter, I use knowledge and technology interchangeably.

explaining why the initiation of an external knowledge transfer is completed or not (Szulanski, 1996, 2000). My results show that opportunities to transfer dissonant knowledge, that is, knowledge that challenges a recipient unit's dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986), are significantly less likely to be acted upon. In other words, everything else being equal (including the level of technological relatedness; e.g., Hansen, 2002), business units tend not to act on opportunities to transfer technologies that do not fit with their dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986). At the heart of this new knowledge dimension is the idea of "lack of agreement" rather than "lack of understanding" (Cohen and Levinthal, 1990; Hansen, 2002). Although a number of studies have shed light on the role of managerial cognition in managing technological change (e.g., Garud and Rappa, 1994; Kaplan, 2008; Lane and Lubatkin, 1998; Tripsas and Gavetti, 2000), this is the first study to directly show that dissonant technologies might be selected out in the early stages (i.e., at the initiation) of the external knowledge sourcing process (i.e., well before they are brought for investment consideration during the resource allocation process; Adner and Levinthal, 2008; Bower, 1970).

Conversely, I found empirical support for my prediction that the market provenness of an external technology (e.g., Jensen and Szulanski, 2008; Menon and Pfeffer, 2003; Szulanski, 1996) has the opposite effect on the likelihood of the initiation of a transfer being completed. If knowledge dissonance makes initiation more eventful (Szulanski, 1996), market provenness facilitates it. While a lot of emphasis has been put on the challenges of bringing external knowledge inside because of the "not invented here" syndrome (Katz and Allen, 1982) this paper reveals how the "external" market proveness can facilitate sourcing external knowledge.

These findings, taken together, suggest an intriguing paradox: even when scouting units are purposefully established thousands of miles from headquarters to access diverse

knowledge, internal selection processes, usually unobservable at this stage of the sourcing process, might be so strong that the organization ends up acting mostly on market validated opportunities consonant with its existing dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986). There are important strategic implications of this selection pattern, which has the potential advantage of resulting in the acquisition of knowledge more easily recognized and managed by the organization's existing routines and members (Cohen and Levinthal, 1990; Rosenkopf and Almeida, 2003: 753), but risks leading a focal firm to develop "core rigidities" (Leonard-Barton, 1992) or fall into "competency traps" (Levitt and March, 1988).

Equally important, this paper shows that the odds of the initiation of a transfer being completed are significantly improved by scouters' efforts to search for needs and constraints within the firm, and sell the external technologies internally their MNCs. In other words, despite (in the case of knowledge dissonance) or in addition to (in the case of market proveness) the characteristics of the external technology, the amount of effort managers devote to specific activities at this stage of the knowledge sourcing process directly and significantly affects the likelihood of the initiation of a knowledge transfer being completed (or not).

The rest of the paper is organized as follows. The theoretical background and hypotheses are presented in the next section. A section on my multi-methods approach and the empirical setting and analytical techniques follows. I subsequently present the results of my regression analyses and robustness checks. Contributions and implications are discussed in the concluding section.

## THEORETICAL BACKGROUND AND HYPOTHESES

Researchers from different disciplines, using different methods and studying different contexts, have provided many explanations of and insights into the management of

knowledge within MNCs (Argote, McEvily and Reagans, 2003). Two relatively recent developments reported in this stream of literature shape the approach employed in the present study. First, whereas some scholars initially focused almost exclusively either on the attributes of transferred knowledge (e.g., Winter, 1987; Zander and Kogut, 1995) or on the situation in which transfer occurs (e.g., Arrow, 1969), more recently researchers have tended to adopt a more eclectic model that accommodates the relative importance of each set of factors to be measured (e.g., Gupta and Govindarajan, 2000; Hansen, 1999; Hansen and Lovas, 2004; Monteiro, Arvidsson and Birkinshaw, 2008; Szulanski, 1996). Second, Szulanski (1996, 2000, 2003) showed that different factors have a different impact depending on the stage of knowledge transfer. For instance, factors that affect the opportunity to transfer are more likely to predict difficulty during the initiation stage, factors that affect the execution of the transfer difficulty during subsequent implementation stages (Szulanski, 2000: 9).

I build on these two points to explain when and why the initiation of the external knowledge sourcing processes is completed (or not). First, I adopt an eclectic perspective in investigating the impact not only of the attributes of the transferred knowledge (namely, dissonance and market provenness), but also of the situation in which the transfer occurs (i.e., the level of scouter effort expended on external and internal search and internal selling).[2] Second, I focus on understanding the factors that affect the completion of a specific stage of the transfer process: the initiation stage. Below, I develop two sets of hypotheses. The first set (H1-H2) relates to the impact of knowledge attributes. The second set (H3-H5) predicts the impact of process factors.

[2] Attributes of the source and recipient units as well as of the knowledge transferred and the situation in which the transfer occurs have an impact on the success of a transfer (e.g., Argote *et al.*, 2003). As I describe in detail below, a number of control variables are included to account for the characteristics of the source and recipient units (e.g., source age and size, recipient unit dummies). Knowledge attributes like knowledge dissonance and knowledge relatedness are also relevant to the recipient unit. I further control for the strength of the tie between the parties involved in the knowledge transfer.

***Knowledge Dissonance***

I argue that opportunities to transfer external knowledge that do not fit with a firm's dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986) are less likely to be initiated, and suggest that external knowledge that goes against a firm's dominant logic be called "dissonant knowledge." In my fieldwork, described in detail below, informants reported considerable difficulty getting business unit managers to act on opportunities to transfer external technologies that went against their "commercial or technological convictions." In the informants' words, some external knowledge acted as "irritants" and some recipient units had "antibodies" to certain external technologies that did not fit with their "world view of their business," which seems to be well encapsulated in Prahalad and Bettis's (1986: 490) notion of dominant logic.

I posit that this "lack of fit" dimension remains practically unexamined by the recent literature on how knowledge transfers are *initiated* (e.g., Monteiro *et al.*, 2008, Szulanski, 1996, 2000, 2003)[3]. This said, the roots of how dissonance affects the way we act (or fail to act) on external knowledge can be traced back to Festinger's (1957) theory of cognitive dissonance. According to cognitive dissonance theory (Festinger, 1957), once committed to an alternative, to avoid or reduce post decisional conflicts people prefer supportive (consonant) information over opposing (dissonant) information. Cognitive dissonance is unpleasant (Elliot and Devine, 1994), and people try to reduce the proportion of dissonant links by privileging information that is not dissonant with other elements (Brownstein, 2003). This effect has been labelled selective exposure to information, or confirmation bias (Jonas *et*

3 An exception is Lane and Lubatkin (1998) who suggested that fit with dominant logic has important implications for a firm's capacity to absorb external knowledge. It is important to note however that they neither examined why and how knowledge dissonance may prevent knowledge transfer from being initiated in the first place nor really measured "fit" as the level of agreement (or lack thereof) with a firm's dominant logic. Rather, Lane and Lubatkin focused on a firm's ability to readily commercialize external knowledge (1998: 466) and measured "fit" between dominant logics by counting the number of research communities that both partners had published in a certain period (1998:468), which is similar to the notion of knowledge relatedness I discuss below. This is qualitatively different from the conceptualization and operationalization of knowledge dissonance advanced in this paper.

*al.*, 2001: 557)[4]. As Nickerson (1998: 177) put it, people tend to avoid analysing information that would be considered counterindicative with respect to their favoured hypotheses or beliefs and supportive of alternative possibilities. More recent studies have also demonstrated that such a confirmation bias is not restricted to situations in which a final decision has been made (a similar bias arises after preliminary decisions) and, more important, this confirmatory external knowledge search can also be observed in group decision making (Ambos and Birkinshaw, 2010; Schulz-Hardt et al., 2000).

Consistent with the view that cognitive ability and motivation are multiplicatively interrelated (Kruglanski and Webster, 1996; Siemsen, Roth and Balasubramanian, 2008), I suggest that not acting on opportunities to transfer dissonant external knowledge is a function not only of managers' cognitive biases to disregard dissonant information, but also of their motivation to internally justify previous technological choices (Bower, 1970; Christensen and Bower, 1996; Sleesman *et al.*, in press).

More important, I maintain that understanding the impact of knowledge dissonance on the likelihood of an opportunity to transfer external knowledge being acted upon is crucial because it takes into account the role of managers' cognition (e.g., Garud and Rappa, 1994; Kaplan, 2008; Kaplan and Tripsas, 2008; Tripsas and Gavetti, 2000) and motivation (Bower, 1970; Burgelman, 1994; Christensen and Bower, 1996) at a stage of the external knowledge sourcing process that has thus far received little scholarly attention. At the initiation (Szulanski, 1996, 2000, 2003) of the external knowledge sourcing process, business unit managers are faced with the relatively simple decision of whether or not to follow up an opportunity to transfer an external technology. Basically, the only resource to be allocated by

4 An illustrative example of how this bias has been tested in experiments is provided by Jonas *et al.* (2001: 558). Participants in an experiment are confronted with a decision case, for example, whether a company should invest in a particular developing country, and asked to reach a preliminary or final decision. The participants are then offered additional information (articles) from which they can select. In most experiments, this additional information takes the form of experts' commentaries. From a list of topics from which it is apparent whether particular articles are consonant or dissonant with the previous decision, participants are asked to indicate which they want to read. Although half of the articles are consonant and half dissonant, participants end up choosing more consonant than dissonant articles.

managers (Bower, 1970) at that stage is attention (and time). Identifying the impact of knowledge dissonance on the likelihood that an opportunity to source external knowledge will be acted upon can inform our understanding of how organizations deal with opportunities to transfer dissonant external knowledge (that might precipitate important technological changes) and how soon organizational inertial forces might kick in.

Finally, it is critical to differentiate what I label "knowledge dissonance" from the notion of technological relatedness. A key knowledge attribute found by previous research to affect the success of knowledge transfer is technological relatedness, defined as the level of overlap between two knowledge bases (Tanriverdi and Venkatraman, 2005). Empirically, technological relatedness has usually been measured by the level of overlap in patent classes or sub-classes. The general argument is that technologically related knowledge is easier to transfer. In other words, firms are more likely to be able to evaluate effectively the value of external knowledge that is related to their technological bases (e.g., Cohen and Levinthal, 1990). I do not dispute this argument, and empirically control for technological relatedness. I suggest, however, that two firms' interpretations of how to profit from the use of knowledge in that same technological area can be profoundly different. Whereas technological relatedness seems to involve the *ability* of a recipient unit to understand incoming knowledge (Cohen and Levinthal, 1990), I posit that the likelihood of the initiation of an external knowledge transfer being completedd (Szulanski, 1996, 2000, 2003) is highly influenced by the level of *agreement* or *fit* between external knowledge and a recipient unit's beliefs about how that knowledge should be used. I thus hypothesize that, everything else being equal, recipient units will be less likely to act on opportunities to transfer dissonant external technologies. More formally, I predict:

*Hypothesis 1 – Ceteris paribus, the more dissonant (in relation to a recipient unit's dominant logic) an external technology, the lower the odds of the initiation of a transfer being completed.*

***Market Provenness***

Previous research on intra-firm knowledge transfers has shown knowledge with a proven record of past usefulness to be easier to transfer. Absent such a record, it is more difficult to induce potential recipients to engage in knowledge transfer (Szulanski, 1996). This paper suggests that knowledge provenness might be equally (if not more) critical in the case of inter-firm knowledge transfers, that is, that opportunities to transfer *external* knowledge that is proven are more likely to be acted upon by an in-sourcing firm. But the concept of market proveness as interpreted here goes beyond the notion of past usefulness described by Szulanski in knowledge transfers *within* the firm (1996, 2000, 2003). Market proveness in the present context provides some evidence that the source of the external technology is legitimate and reliable. External sources that have a commercially available technology that has already attracted customers may be able to provide templates that reveal nuances and details of how the product really works (Jensen and Szulanski, 2008). More important, documenting deployments of technologies to their first customers enables firms to build templates (Jensen and Szulanski, 2008) of how the technologies work in concrete product deployments (instead of in simulated situations in research labs). This provides real proof of results that a technology developed internally can rarely provide. Investors might further indicate that the external party is a reliable source that has the endorsement of other market actors (e.g., Stuart, Hoang and Hybels, 1999). Finally, that organizations backed by customers and investors are likely to be perceived as legitimate enhances their credibility and the likelihood that they will be able to secure resources from other organizations (Parsons, 1960; Suchman, 1985). This is also consistent with Menon and Pfeffer's (2003: 498) finding

that managers sometimes "place a premium on external knowledge" precisely due to its market validation. According to Menon and Pfeffer (2003: 505), "when there is a clear market indicator that an external technology is of value, it is 'validated' by the market." In sum, I propose that recipient units are more likely to act on an opportunity to transfer an external technology demonstrated to be market proven. More formally:

> *Hypothesis 2 – Ceteris paribus, the more market proven an external technology, the higher the odds of the initiation of a transfer being completed.*

Thus far, I have hypothesized about the relationship between knowledge attributes and the likelihood of the initiation of an external knowledge transfer being completed. The focus of the following hypotheses shifts to the influence of the amount of scouter effort expended on different tasks on the likelihood that business unit managers will act on a given opportunity to transfer an external technology.

***External Search Effort***

One of the key tasks performed by scouters is to search the environment for opportunities to transfer external technologies. Scouting units are created by MNCs with the express mandate (Birkinshaw, 1996; Birkinshaw and Hood, 1998) of searching for external knowledge on behalf of the firm. This search involves looking for, identifying, and evaluating knowledge resident in other organizations (Hansen, Mors and Lovas, 2005). As Szulanski (1996, 2000, 2003) explains, in both problemistic and slack searches (Cyert and March, 1963), initiating a transfer will depend on how difficult it is to find an opportunity to transfer. A "global" search across all companies being extremely time-consuming, if not impossible (e.g. Hansen, 1999), search inevitably is an uncertain and complex process, and specific opportunities to transfer external technologies often are not known to scouters ex ante. Even after a potential opportunity is identified, scouters must sometimes spend significant amounts

of time evaluating it (e.g. Hansen *et al.*, 2005; Teece, 1976). The amount of effort scouters expend on the external search process is thus likely to influence the odds that an external knowledge transfer will be initiated. Everything else being equal, the more effort scouters devote to external search, the more likely they are to find an opportunity to transfer a technology that will be considered useful, and thus be more likely to be acted upon, by other units. More formally, the foregoing arguments yield the following hypotheses.

> *Hypothesis 3 – Ceteris paribus, the greater the external search effort, the higher the odds of the initiation of a transfer being completed.*

***Internal Search and Selling Efforts***

Whereas the existing literature mostly equates external knowledge sourcing with external search, Szulanski (2000:13) acknowledges that the eventfulness of the initiation stage might increase when existing operations are inadequately understood. This is entirely consistent with our informants' assessment that even more important than searching the environment, are their efforts to understand what they should be looking for and how "to position their radars." Scouters consequently need to devote considerable time to internal search in order to be able to make sense of what they should be looking for in the external environment. This leads me to argue that, all else being equal, the more effort they expend on searching the internal environment for other units' requirements and constraints, the more likely scouters are to identify external technologies that will be acted upon. By searching internally for the company's needs and technology requirements, scouters are more likely to be able to identify the right connections to be made between external and internal actors and identify how to cross the boundaries between them (Hargadon and Sutton, 1997). I posit that efforts spent searching internally how external opportunities can be connected to specific areas and managers within the organization can facilitate the initiation of the external knowledge sourcing process.

In addition to internal search, scouters need to persuade business unit managers to act on transfer memos. This is a necessary first condition for the external technology sourcing process as a whole. As the VP, Strategy & Business Development of one of Europ Telco's lines of business insightfully put it: "They [scouters] don't have a route to market and they don't have the mandate to transfer what they find to other units. . . . They do have the mandate to look for external technologies, but they can't impose what they find on anyone."

This process of transferring to the business units their knowledge about an external opportunity resembles some of the mechanisms described in the literature on issue selling (e.g., Dutton and Ashford, 1993; Dutton *et al.*, 2002). I suggest that this is a very different, and arguably more realistic, description of how a transfer is initiated than the conventional approach of using communication theory (e.g., Shannon and Weaver, 1963) as an overarching framework for modelling knowledge transfers in MNCs (e.g., Gupta and Govindarajan, 2000: 475). I propose that the extent to which scouters lobby internally for an external technology's potential within a firm has a significant impact on decision makers' attention (e.g., Dutton and Ashford, 1993; Dutton *et al.*, 2002). I therefore hypothesize that the more effort scouters expend on this "internal selling" process, the more likely the initiation of an external knowledge transfer is to be completed.

Taking these two arguments together, I predict that:

> *Hypothesis 4 – Ceteris paribus, the greater the internal search effort, the higher the odds of the initiation of a transfer being completed.*
>
> *Hypothesis 5 – Ceteris paribus, the greater the internal selling effort, the higher the odds of the initiation of a transfer being completed.*

**DATA AND METHODS**

I tested the foregoing hypotheses using detailed data from one of the largest telecommunication services providers in the world. Europ Telco (ET), a pseudonym, is one of

the largest telecommunications service providers in the world. The company is headquartered in Europe, with annual revenues of more than USD 30 billion and R&D expenditure in excess of USD 1 billion. ET had a long history of technological innovations with a total worldwide portfolio of a few thousands patents and applications. However, during the 1990s, the company realized that the traditional telecommunications industry was changing rapidly, and moreover that many of the new technologies were emerging a long way from its home base in Europe. As part of its attempt to stay abreast of technological change, it established a scouting unit in 1999 in Silicon Valley (it also opened scouting units in Japan and China, but these were subsequently closed so were not an important part of our research). A prevalent type of subsidiary of large MNCs, scouting units are sometimes referred to as technological listening posts (Gassman and Gaso, 2004; Von Zedtwitz` and Gassman, 2002) or dedicated sensor units (Doz *et al.*, 2001: 160). Because these units have no other operational responsibilities, virtually all their activities revolve around the process of searching for, and transferring to other units within the firm, knowledge about potentially useful external technologies. Therefore, whereas in other empirical settings it may be more difficult for researchers to disentangle daily operational activities from search activities, technology scouting units' activities should be almost entirely an integral part of the initiation of the external knowledge sourcing process (Szulanksi, 1996, 2000, 2003).

Given previous research relationships of the author with the company, and after months of negotiation, Europ Telco agreed to provide us, upon the signature of a non-disclosure agreement, with access to its databases, files and to all its relevant managers involved with technology scouting.

I test the foregoing propositions using both archival (from internal and publicly available databases) and survey data. The unit of analysis is the specific opportunity to transfer an external technology. Standard operating procedure for scouters was to provide to business

unit managers a standardized form containing detailed information including a technology's source and relevance to Europ Telco. Completed forms were entered into a proprietary database called Rock. Upon signing a non-disclosure agreement, I was given access to 137 entries in the Rock database representing 96% of all the external technologies formally assessed by Europ Telco scouters between January 2003 and December 2005.[5]

I complemented this database with a survey, based on more than 70 semi-structured interviews, designed to collect additional data for each of these 137 initiation processes, notably on the amount of effort expended by scouters on different tasks. In addition to the interviews conducted in my fieldwork, the survey instrument employed, as available and appropriate, items from prior studies. I first developed pilot designs that were pre-tested in hour-long, face-to-face interviews with one former scouter, one manager in one line of business, and one R&D manager. On the basis of these tests, I modified questions that did not make sense in Europ Telco's setting or were ambiguous or in other ways misconstrued. I sought from some of these managers responses to the modified questions, which we then discussed on the phone.

I split the 137 external technologies according to lead contact and sent to each scouting unit manager (via email, as a Word file, and by fax) a customized survey with the names of all the companies the unit had input to the Rock database between January 2003 and December 2005. I assured the managers that their responses would be reviewed only by me and the data reported only at the aggregate level. Responses could be returned by email or fax. I received approximately one-third of the responses within four weeks. I followed up by phone with the managers' assistants and scheduled phone calls to complete the survey

[5] Five entries during this period not included in my database were excluded by Europ Telco before I was afforded access to the database. These entries, according to the company, revealed internal information that was still sensitive at the time of the study. There was no *prima facie* indication that the entries were, along the dimensions examined in this study, qualitatively different from the rest of the sample. Although all were assessed by the Palo Alto scouting unit, the sources of these external technologies were scattered around the world (more precisely, as I describe below, the distance between Palo Alto and the cities of origin of the external sources ranged from 1 km to 7,500 km).

instrument with respondents who had not yet done so. After eight weeks, I had increased the response rate to approximately 65%. With the approval of Europ Telco's senior vice president responsible for the scouting units, I returned to the Silicon Valley unit and requested face-to-face meetings with the managers who had not yet completed the surveys. In the end, all surveys were completed.[6]

The Rock database contained detailed information about each external technology scouted, but was less precise as to whether a specific entry had been acted upon by the recipient unit. To obtain that information, I accessed scouting units' internal records that tracked the outcome of every entry in the Rock database. The timing of accessing those records was critical. Managers estimated that it could take as much as one year for a unit to act on an external technology identified in a transfer memo. Constant access to Europ Telco was thus needed, and this variable, which is the dependent variable in the present study, was the last to be collectedafter a period well in excess of one year after all entries were input to the database.[7] I supplemented these internal sources with data collected from Venture Economics' database and the United States Patent and Trademark Office (USPTO).[8]

***Dependent Variable***

***Initiation completed:*** The initiation of a transfer was completed if the opportunity to transfer an external technology (captured by each transfer memo) was acted upon by the recipient unit. The decision to act upon opportunities and proceed with the transfer process resided in the business units, which had a "route to market" (i.e., they could use the external technologies in products or services that could be sold to customers). The external knowledge sourcing process could only proceed to the next stage (i.e., implementation of the transfer) if

[6] As reported below, I tested for inter-rater reliability by randomly selecting 30 entries (approximately 20% of the sample) and asking the second (as well as the lead) contact to complete the survey. The correlation between the answers of the lead and second contacts ranged from 0.71 to 0.91.
[7] I ran an alternative model with a control variable called "time lapsed" to account for the number of days between the entry date and June 2007. All results remained qualitatively the same.
[8] This was possible because all entries in the Rock database contained the name of the source of the external technology.

the recipient unit agreed to connect with the source of the external technology to discuss next steps. Action or follow-up on a transfer memo typically took the form of the scouting unit mediating a meeting between a manager of the recipient unit within Europ Telco and senior management of the source of the external technology to discuss details and next steps in the transfer process, at which point Europ Telco and the source of the external technology typically signed a non-disclosure agreement and memorandum of understanding, and teams from the companies began to discuss how the transfer was to be implemented.[9] Once this connection between the recipient unit and source of the external knowledge was established, the initiation of knowledge transfer was considered formally completed. The initiation of a transfer was aborted (or not completed) when the recipient unit decided not to engage in any follow up with the source of an external technology. In practice, this meant that Europ Telco would not act on such an opportunity and that all action related to the potential transfer of that specific external technology would cease at that point.[10] This action by recipient units was the most critical and objective performance indicator for the scouting units, and Europ Telco maintained updated records of the final outcome of each entry in the Rock database.[11] I therefore measured whether the initiation of a transfer was completed or not as a dichotomous variable that took the value of 1 if the transfer memo was acted upon, and zero otherwise.[12]

[9] My interviews with scouts in different organizations indicated that the steps above characterizing the initiation of the external knowledge transfer were typical not only in the telecommunications sector but also in other industries. For instance, one large pharmaceutical company describing its licensing process characterized the completion of the initiation of a transfer opportunity when confidentiality and disclosure agreements were signed and face-to-face scientific meetings took place.

[10] It was plausible, though not probable, that scouting unit managers had an incentive to inflate the number of entries that were followed up. In other words, the scouting unit records to which I had access might conceivably have exaggerated the number of successful initiations. To check the reliability of these records, I randomly selected 15 successful entries (roughly one third of the total successful cases) and contacted the recipient unit directly by email or phone. In *all* cases, the scouting units' records were confirmed by the corresponding recipient units. Given this high reliability and the fact that scouters had no incentive to under report the number of successful cases, I did not systematically contact lines of business for a sub-sample of cases in which the records indicated an unsuccessful outcome. I used my interviews with the line of business managers to advantage, however, to discuss memos received but not followed up. Again, scouting unit records were consonant with line of business' accounts. These results reinforce the objective nature of this measure.

[11] As explained above, this variable was the last to be collected, in June 2007, after a period well in excess of one year after all entries were input to the database.

[12] An alternative dependent variable could be the success of the knowledge transfer. Success has previously been captured using either perceptual measures (e.g., Gupta and Govindarajan, 2000) or completion time (e.g., Hansen, 1999). The use of perceptual measures is subject to important limitations (e.g., Gupta and Govindarajan, 2000: 491). Completion time is unlikely to be a good measure in the initiation stage, not to mention that a precise indication of when the follow-up occurred

### *Independent Variables*

***Knowledge dissonance.*** I suggest that knowledge is dissonant when it goes against a recipient unit's dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986), and propose, as a tractable operationalization that maintains its cognitive dimension, thinking of that dominant logic in terms of an organization's (or one of its business units') business model (Amit and Zott, 2001; Chesbrough, 2003; Chesbrough and Rosenbloom, 2002; Zott and Amit, 2007, 2008). Amit and Zott (2001: 511) define business model as "the structure, content and governance of transactions between the focal firm and its exchange partners." More recently, the same authors acknowledged a more holistic aspect of a business model, affirming that it refers to "the overall *gestalt* of these possibly interlinked boundary spanning transactions" (Zott and Amit, 2008: 3). In a similar vein, Chesbrough (2003: 70) posited that constructing a business model requires managers to deal with significant complexity and ambiguity, and we know from earlier research (e.g., March and Simon, 1958; Simon, 1947) that managers cannot, and do not, exhaustively evaluate every alternative when confronted with such situations. Chesbrough (2003: 90) summarizes: "A business model is a double-edged sword for the corporation. It unlocks the potential value in a new innovation, but its very success can create a subtle, cognitive trap for the company later. An effective business model creates an internal logic of its own for how value is created and claimed. Every subsequent opportunity is evaluated in the context of this *dominant logic*" (emphasis added).

Building on Chesbrough and Rosenbloom's (2002: 533) "detailed and operational" definition of business model, I operationalized knowledge dissonance as the level of disagreement between the business model underlying the external technology and the business model of the recipient unit. More precisely, the lead scouter responsible for an

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was not available for most cases in my database. The dichotomous variable used above, notwithstanding its limitations, was objective and reliable, ruling out possible concerns about respondent bias (see footnote 9 above).

entry[13] was asked to rate, on a 1-5 Likert scale[14] (1=very low and 5=very high), and along five dimensions ((1) value proposition (i.e., the value created for users), (2) market segment (i.e., the users for whom, and purpose for which, the technology is useful), (3) value chain structure required to create and distribute the technology (and/or products/services enabled by it), (4) cost structure and profit potential, and (5) relevant technological standards), the level of fit or agreement between the business model that underlies the external technology and that of the Europ Telco line of business to which the transfer memo was sent.[15]

Factor analysis of the foregoing dimensions is consistent with their forming a single, unidimensional variable, and the scale is reliable with Cronbach Alpha=0.84. I reverse coded the responses and added the score for each of the five dimensions to obtain a cumulative score for knowledge dissonance. This construct has a potential value range from 5 to 25; the higher the score, the greater the level of dissonance of the external technology relative to the dominant logic of the recipient unit.

***Market provenness.*** Fieldwork in my empirical setting revealed three key dimensions indicative of the market provenness of a technology, (1) its commercial availability, (2) whether customers were using the technology, and (3) whether investors were funding the source of the technology. Using the information contained in the Rock database entries, market provenness was measured as the sum of the following six dummy variables: 1) technology is commercially available (1=yes, 0=no); 2) technology is no longer in trials/beta versions (1=yes; 0=no); 3) customers are buying the technology (1=yes, 0=no); 4) other telcos are buying the technology (1=yes, 0=no); 5) venture capital investors are funding the

[13] The ideal respondent for the question would have been the recipient unit manager to whom the transfer memo was sent. Unfortunately, it was not possible to gain access to all of the managers in my sample who received transfer memos. I did manage, however, to obtain recipient units' scores for 38 entries, which constituted a very good representation of the total sample. The correlation between scouters' and recipient units' scores was high (0.82). In addition, I was able to obtain for 30 entries the ratings from the second contacts. For this item (i.e., knowledge dissonance), the correlation between lead contacts' and second contacts' scores was also good (0.81).

14 As described above, I pre-tested the survey instrument extensively during my pilot study and respondents did not report any difficulty in rating external technologies according to this five-item scale.

[15] Results presented below are robust to an alternative operationalization of knowledge dissonance that does not include technological standards.

company (1=yes, 0=no); 6) the company is no longer in the seed stage (1=yes, 0=no). The six items were added to form a cumulative score. Factor analysis of these items is consistent with their forming a single, unidimensional variable, and scale reliability was good with Cronbach Alpha=0.80. A second rater independently coded this variable, and inter-rater reliability was good (0.84).

***External search effort.*** Following previous research (e.g., Hansen, 1999; Hansen *et al.*, 2005), external search effort was measured in terms of full-time employee days spent searching for a focal external technology. More precisely, the head of the scouting units was asked to estimate, based on company records, the number of full-time employee days spent on "external search," that is, searching the outside environment for the external technology captured in a focal transfer memo.[16]

***Internal search effort.*** Internal search effort was similarly measured as the number of full-time employee days spent on "internal search," that is, identifying the roadmaps and understanding the requirements/needs of lines of business (i.e., the recipients of transfer memos) regarding the external technology captured in a focal transfer memo.

***Internal selling effort.*** Following the same procedure described above for search efforts, the number of full-time employee days spent trying to "sell" a focal external technology to a recipient unit was used as the measure of "internal selling."[17]

[16] Because the company kept detailed records of how scouts spent their time in internal and external activities;that same manager headed the units for the entire period of this study, and that our qualitative interviews revealed that the three types of effort measured here (external search, internal search and internal selling) were clearly distinct categories for the scouts (e.g. scouts called internal selling "downstreaming" as a contrast to "internal search"), we were confident that the measures of effort were a good proxy for the actual effort spent by scouts in each activity. Nevertheless, as a robustness check, following Reuer, Arino and Mellewigt (2006), I asked the scouts to indicate on a scale of 1-5 (1=insignificant amount of time, 3=reasonable amount of time, 5=a lot of time) how much time was spent on "external search." The correlation between the estimate by the units' head and the scouts' responses was 0.70.

[17] The same robustness check described in footnote 14 was performed for the internal search and internal selling variables. The correlations between the estimates of the units' head and the scouters' responses were 0.72 and 0.70, respectively. The results presented below are robust to these alternative operationalizations of external search, internal search, and internal selling effort.

**Control Variables**

***Technological relatedness***. The first control variable concerns the obvious alternative explanation that external technologies related to Europ Telco's existing technological base are the most likely to be acted upon. Controlling for technological relatedness between the external source and Europ Telco was thus crucial. Patent-based measures are probably the most widely used method of controlling for technological relatedness. Although I use those measures in my robustness checks (and the results are robust to these alternative specifications), using patent-based measures drastically reduces the number of observations in my models, as only about 70% of the sources of the external technologies in my sample held patents (or had submitted patent applications) at the time the transfer memo was written.[18] Following Wadhwa and Kotha (2006: 826), I therefore operationalized technological relatedness on the basis of industry and developed a concordance between Europ Telco's SIC code (4813) and the Venture Economics Industry Classification (VEIC) codes assigned to the sources of the external technologies. An external technology was considered technologically related to Europ Telco's knowledge base if its VEIC code was in the 1200 (Telecommunications) or 1300 (Wireless Communication) categories. The technological relatedness measure is a dummy variable that takes the value of 1 if an external technology is technologically related, and zero otherwise.

***Technology attractiveness***. A good proxy for level of attractiveness for Europ Telco was its assessment of an external technology's "potential innovation dividends." A key performance indicator within the company, potential innovation dividends were calculated in US$

[18] I performed robustness checks using eight alternative types of patent based relatedness measures, namely: 1) dummy variable=1 if Europ Telco and external source have any patenting in the same technology class, and zero otherwise; 2) number of external source patents with same classes as Europ Telco's; 3) number of technology classes in common between Europ Telco and external source/total number of classes in which the external source has patenting activity; 4) dummy variable=1 if Europ Telco and external source have any patenting in the same technology sub-class, and zero otherwise; 5) number of external source patents with the same sub-classes as Europ Telco's; 6) number of technology sub-classes in common between Europ Telco and external source/total number of sub-classes in which the external source has patenting activity; 7) number of Europ Telco patents in the same classes as the external source; and 8) number of Europ Telco patents in the same sub-classes as the external source.

according to an internally developed, proprietary formula that estimated the potential amount, in terms of cost reductions and/or revenue generation, likely to accrue to Europ Telco in the three-year period following internalization of an external technology. However imperfect an estimate, the potential innovation dividends measure was calculated based on an objective formula derived from input from different areas within Europ Telco (and thus was not scouters' arbitrary assessments of the attractiveness of external technologies).[19] This being a highly sensitive metric, figures for individual technologies were not disclosed, it being agreed, instead, that the lead scouter for each external technology would indicate, on a 1-5 Likert scale (1=very low, 3=reasonable, 5=very high), the potential innovation dividends, in terms of cost reductions and/or revenue generation, likely to accrue to its internalization by Europ Telco.

***Age and size of external source.*** That older, larger firms might be perceived to be more reliable and legitimate is likely to have an impact on the odds of successful initiation. To control for these effects, I included (1) a variable called "source age (years)," being the age in years of the source of the external technology at the date the relevant transfer memo was written, and (2) a variable called "source size," being the amount in US$ of investments received by the source of the external technology as of the date of the transfer memo. This amount was converted to a natural logarithm to dampen the high variability in size and achieve a more normal distribution.

***Geographic distance***. Previous research (e.g., Ghemawat, 2001; Hansen and Lovas, 2004; Monteiro *et al.*, 2008) has suggested that geographic distance might hinder the knowledge transfer process. I computed the geographic distance in miles between the host city of the

19 Although this is, to a large extent, an objective measure, it would be desirable to obtain recipient units' assessments of the attractiveness of external technologies. As a robustness check, I obtained the recipient units' scores for 25 entries, which constituted a good representation of the total sample. The correlation between scouters' and recipient units' scores was quite high (0.9). In addition, I was able to obtain for 30 entries the ratings from the second contacts. The correlation between lead contacts' and second contacts' scores was even higher (0.91). These extremely high correlations seem to corroborate the existence of a common understanding/agreement within Europ Telco about the formula to be used to calculate potential innovation dividends.

source of each external technology and Palo Alto, California. To dampen the high variability in distance and achieve a more normal distribution, I used the natural logarithm of the geographic distance in the analyses.

***Cultural distance***. Previous studies in the international business literature indicate that cultural distance is likely to affect the knowledge transfer process. Following such studies (e.g., Jensen and Szulanski, 2004), I used the Kogut and Singh Cultural Distance Index (Kogut and Singh, 1988) derived from Hofstede's (1991) indices to measure the cultural distance between the country of the source of the external technology and the host country of the scouting unit (i.e., the United States).[20]

***Tie strength***. Following a number of studies (Hansen, 1999; Marsden and Campbell, 1984; Podolny and Baron, 1997), I measured the strength of the tie between scouting and recipient units as the average of self-reported frequency and closeness scores. Similar to Hansen (1999), I assigned a work-related meaning to closeness, as opposed to the typical inter-personal affective meaning. More precisely, the lead scouter who wrote the transfer memo was asked to rate the strength of the tie between the scouting and recipient units prior to the date of the transfer memo by responding to the following requests: 1) Please indicate how frequently you and your colleagues in the scouting unit interacted with the recipient unit, on average, over the year prior to the introduction of this external technology (1=once a year or less, 2=once every 3-4 months, 3=once every 2nd month, 4=once a month, 5=more than once a month); and 2) Please indicate how close the working relationship between your unit and the line of business [recipient unit] was before you introduced the company [source of the external technology] (1=distant, like an arm's length relationship, 3=somewhat close, like solving and discussing issues together, 5=very close, practically like being in the same unit).

[20] Results are robust to different specifications of cultural distance. For instance, results are similar if cultural distance is measured as the distance from the home country of the company's headquarters (instead of from the host country of the scouting unit). A similar pattern of results is found when I use a more recent operationalization of cultural distance as suggested in a paper by Berry, Guillén and Zhou (2010).

Factor analysis of these two items is consistent with their forming a single, unidimensional variable, and the scale was reliable with Cronbach Alpha=0.90.

***Additional Controls.*** There being multiple transfer memos written by the same scouter or sent to the same recipient unit, I included dummy variables for each scouter and each recipient unit in order to eliminate any spurious effects due to unobserved differences among them.

**VALIDITY CHECKS**

I used SAS V 9.1.3 (Lattin, Carroll and Green, 2003) to check via confirmatory factor analyses (CFA) the convergent (i.e., degree to which specific items jointly load on their hypothesized constructs; Judge, 1993) and discriminant (Judge, 1993) validity of my multi-item constructs (knowledge dissonance, market provenness, and tie strength). Factor loadings, which varied from 0.61 to 0.98, were highly significant and corresponded to the hypothesized latent constructs. My measure of tie strength is well established in the literature and, not surprisingly, its two-factor solution had an excellent Goodness of Fit Index (GFI) and GFI Adjusted for Degrees of Freedom (AGFI). More interesting, though, was the test of the adequacy of the one-factor model of knowledge dissonance and market proveness. A comparison of standardized loadings, composite reliabilities, and average variances extracted between the one-factor models of knowledge dissonance and market provenness and plausible rival models further confirmed the superiority of the specifications presented here.

**RESULTS**

Because the dependent variable in my regression model is a binary variable, I used probit regression to test the hypotheses. Specifically, I used the Stata 11 probit regression function with robust standard errors to counter the effects of heterocedasticity (Wooldridge, 2003). To check for the effects of multicollinearity, I calculated the variance inflation factors (VIF) and found none of the variables to be close to the common cut-off threshold of tolerance that

corresponds to a VIF in excess of 10 (Wooldridge, 2003).[21] Table 1 reports summary statistics, Table 2 the pairwise correlations between the variables used in the analysis.

The results of the probit regressions are presented in Table 3, which displays not only the coefficients and robust standard errors, but also the marginal effects (cf. Hoetker, 2007; Wiersema and Bowen, 2009). Unless stated otherwise, I interpret the magnitude of the coefficient estimates using marginal effects estimated at the mean of all other variables.[22]

I first present a base model with only the control variables (Model 1). Model 2 adds the independent variables of interest. As expected, the base model (Model 1) shows positive and significant effects of tie strength, technology attractiveness, technological relatedness, and source age. Geographic and cultural distances (between the scouting unit and source of the external technology) were negative and significant. Source size is not statistically significant.

Hypotheses 1 and 2 relate to the impact of knowledge dissonance and market provenness on the likelihood of the initiation of a transfer being completed. Hypothesis 1 posits that the more dissonant an external technology, the less likely an initiation is to be completed, Hypothesis 2 that market provenness will have the opposite effect, that is, it increases the likelihood of completed initiation.

Model 2 shows the coefficient and marginal effect of knowledge dissonance to be negative and highly significant ($p<0.01$). Calculated at the mean of all other variables, a one-standard deviation (3.86) increase in the level of dissonance decreases the probability of the initiation of a transfer being completed from a baseline of 61% to a mere 18%.[23]

Market provenness, on the other hand, positively and significantly increases the likelihood of completed initiation. Calculated at the mean of all other variables, the predicted probability

[21] VIF values ranged from 1.2 to 4.7.

22 Mfx command in Stata. The same levels of significance are obtained when I compute, using Stata's *margeff* command, the average of the individual marginal effect values at each observation.

[23] Probability changes are calculated using the *spost* ado file developed by Long and Freese (2006) for Stata.

of the initiation of a transfer being completed ranged from 23% when the external technology had no market provenness to 93.1% when it received the maximum rating (6) for market provenness. These findings support both Hypothesis 1 and Hypothesis 2.

When dissonance is at its mean, an opportunity with low market proveness (-1 S.D) has a 40% likelihood of being acted upon. Increasing market proveness to one standard deviation above its mean increases that likelihood to 83%, which indicates how important market proveness can be. This picture, however, changes noticeably when knowledge dissonance is also above its mean. For instance, for high levels of both market proveness and knowledge dissonance (both variables at 1 S.D. above their means), the likelihood of an opportunity being acted upon was 38%. More important, the likelihood decreases substantially, to a mere 5%, when both variables (market proveness and knowledge dissonance) are at maximum levels. This seems to indicate that although high levels of market proveness can considerably increase the likelihood of an opportunity being acted upon (assuming all other variables are at their means), when knowledge dissonance is also high its effect clearly dominates even the most proven technology.

Hypotheses 3, 4, and 5 suggest that greater external search, internal search, and internal selling efforts, respectively, are associated with a greater likelihood of completed initiation. Hypotheses 4 and 5 are supported, but the effect of external search effort did not reach statistical significance. A one standard-deviation increase in internal search effort corresponds to a 24% increase in the probability of a transfer being initiated, calculated at the mean of all other variables. Similarly, the predicted probability of an external technology being followed up by the recipient unit ranged, when calculated at the mean of all other variables, from 43% when scouters selling the opportunity internally exerted minimal internal selling effort (score=1) to 94.6% when they expended a great deal of effort (+ 2 S.D.).

I also estimated the probability of successful initiation in two particularly interesting scenarios. First, I calculated the odds of a highly dissonant opportunity (+2 S.D.) being acted upon if the scouters also put a lot of effort into internal search and internal selling (+ 2 S.D). That probability was 63% if all other variables were kept at their means, but increased to 92% if I estimated market provenness to be at its maximum (and all remaining variables at their means). Second, I estimated the probability of an opportunity to transfer a completely unproven (market proveness=0) technology being acted upon if the scouters put a lot of effort (+ 2 S.D) into internal search and internal selling. That likelihood was quite high (96%) when all other variables were kept at their means and remained high (67%) even when knowledge dissonance was 1 S.D. above the mean. These results indicate that opportunities to transfer dissonant external knowledge have a decent shot at being acted upon when scouters put a lot of effort into the process. Even more noticeable is the effect of scouters' efforts in increasing the likelihood of initiation even when the external technology is unproven.

***Robustness checks***. I performed several tests to check the robustness of the findings. For instance, even though doing so reduced the number of observations in the model to fewer than ninety, I ran several models using patent-based measures of knowledge relatedness.. The findings were robust, in all cases, to using eight different patent-based knowledge relatedness measures.[24] Testing whether the results were robust to slightly different operationalizations of market provenness and knowledge dissonance also yielded qualitatively similar results. Finally, I examined the frequency distribution of the knowledge dissonance variable to check whether scouters selected out the opportunities to transfer dissonant technologies, by sending transfer memos only (or mostly) to business units with consonant knowledge. The histogram of that variable, however, revealed that scouters sent transfer memos across the entire range of knowledge dissonance.

[24] Please refer back to footnote 18.

## DISCUSSION

Overall, the present study finds that both the attributes of an external technology (i.e., its level of dissonance and market provenness) and process variables (i.e., the effort expended by scouters on internal searching and selling) significantly affect the likelihood that the initiation of a transfer of external knowledge will be completed.

Three broad sets of insights emerge from this study. First, I show that a high level of dissonance negatively and significantly affects the likelihood of an external technology being acted upon by a recipient unit. All else being equal, line of business managers tend not to initiate opportunities to transfer external technologies that do not fit with their dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986). At the organizational and strategic levels, discovering the impact of knowledge dissonance on the initiation of the external knowledge sourcing process contributes to a better understanding of the role of managerial cognition in managing technological change (e.g., Barr, Stimpert and Huff, 1992; Garud and Rappa, 1994; Kaplan, 2008; Kaplan and Tripsas, 2008; Tripsas and Gavetti, 2000) and enrich existing accounts of how organizations are subject to strong inertial forces once the pursuit of individuals' or groups' interests tends to preserve the *status quo* (e.g., Bower, 1970; Burgelman, 1994; Christensen and Bower, 1996; Sleesman *et al.*, in press). This paper contributes further to these increasingly important research streams.

More important, the present study examines the role of managers at a stage that has thus far received little scholarly attention: the initiation of the external knowledge sourcing process. At this stage, managers are faced with the relatively simple decision of whether to follow up an opportunity to transfer an external technology and begin discussing implementation of the transfer. Essentially, the only resource to be allocated by managers (Bower, 1970) at this stage is attention (and time). But even at this stage, cognition and motivation (Kruglanski and Webster, 1996; Siemsen, Roth and Balasubramanian, 2008) play

an important role, managers being unlikely to allocate attention to opportunities that challenge their dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986). This finding has important implications for our understanding of how organizations deal with technological change, as it may indicate that inertial forces might kick in much earlier than previously thought. In other words, dissonant technologies might be selected out of the resource allocation process well before they are brought for investment consideration (Adner and Levinthal, 2008; Bower, 1970).

Second, the present study provides empirical support for the importance of market provenness in improving the odds of a transfer being initiated. While most previous studies have emphasized the challenges of bringing external knowledge inside because of the "not invented here" syndrome (Katz and Allen, 1982) this paper reveals how the "external" market proveness can facilitate sourcing external knowledge. Our finding that managers in an in-sourcing firm are more likely to act on opportunities to transfer external technologies that are market proven provide a nice illustration of Menon and Pfeffer's (2003: 498) suggestion that sometimes managers may "place a premium on external knowledge" precisely due to its market validation. It is important to note, however, that this paper introduces a conceptual and empirical notion that goes beyond the idea of provenness merely in terms of the usefulness of knowledge (Szulanski, 1996, 2000, 2003) to encompass a market and institutional endorsement of the source of an external technology (e.g., Stuart *et al.*, 1999). This extension is consistent with the view that having customers and investor backing is likely to legitimate an organization and thereby enhance its credibility and the likelihood that it will be able to secure resources from other organizations (Parsons, 1960; Suchman, 1985).

It is important to note that this study examined the transfer only of external *product* technologies. I suggest that market proveness will have an even stronger impact in the initiation of transfers of external *process* technologies, in which cases providing templates

revealing nuances and details of how the external process technology already worked in other firms is likely to substantially affect perceptions of source reliability (Jensen and Szulanski, 2008) and therefore considerably increase the perception of market proveness.

In addition to providing a richer, more sociologically informed measure of provenness, this paper provides early insights into the underlying mechanisms that might explain why and how market provenness facilitates the internalization of an external technology. My fieldwork suggests that the internalization of market proven external technologies might increase the innovation performance of an in-sourcing firm without necessarily involving any knowledge recombination. In other words, this seems to be another mechanism that might explain, and so might have important implications for the stream of research that is examining, the positive relationship between external knowledge sourcing and innovation performance (e.g., Laursen and Salter, 2006; Rosenkopf and Nerkar, 2001).

Taken together, the present study's two findings related to knowledge attributes suggest an intriguing paradox: even when a scouting unit is purposefully established thousands of miles from headquarters to overcome local search, internal selection processes, usually unobservable at this stage of the sourcing process, might be so strong that the organization ends up acting almost exclusively on market validated opportunities that are consonant with its existing dominant logic. This has the advantage of prejudicing acquisition towards knowledge that can be more easily recognized and managed by existing routines and organization members (Cohen and Levinthal, 1990; Rosenkopf and Almeida, 2003: 753). It can also encourage a focus on similar technologies that leads firms to generate incremental innovations and become more expert in their existing domains, termed by Rosenkopf and Nerkar (2001: 288) "first-order competence," which can constitute a competitive advantage. It risks, however, giving rise to the development of "core rigidities" (Leonard-Barton, 1992) or making firms vulnerable to "competency traps" (Levitt and March, 1988). Particularly

revealing was our sensitivity analysis showing that opportunities to transfer even the most market proven external technologies are unlikely to be acted upon if they are highly dissonant.

Third, my findings reveal that the level of effort expended by scouters in this process positively and significantly affects the odds of a transfer being initiated. It is important in this regard to emphasize that the internal search effort, the effort expended trying to understand a line of business's requirements, needs, and constraints, matters significantly. Whereas the extant literature has focused almost exclusively on the externally-oriented facet of the external technology sourcing process, and emphasized the importance of *accessing* external ideas and "capturing" environmental signals, this paper highlights the importance of the potentially less glamorous task of spending time searching internally, within the firm, for line of business requirements and constraints. This shift of focus to the internally facing activities of the external knowledge sourcing process has revealed the importance of another activity: internal selling. More important, this paper suggests that organizations are not necessarily destined to disregard opportunities to transfer knowledge that is dissonant and/or unproven, finding that when scouters expend maximum possible effort on internal activities, unproven and even dissonant opportunities (which, under usual circumstances, would almost certainly be disregarded) have a greater likelihood of being acted upon.

Given that my findings are based on observations coming from only one company, there are several limitations on generalizing the results to other settings. Leonard-Barton (1990:250) explained that a single case study is subject to limits in generalizability and a number of potential biases, such as the misjudgement of the representativeness of a single event, exaggerating the salience of data because of its availability or even biasing estimates because of unconscious anchoring. In addition, there are a number of specific limitations that need to be considered in terms of the generalizability of the findings presented here. I focused

on the formal process of search for external technologies, which represented a very important mode of accessing external knowledge in the company in this study. Informal mechanisms and employee mobility may be more important in other settings (e.g. Almeida & Kogut, 1999; Rosenkopf & Almeida, 2003). Also, it is possible that the process described here is mostly valid in large organizations where resources are more likely to be formally allocated to the external technology scouting function. I should also offer the caveat that this study, given its focus on initiation, does not provide robust findings about the subsequent stages of the knowledge sourcing process. These are all important limitations that should be borne in mind when extending the findings of this paper to other settings. That said, as limited as these initial insights might be, they begin to reveal the potential benefits of opening the external knowledge sourcing process "black box" and trying to directly observe the underlying mechanisms at play.

This study, in taking a fresh look at the initiation of the external knowledge sourcing process, sheds new light on the patterns that explain why some opportunities to transfer external knowledge are acted upon and others are not. This paper is a first attempt to discover new reasons for initiation stickiness by uncovering an organizational process that has thus far been largely inferred from outcomes, typically derived from patent data. It shows that MNCs are more likely to act on opportunities to transfer market proven technologies that confirm their dominant logic. Finally, I show that process attributes, notably scouters' efforts to search within the MNC for needs and constraints andsell the external technology to business units, bothincrease the odds of the initiation of an external knowledge transfer being completed. For MNCs concerned about how they might better manage their global external knowledge sourcing processes, understanding initiation is a priority and should therefore be the focus of far more attention than it has received to date.

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**Table 1:** Descriptive Statistics

| | Mean | SD | Min | Max |
|---|---|---|---|---|
| *Dependent variable* | | | | |
| Initiated Transfer | 0.35 | 0.48 | 0.00 | 1.00 |
| *Independent variables* | | | | |
| Knowledge Dissonance | 14.15 | 3.86 | 6.00 | 24.00 |
| Market Proveness | 3.05 | 1.63 | 0.00 | 6.00 |
| External Search | 3.02 | 1.38 | 1.00 | 7.00 |
| Internal Search | 3.09 | 2.16 | 1.00 | 12.00 |
| Internal Selling | 2.97 | 2.58 | 1.00 | 20.00 |
| *Control variables* | | | | |
| Tie Strength | 6.09 | 2.44 | 2.00 | 10.00 |
| Geographic Distance (ln) | 4.51 | 2.73 | 0.00 | 8.92 |
| Cultural Distance | 0.28 | 0.65 | 0.00 | 20.00 |
| Technology Attractiveness | 2.54 | 1.16 | 1.00 | 5.00 |
| Source Age (years) | 4.27 | 3.31 | 0.00 | 24.93 |
| Source Size (ln) | 2.38 | 1.51 | 2.53 | 6.46 |
| Technological Relatedness | 0.49 | 0.50 | 0.00 | 1.00 |

**Table 2:** Pairwise Correlations among Variables

| | | 1 | 2 | 3 | 4 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | Initiated Transfer | 1.00 | | | | | | | | | | | | |
| **2** | Knowledge Dissonance | -0.51 | 1.00 | | | | | | | | | | | |
| **3** | Market Proveness | 0.29 | -0.08 | 1.00 | | | | | | | | | | |
| **4** | External Search | 0.36 | -0.43 | 0.05 | 1.00 | | | | | | | | | |
| **6** | Internal Search | 0.40 | -0.50 | -0.09 | 0.56 | 1.00 | | | | | | | | |
| **7** | Internal Selling | 0.35 | -0.42 | 0.09 | 0.17 | 0.27 | 1.00 | | | | | | | |
| **8** | Tie Strength | 0.23 | -0.66 | -0.17 | 0.43 | 0.64 | 0.32 | 1.00 | | | | | | |
| **9** | Geographic Distance (ln) | -0.27 | 0.13 | -0.04 | -0.04 | 0.09 | -0.32 | -0.08 | 1.00 | | | | | |
| **10** | Cultural Distance | -0.18 | 0.16 | -0.00 | 0.02 | -0.02 | -0.14 | -0.08 | 0.20 | 1.00 | | | | |
| **11** | Technology Attractiveness | 0.34 | -0.38 | 0.28 | 0.12 | 0.13 | 0.42 | 0.06 | -0.17 | -0.23 | 1.00 | | | |
| **12** | Source Age | 0.02 | 0.05 | 0.45 | -0.08 | -0.18 | -0.08 | -0.16 | 0.02 | 0.05 | 0.17 | 1.00 | | |
| **13** | Source Size (ln) | 0.25 | -0.05 | 0.51 | 0.03 | -0.00 | 0.20 | -0.11 | -0.10 | -0.02 | 0.36 | 0.29 | 1.00 | |
| **14** | Technological Relatedness | 0.25 | -0.10 | 0.44 | 0.12 | 0.11 | 0.06 | -0.02 | 0.10 | 0.17 | 0.15 | 0.19 | 0.23 | 1.00 |

N ranges from 126 to 137. Correlations above 0.17 are significant at the 5% level or better.

**Table 3:** Regression Results
Dependent Variable: Initiation Completed

| | Model 1 | ME | Model 2 | ME |
|---|---|---|---|---|
| H1 Knowledge Dissonance | | | -0.31** | -0.11** |
| | | | (0.09) | |
| H2 Market Proveness | | | 0.37** | 0.14** |
| | | | (0.14) | |
| H3 External Search | | | 0.22 | 0.08 |
| | | | (0.17) | |
| H4 Internal Search | | | 0.33* | 0.12** |
| | | | (0.13) | |
| H5 Internal Selling | | | 0.25** | 0.09** |
| | | | (0.08) | |
| Technological Relatedness | 0.75** | 0.29** | 0.62 | 0.23 |
| | (0.28) | | (0.44) | |
| Tie Strength | 0.14* | 0.06* | -0.33** | -0.12** |
| | (0.06) | | (0.12) | |
| Geographic Distance (ln) | -0.12* | -0.05* | -0.16* | -0.06* |
| | (0.05) | | (0.07) | |
| Cultural Distance | -0.36† | -0.15† | -0.72** | -0.27** |
| | (0.20) | | (0.29) | |
| Technology Attractiveness | 0.46** | 0.18** | -0.14 | -0.05 |
| | (0.15) | | (0.23) | |
| Source Age (years) | 0.11† | 0.04† | 0.05 | 0.02 |
| | (0.06) | | (0.07) | |
| Source Size (ln) | -0.01 | -0.01 | 0.15 | 0.05 |
| | (0.11) | | (0.16) | |
| _cons | -1.26† | | 5.04† | |
| | (0.68) | | (2.52) | |
| N | 122 | | 115 | |
| Wald Chi2 | 47.75*** | | 57.81*** | |
| Log likelihood | -57.35 | | -36.38 | |
| McFadden's pseudo R2 | 0.32 | | 0.54 | |

† p < 0.10, * p < 0.05; **p < 0.01, ***p<0.001. Two-tailed tests. Robust standard errors between parentheses. Scouters and recipient unit dummies included in all models but not shown. Marginal effects (ME) calculated at the mean of all variables.