# GOING FAR FOR SOMETHING CLOSE:

# EXPLAINING STICKINESS IN THE INITIATION OF THE EXTERNAL KNOWLEDGE SOURCING PROCESS

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***PRELIMINARY DRAFT – PLEASE DO NOT CITE WITHOUT PERMISSION***

***September, 2009***

I thank Julian Birkinshaw, Mauro Guillen, Sarah Kaplan, Michael Mol, Phanish Puranam, Evan Rawley, and Freek Vermeulen for their comments and suggestions on earlier versions of this manuscript. I am also grateful to the many managers at Europ Telco who generously provided me with their time, insights, and ample access to their internal databases. Funding for this project was provided by the Advanced Institute of Management Research (AIM) and by the Mack Center for Technological Innovation at the Wharton School. Any errors are mine.

**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 being missed? Researchers typically observe only opportunities to transfer external knowledge that have been followed up 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 "missed" opportunities, this paper reveals new sources of knowledge stickiness at the initiation of the external knowledge sourcing process. 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 an opportunity will be acted upon. I also hypothesize that process attributes will have a positive impact on the odds of successful initiation. 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.

## INTRODUCTION

The search for external knowledge is seen today as one of the key drivers of foreign direct investment (e.g., Almeida, 1996; Ambos, 2005; Berry, 2006; Cantwell, 1989; Chung and Alcacer, 2002; Nachum and Zaheer, 2005). Multinational corporations (MNCs) constantly reach outside their boundaries, viewing the world as a global canvas dotted with pockets of knowledge. Research suggests that MNCs that source this dispersed knowledge, 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 (e.g., Arora, Fosfuri and Gambardella, 2001; Fosfuri, 2006), but also that firms that engage in external knowledge sourcing realize a number of innovation related benefits (e.g., Eisenhardt and Santos, 2002; Henderson and Cockburn, 1996; 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 recognize and act (or fail to recognize and act) upon opportunities to transfer external knowledge across geographic boundaries. Despite the criticality of this stage of the external knowledge sourcing process, we do not know much about how firms deal with initiation stickiness, "the difficulty in recognizing opportunities to transfer knowledge and in acting upon them" (Szulanski, 1996, 2000:13).

The reality is that the initiation of a knowledge transfer, the initial stage in which firms search for, recognize, and eventually act (or fail to act) upon opportunities to transfer external knowledge, is rarely observable. Therefore, most scholars thus far have either relied on patent data to describe this initial search process (e.g., Almeida, 1996; Almeida and Kogut, 1999; Katila and Ahuja, 2002; Rosenkopf and Almeida, 2003) or focused on steps subsequent to the identification of external knowledge, that is, the form of relationship that can potentially be established when an opportunity to transfer and exploit such knowledge has been identified and recognized (Vanhaverbeke, Duysters and Noorderhaven, 2002).

We know, however, that decision-makers in MNCs allocate their attention selectively, and so what they do at any given time depends on the issues on which their attention is focused at that time (e.g., Bouquet and Birkinshaw, 2008; Hansen and Haas, 2001; Ocasio, 1997). Given that some opportunities to transfer external technologies are thus bound not to be acted upon, the obvious unanswered question is: Are there patterns that explain why some opportunities to transfer external knowledge are acted upon and others missed? I argue that existing research does not (and cannot) answer this question because studies of external knowledge sourcing conducted thus far have not taken into account the "missed" opportunities. Only opportunities to transfer external knowledge that have been followed up 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) are thus observed.

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

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) of searching for external knowledge (viz. technology scouting units). I conducted more than 50 semi-structured interviews with managers involved in technology scouting (hereafter called scouters) on three continents, 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 few of the opportunites to transfer external technologies identified by scouters were acted upon by business unit managers introduced to these opportunities. The results further suggest that the likelihood of successful initiation 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 explaining initiation stickiness (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 significanlty less likely to be acted upon. In other words, everything else being equal (including the level of knowledge relatedness; e.g. Hansen, 2002), business units tend to miss opportunities to transfer technologies that do not fit with their dominant logic (Bettis and Prahalad, 1995; Prahalad

[1] I build on Burgelman, Christensen and Wheelwright (2004: 2) in defining technology as "the theoretical and practical knowledge, skills, and artifacts that can be used to develop products and services as well as their production and delivery systems." Hereafter, I use knowledge and technology interchangeably.

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; Tripsas and Gavetti, 2000), this is the first study to suggest that dissonant technologies might be selected out in the early stages of the external knowledge sourcing process (i.e., well before they are brought for investment consideration during the resource allocation process; Bower, 1970).

Conversely, I found empirical support for my prediction that the market provenness of an external technology (e.g., Menon and Pfeffer, 2003; Szulanski, 1996) has the opposite effect on the likelihood of successful initiation. If knowledge dissonance makes initiation more eventful, market provenness facilitates it. 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 upon 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 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 successful initiation are improved by scouters' efforts to search for needs and constraints within, and translate external technology into the internal language and match external opportunities to specific areas of, 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 successful initiation.

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 the 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; Tsai, 2001). 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 stickiness in the initiation of the external knowledge sourcing process. 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 and matching).[2] Second, I focus on understanding the factors that affect the success 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-H6) predicts the impact of process factors.

***Knowledge Dissonance***

A key knowledge attribute found by previous research to affect the success of knowledge transfer is knowledge relatedness, defined as knowledge held in common (Sapienza, Parhankangas and Autio, 2004: 812) or the level of overlap between two knowledge bases (Tanriverdi and Venkatraman, 2005). Empirically, knowledge relatedness has usually been measured by the level of overlap in patent classes or sub-classes. Jaffe (1986, 1989), for instance, measured knowledge relatedness among a sample of firms by looking at the overlap in the distribution of their patents in different technology fields. In a related vein, Hansen (2002) equates knowledge relatedness with whether two units have the same technical competence. Common to all these definitions and operationalizations is the technical aspect of knowledge relatedness. The general argument is that related knowledge is easier to transfer. Sapienza *et al.* (2004: 813) posit that "if external knowledge is closely related to the previously held knowledge in the organization, its communication will be smoother and face less resistance." In other words, firms are more likely to be able to evaluate effectively the value of external knowledge that is related to their knowledge bases (e.g., Cohen and Levinthal, 1990; Sapienza *et al.*, 2004). I do not dispute this argument, and empirically

[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.

control for knowledge relatedness, but suggest that not all related knowledge is the same. For example, two firms might have profoundly different interpretations of how to profit from the use of knowledge in the same technical area.

Whereas relatedness seems to involve the *ability* of the recipient unit to understand the incoming knowledge (Cohen and Levinthal, 1990), I posit that initiation stickiness (Szulanski, 1996, 2000, 2003) is highly influenced by the level of *agreement* or *fit* between external knowledge and a recipient unit's beliefs about that knowledge. For instance, in the 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. This was clearly not a matter of the external technology being incomprehensible to the organization, which, in most cases, had patenting activity in the focal technical area. The problem was not "lack of understanding" but "lack of agreement."[3]

An example from my empirical setting will serve to contrast knowledge relatedness with lack of agreement or fit. Companies developing technologies based on Voice over Internet Protocol (VoIP) possess knowledge related to the knowledge base of a typical telecommunication services provider (telco). For example, Skype, until few years ago a small start-up, and most telco incumbents all had knowledge in the same technical area (VoIP). That is, their knowledge was related. But that does not mean that it was consonant. Quite the contrary, in fact, as Skype and the incumbent telcos have quite different business models. So, although telcos can understand it, the technology developed by Skype is dissonant to them. Compare this with the case of Vonage, which also developed VoIP technologies. But the way Vonage commercialized the technologies—via monthly subscription and a box connected to a

3 As I describe below, to empirically disentangle these effects I specifically control for technical relatedness using either industry relatedness or patent based relatedness.

customer's broadband modem—was consonant with the way telcos traditionally operated. Many telcos now, in fact, offer VoIP services using the same model as Vonage. These two examples illustrate a case of a related technology (VoIP) that can be dissonant or consonant.

This paper proposes a new knowledge dimension, knowledge dissonance, and posits that it plays a pivotal role in explaining initiation stickiness (Szulanski, 1996, 2000, 2003). Notwithstanding that knowledge dissonance remains unexamined in the literature (e.g., Gupta and Govindarajan, 2000; Hansen, 1999; Hansen and Lovas, 2004; Monteiro *et al.*, 2008; Szulanski, 1996), I maintain that understanding its impact is crucial because it takes into account the role of managers' cognition (e.g., Barr, Stimpert and Huff, 1992; Garud and Rappa, 1994; Kaplan, 2008; Kaplan and Tripsas, 2008; Tripsas and Gavetti, 2000) 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 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 early inertial forces might kick in.

More specifically, I suggest that knowledge is dissonant when it goes against the dominant logic of the recipient unit (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986). Prahalad and Bettis (1986: 490), who coined the term "dominant general management logic" (or simply "dominant logic"), suggested that it can be observed as the way in which top managers conceptualize the business and make critical resource allocation decisions, be they in technologies, product development, distribution, advertising, or human resource

management. “[D]ominant logic,” they explained, “is a mindset or a world view or a conceptualization of the business and the administrative tools to accomplish goals and make decisions in that business” (Prahalad and Bettis, 1986: 491). I therefore argue that this relationship of consonance (or dissonance) between external knowledge and a recipient unit’s dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986) effectively captures the notion of knowledge dissonance and conforms to the descriptions I obtained in the field (see Table 1 below for quotes from scouters).

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 less likely a successful initiation.*

***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). In more recent work, and more important for purposes of the present study, Szulanski (2000:14) has provided empirical evidence that it is precisely in the initiation stage that knowledge unprovenness has the strongest negative effect, that is, absent evidence that knowledge has proven robust in other environments, its transfer is unlikely.

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 (1996, 2000, 2003). Market proveness in the present context provides

some evidence that the source of the external technology is legitimate and reliable. For example, that an external technology is commercially available and has attracted customers and 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). Additionally, organizations backed by customers and investors are likely to be perceived as legitimate, which enhances their credibility and the likelihood that they can 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 within a firm 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 more likely a successful initiation.*

Thus far, I have hypothesized about the relationship between knowledge attributes and initiation stickiness. 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. I suggest that 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 external knowledge sourcing process directly and significantly affects the likelihood of successful initiation.

***Search Efforts***

One of the key tasks performed by scouters is to search the environment for opportunities to transfer external technologies. 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), successful initiation 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 (Hansen, 1999; Szulanski, 2000), 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 sometimes have to spend significant amounts of time evaluating it (Hansen *et al.*, 2005; Szulanski, 1996; Teece, 1976). The amount of effort scouters expend on the external search process is thus likely to influence the chances of successful initiation. 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.

Equally important are scouters' 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. In other words, 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 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.

More formally, the foregoing arguments yield the following hypotheses.

*Hypothesis 3 – Ceteris paribus, the greater the external search effort, the more likely a successful initiation.*

*Hypothesis 4 – Ceteris paribus, the greater the internal search effort, the more likely a successful initiation.*

***Transfer Efforts***

Previous research has shown not only search but also transfer efforts to affect the success of the knowledge sourcing process (e.g., Hansen, 1999; Hansen *et al.*, 2005). In this regard, two activities performed by scouters are critical.

First, I argue that the more effort scouters expend on manipulating what they know about an external technology (e.g., Brown and Duguid, 1991, 1998; Pawlowski and Robey, 2004) before trying to convince other units that there is an opportunity to transfer it, the more likely a successful initiation. As described in the communities of practice literature (e.g., Brown and Duguid, 1991; Pawlowski and Robey, 2004; Wenger, 1998), it is fundamental when sourcing external knowledge to frame the elements of one community's worldview (e.g., a Silicon Valley start-up's) in terms of another community's worldview (e.g., a large, incumbent European telco's). I further suggest 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.*, 2001, 2002). I therefore hypothesize that the more effort scouters expend on this "internal selling" process, the more likely the successful initiation of the knowledge sourcing process.

Second, I propose that the ability to match an external technology to a specific manager or team increases the likelihood that an opportunity to transfer external knowledge will be acted upon. More precisely, the initiation of the technology sourcing process is more likely to be successful if connections between external and internal actors can be made across the

boundaries between them (Hargadon and Sutton, 1997). Managers who work in the scouting units not only reconnoitre the external environment for the purpose of making discoveries or acquiring information, but are also brokers. I hypothesize that scouters' ability to broker with a *tertius iungens* strategic orientation (Obstfeld, 2005), whereby they "facilitate transactions between other actors lacking access to or trust in one another" (Marsden, 1982: 202), increases the odds that an opportunity to transfer an external technology will be acted upon.

Taking these two arguments together, I predict that:

> *Hypothesis 5 – Ceteris paribus, the more effort scouters devote to internal selling, the greater the likelihood of a successful initiation.*
>
> *Hypothesis 6 – Ceteris paribus, the ability to match an opportunity to transfer an external technology to a specific manager (or team) within a focal firm increases the likelihood of a successful initiation.*

**DATA AND METHODS**

I tested the foregoing hypotheses using detailed data from one of the largest telecommunication services providers in the world. Headquartered in Europe, the company had annual revenues of more than USD 30 billion in 2007. Europ Telco, a pseudonym, had a long history of technological innovation and a worldwide portfolio totalling a few thousand patents and applications. It invested more than USD 1.2 billion in research and development (R&D) in the 2006 financial year. Despite the huge patent portfolio and substantial annual investment in R&D, management was convinced that Europ Telco needed to identify and access external sources of innovation and build strategic partners globally. The past few years had seen an extraordinary rate of convergence between fixed and mobile telephony, and, equally important, increasing intersections with other industries including consumer electronics, software development, gaming, and media content providers. Collectively, these

factors dictated that telecommunication services providers, in order to be able to offer innovative services to ever more demanding customers, intensify their search, globally, for sources of external technologies. It was in this context that Europ Telco established a presence in Palo Alto, California in 2000. It subsequently established scouting units in Tokyo (2003) and Beijing (2003) and assigned one of its Silicon Valley scouters the job of covering the Israeli (2003) market.

A prevalent type of subsidiary of large MNCs, scouting units are sometimes referred to as technological listening posts (Gassman and Gaso, 2004; Patel and Vega, 1999; 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, while in other empirical settings it may have been harder for the researcher to disentangle daily operational activities from search activities; here the vast majority of the technology scouting unit's activities should be an integral part of the initiation (Szulanksi, 1996, 2000, 2003) of the external knowledge sourcing process.

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 Europ Telco scouters apprising business unit managers of opportunities identified for transferring external technologies was to provide on a standardized form detailed information about the technology including its 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.[4]

I complemented this database with a survey, based on more than 50 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 those 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 both by 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 ensured 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 either 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 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

[4] Five entries during this period that were 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 those 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 1km to 7,500km).

requested face-to-face meetings with the managers who had not yet completed the surveys. In the end, all surveys were completed.[5]

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 collected, in June 2007, after a period well in excess of one year after all entries were input to the database.[6] I supplemented these internal sources with data collected from Venture Economics' database and the United States Patent and Trademark Office (USPTO).[7]

***Dependent Variable***

***Successful completion of the initiation of external technology sourcing.*** The dependent variable is whether initiation of the external technology sourcing was successfully completed. The scouting units' activities are virtually inconsequential unless a business unit acts on the opportunity to transfer the identified external technology. My fieldwork further indicated that the descriptions provided in the transfer memos, although detailed, were not of a nature that would enable a recipient unit to conduct an in-depth analysis or make an informed final decision about the external technology. The purpose of the memos was rather to provide a relevant, precise assessment of an external technology that would convey the nature of the opportunity and generate interest in following up on it. A transfer memo were not an end in

[5] 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.
[6] As explained in the robustness checks section, 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.
[7] This was possible because all entries in the Rock database contained the name of the source of the external technology.

itself, but rather the first step in connecting the dots between the external source and a specific unit within Europ Telco. Follow-up by recipient units was a critical performance indicator for the scouting units, and Europ Telco maintained updated records of the outcome of each entry in the Rock database.[8] I measured success of initiation as a dichotomous variable that took the value of 1 if the transfer memo was acted upon, and zero otherwise.[9] Action or follow-up on a transfer memo typically took the form of a meeting arranged between the source of the external technology and recipient unit. In cases in which no action was taken by the recipient unit, the scouting unit noted in its records that the recipient unit had been contacted but taken no action or initiated any follow up.[10]

### *Independent Variables*

***Knowledge dissonance.*** I propose that knowledge is dissonant when it goes against a recipient unit's dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986). I suggest here as a tractable operationalization that maintains the cognitive dimension of a dominant logic, 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 the more holistic aspect

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

[9] Success of a knowledge transfer 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 of success in the initiation stage, not to mention that a precise indication of when the follow-up occurred was not available for most cases in my database. I consequently opted for a dichotomous variable that, notwithstanding its limitations, was objective and reliable, ruling out possible concerns about respondent bias (see footnote 10 below).

[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 those 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 the line of business' accounts. These results reinforce the objective nature of this measure.

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 that underlies the external technology and the business model of the recipient unit. More precisely, the lead scouter responsible for the entry[11] was asked to rate on a 1-5 Likert scale (where 1=very low and 5=very high)—along the following 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) the value chain structure required to create and distribute the technology (and/or products/services enabled by it); 4) the cost structure and profit potential; 5) relevant technological standards—the level of fit or agreement between the business model that

[11] The ideal respondent for the question would have been the manager in the recipient unit 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 23 entries, which were a good representation of the total sample. The correlation between scouters' and recipient units' scores was high (0.78). In addition, for 30 entries I was able to obtain the ratings from the second contact. For this item (i.e., knowledge dissonance), the correlation between lead contacts' and second contacts' scores was also good (0.81).

underlies the external technology and that of the Europ Telco line of business to which the transfer memo was sent.[12]

Factor analysis of the foregoing five dimensions is consistent with them 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 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 them forming a single, unidimensional variable, and the 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 Reuer, Arino and Mellewigt (2006), survey respondents were asked 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," that is,

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

searching the external environment for the source of an external technology that could meet the requirements/needs of the line of business (i.e., the recipient unit).[13]

***Internal search effort.*** A similar scale was used to measure internal search. More precisely, respondents were asked 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 "internal search," that is, identifying the roadmap of the line of business (i.e., the recipient of the transfer memo) and understanding its requirements/needs.

***Internal selling effort.*** Respondents were also asked 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 "internal selling," that is, trying to translate the external technology to Europ Telco's language and "sell" it to the recipient unit.[14]

***Matching.*** My field study indicated that a key task performed by scouters was matching external technologies with specific Europ Telco managers and/or teams. Using the information contained in the Rock database entries, I measured matching as a dichotomous variable that takes the value of 1 if the transfer memo indicates a specific area to which and/or manager to whom the external technology is relevant, and zero otherwise. A second rater independently coded this variable, and inter-rater reliability was high (0.89).

**Control Variables**

[13] An alternative, and more objective, way to measure internal and external search effort would be to estimate the number of full-time employee days spent on each of the activities (e.g., Hansen, 1999; Hansen *et al.*, 2005). Although this was one of the questions in the original survey, respondents piloting the survey admitted that it would be difficult to provide this estimate. It thus not being possible to collect this objective data for all entries, I used two procedures to check the reliability of the perceptual measures. First, as described above, I also collected for 30 entries estimates from a second respondent. The correlation between the two respondents was 0.75 (internal search) and 0.71 (external search). Additionally, I asked the head of the scouting unit to provide full-time employee day estimates for as many entries as possible. Estimates for 29 entries were provided. The correlation between the perceptual measure of internal search effort and full-time employee day estimate was 0.78, the correlation between the two external search measures slightly lower (0.73). The high correlations between different respondents and between the perceptual measure and full time employee day measure provide additional confidence that the measures used here are a good representation of the actual effort spent on internal and external search activities.

[14] The same limitation and same remedial procedures described in footnote 13 were adopted here. The correlation between the two respondents was 0.74, and between the perceptual measure and the full time employee day measure 0.71.

***Knowledge relatedness***. The first control variable concerns the obvious alternative explanation that external technologies related to Europ Telco's existing knowledge base are most likely to be acted upon. Controlling for knowledge relatedness between the external source and Europ Telco was thus crucial. Patent-based measures of knowledge relatedness are probably the most widely used method for controlling for knowledge 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.[15] Therefore, following Wadhwa and Kotha (2006: 826), I operationalized knowledge 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 related to Europ Telco's knowledge base if its VEIC code was in the 1200 (Telecommunications) or 1300 (Wireless Communication) categories. The knowledge relatedness measure is a dummy variable that takes the value of 1 if it is related knowledge, and zero otherwise.

***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

[15] 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.

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.

***Motivation of the source.*** It is plausible that some firms might be more motivated to transfer their technologies to Europ Telco, and the motivation of the source might affect the likelihood of successful initiation (e.g., Gupta and Govindarajan, 2000; Szulanski, 1996). To control for this effect, I included a dichotomous variable that takes the value of 1 when the external source approached Europ Telco's scouting units, and zero otherwise, which works as a proxy for the external source's motivation.

***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 hosting city of the source of each external technology and Palo Alto, California. The mean distance was 1,127km, with a standard deviation of 1,894km, a minimum of 1km and a maximum of 7,500km. 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.

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

***Scouting and recipient units' incentives***. Previous research (e.g., Gupta and Govindarajan, 2000; Szulanski, 1996) has shown that the motivations of source and recipient units can facilitate or hinder knowledge transfer. A good proxy for scouting and recipient units' motivations is the "potential innovation dividends" of internalization of an external technology. This is a key performance indicator within the studied company, and has an impact on the compensation of the managers, mainly in the scouting unit, but also in recipient units. Potential innovation dividends are calculated in US$ according to a proprietary formula developed internally by Europ Telco. This being a highly sensitive metric, access to actual figures for each technology was not provided. Instead, it was agreed that the lead scouter for each external technology would indicate in 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 Europ Telco's internalization of the external technology.

***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. Table 2 (below) summarizes the measures used in the present study.

## VALIDITY CHECKS

I used SAS V 9.1.3 (Hatcher, 1994; 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 (Bollen, 1989; 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 excellent (Lattin *et al.*, 2003) Goodness of Fit Index (GFI) and GFI Adjusted for Degrees of Freedom (AGFI), both indices exceeding 0.90. More interesting, though, was the test of the adequacy of the one-factor model of knowledge dissonance, which turned out to have a good fit (GFI=0.95, AGFI=0.86), better than plausible rival models. Akaike's information criterion (AIC) (Boomsma, 2000; Hu and Bentler, 1999) was better for the one factor model than for the two- or three-factor models (AIC 1-factor=5.90, AIC 2-factors=78.15, AIC 3-factor=133.08). The one-factor model of market provenness had only an acceptable fit (GFI=0.88, AGFI=0.83), but this was better than the fit of rival models with two or three factors (AIC 1-factor=97.39, AIC 2-factors=197.20, AIC 3-factor=326.51). 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 10 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, 2002).[16] Table 3 reports summary statistics, Table 4 the pairwise correlations between the variables used in the analysis.

The results of the probit regressions are presented in Table 5, 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.[17]

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, innovation dividends, knowledge relatedness, and source age, geographic distance (between the scouting unit and source of the external technology) being negative and significant. Source size and source motivation are not statistically significant.

Hypotheses 1 and 2 relate to the impact of knowledge dissonance and market provenness on the chances of successful initiation. Hypothesis 1 posits that the more dissonant an external technology, the less the likelihood of successful initiation, Hypothesis 2 that market provenness will have the opposite effect, increasing the odds of successful initiation.

Model 2 shows the coefficient and marginal effect of knowledge dissonance to be negative and highly significant ($p<0.001$). Calculated at the mean of all other variables, a one-standard deviation (3.86) increase in the level of dissonance decreases the probability of successful initiation from a baseline of 53% to a mere 6%.[18]

[16] VIF values ranged from 1.2 to 4.7.

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

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

Market provenness, on the other hand, positively and significantly increases the likelihood of successful initiation. Calculated at the mean of all other variables, the predicted probability of successful initiation ranged from 23% when the external technology had no market provenness to 80.2% when it received the maximum rating (6) for market provenness. These findings support both Hypothesis 1 and Hypothesis 2.

Hypothesis 3 suggests that greater external search effort is associated with a higher likelihood of successful initiation. Model 2 shows the coefficient and marginal effect of external search to have the predicted positive sign, but neither achieves statistical significance. Hypothesis 3 is thus rejected.

Hypotheses 4 and 5 predict that internal search and internal selling effort will have a positive impact on the odds of successful initiation. Both hypotheses are supported. The coefficients and marginal effects of both internal search and internal selling effort are positive, as predicted, and significant at the 5% level. A one standard-deviation increase in internal search effort corresponds to a 28.6% increase in the probability of successful initiation, 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 25% when scouters selling the opportunity internally exerted minimal internal selling effort (score=1) to 81.8% when they expended a great deal of effort (maximum score=5).

Hypothesis 6 predicts that the matching of an external technology with a specific manager (or team) within the focal firm will increase the odds of successful initiation. This hypothesis is also supported ($p<0.001$). Setting this variable to “1” and all other variables to their means, I calculated that opportunities to transfer external technologies matched to specific areas and/or managers had a 78% predicted probability of being followed up. The figure was 33% for opportunities with no clear match.

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 put maximum effort into internal search and internal selling and were able to find an internal match. That probability was 37% if all other variables were kept at their means, but increased to 67% 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 maximum effort into internal search and internal selling and were able to find an internal match. That likelihood was quite high (96%) when all other variables were kept at their means, and remained high (73%) even when knowledge dissonance was 1 S.D. above the mean, and decreased to 55% when the scouters put maximum effort into internal search and internal selling but did not manage to find an internal match (all remaining variables still at their means). These results indicate that opportunities to transfer dissonant external knowledge have a shot at being acted upon when scouters put all their effort into the process. Even more noticeable is the effect of scouters' efforts in increasing the likelihood of successful initiation even when the external technology is unproven.

***Robustness checks***. I performed several tests to check the robustness of the findings. For instance, I ran several models using patent-based measures of knowledge relatedness, although this reduced the number of observations in the model to fewer than ninety. The results are robust to these specifications as well. I probed the robustness of the findings using eight different patent-based knowledge relatedness measures, and in all cases the results were robust.[19] Testing whether the results were robust to slightly different operationalizations of market provenness and knowledge dissonance also yielded qualitatively similar results. Finally, I tested whether including a control variable that takes into account the time lapse

[19] Please refer back to footnote 15.

between the date on which the transfer memo was written and the date on which the dependent variable was collected would change my findings. Specifically, I created a variable called "time lapsed," which, although positive, is not significant; the signs and levels of significance of the variables of interest remained the same.

## DISCUSSION

Overall, the present study finds that both the attributes of the 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 and their ability to match external technologies to specific managers or teams) significantly affect the likelihood of successful initiation of the external knowledge sourcing process.

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 to neglect opportunities to transfer external technologies that do not fit with their dominant logic (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986). Although knowledge dissonance has not been examined by strategy and international management scholars studying knowledge transfers (e.g., Gupta and Govindarajan, 2000; Hansen, 1999; Hansen and Lovas, 2004; Monteiro *et al.*, 2008; Szulanski, 1996), the concept of knowledge dissonance at the organizational unit level is consistent with Festinger's (1957) theory of cognitive dissonance and more recent work on selective exposure to information or confirmation bias at the individual level (Jonas *et al.*, 2001: 557). Interestingly, previous research has 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 to this study, this confirmatory information search can also be observed in group decision-making (Schulz-

Hardt *et al.*, 2000). I suggest that there are clear parallels between the findings presented here and the bodies of literature studying cognitive dissonance at the individual and team levels.

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). Existing accounts of organizations subject to strong inertial forces have mostly examined the issue from a political perspective, showing how the pursuit of individuals' or groups' interests tends to preserve the *status quo* (e.g. Bower, 1970; Burgelman, 1994; Christensen and Bower, 1996). More recently, a number of scholars (e.g., Kaplan, 2008; Kaplan and Tripsas, 2008) have emphasised the role played by managerial cognition in organizational inertia. Kaplan (2008), for instance, argues that managers' cognitive frames are a natural mechanism by which ambiguities created by discontinuities are connected to strategic choice. Frames thus filter managers' perceptions about what is happening and what actions should be taken (Daft and Weick, 1984; Hambrick and Mason, 1984). This paper contributes further to this increasingly important research stream.

More important, the present study examines the role of managers' cognition 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. Essentially, the only resource to be allocated by managers (Bower, 1970) at this stage is attention (and time). But even at this stage, cognition plays 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 might 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 successful initiation. Szulanski (1996, 2000, 2003) has shown the transfer of best practices with a proven record of past usefulness to be less difficult to initiate *within* the firm. The results of the present study reveal a similar pattern in the external knowledge sourcing process. Managers in an in-sourcing firm are more likely to act on opportunities to transfer external technologies that are market proven. Showing that an external technology is market proven, however, not only demonstrates its past usefulness (Szulanski, 1996, 2000, 2003), but might also provide some evidence that the source of the external technology is legitimate and reliable. This paper refines this concept and provides a conceptual and empirical notion that goes beyond the idea of provenness merely in terms of the usefulness of knowledge (Szulanski, 1996, 2000, 2003). Market provenness expands beyond the purely usefulness sense to encompass a market and institutional endorsement of the source of an external technology (e.g., Stuart *et al.*, 1999). It 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).

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 line of business managers might derive assurance from the fact of an external technology already having been adopted by the market, and there being a “group of intelligent people somewhere ready to put their money where their mouth is and fund the

[external] company." This might give such managers the confidence to import the technology "as it is" and launch new products or services based on it. Over time, an in-sourcing firm might launch new products (and thus become more innovative) by internalizing market proven external technologies. Contrast this with the most well established line of thinking in the extant literature on the relationship between external knowledge and higher innovation performance, which, building on evolutionary economics arguments (e.g., March, 1991; Nelson and Winter, 1982), suggests that firms engaged in accessing external knowledge are better able to innovate because the distinctive new knowledge variations acquired thereby provide a broader range of choices for solving new problems (e.g., Fleming and Sorenson, 2001; Katila and Ahuja, 2002; Rosenkopf and Nerkar, 2001). A number of empirical studies support this line of reasoning (e.g., Henderson and Cockburn, 1994; Katila, 2002; Katila and Ahuja, 2002; Rosenkopf and Nerkar; 2001).

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 the positive relationship between external knowledge sourcing and innovation performance. This might have important implications for the stream of research that is examining the relationship between external knowledge sourcing and innovation performance (e.g., Laursen and Salter, 2006; Rosenkopf and Nerkar, 2001).

I should offer the caveat that this study, given its focus on initiation, does not provide robust findings on the role of market provenness in subsequent stages of the knowledge sourcing process. 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 that are at play within.

Taken together, the present study's two findings (regarding the impact of knowledge dissonance and market provenness) 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 their 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), and encourages 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, but risks giving rise to the development of "core rigidities" (Leonard-Barton, 1992) or making firms vulnerable to "competency traps" (Levitt and March, 1988).

Third, my findings reveal that the level of effort expended by scouters in this process positively and significantly affects the odds of successful initiation. It seems, however, that it is the internal (rather than external) search effort, the effort expended trying to understand by mapping a line of business's requirements, needs, and constraints, that significantly matters. Although scouters expend a similar amount of effort, in terms of time spent, on external and internal search (Table 5), only the internal search effort has a positive *and* significant effect on the likelihood of successful initiation. 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 to successful initiation of two other activities, internal selling and matching. More important, the findings of this paper show that organizations are not necessarily destined to disregard opportunities to transfer knowledge that is dissonant and/or unproven, but rather that when scouters expend the maximum possible effort on their internal activities, unproven and even highly dissonant opportunities (which, under usual circumstances, would almost certainly be disregarded) are likely to be acted upon.

## CONCLUSION

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 missed. 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 also show that process attributes, notably scouters' efforts to search within for needs and contraints, translate the external technology into the MNC's internal language, and match the external opportunity to specific areas, all increase the odds of successful initiation. For MNCs concerned about how they might better manage their global knowledge sourcing processes understanding initiation stickiness is a priority and should therefore be the focus of far more attention than they have received to date.

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Table 1 Knowledge Dissonance

| Knowledge Dissonance | Representative Quotes |
|---|---|
| **1. Business/commercial fit** | It is very hard to get them [lines of business] to do something about it [the external technology] when it doesn't fit in with their current model. Even though it's an innovative technology, if it doesn't fit with their current model of what should be done in that technological domain, there won't be a follow-up... (VP, Technology & Innovation) |
| | … it has to fit our particular way of commercializing this type of technology (Account Director) |
| | Whenever you come up with something new, first people try to see if it fits with their business as usual (Director Global Scouting) |
| | Is this something that will fit in our product roadmap? If not, it is not going to happen (Director, Value Added Services) |
| | Does this fit with how ET or a service provider traditionally does business, or will do business in the future? For example, the technologies that support a model where the start-ups are going to be the interface for the customer won't entice the attention of our lines of business (VP, Business Development) |
| **2. Fit with existing vision/ beliefs/thinking** | This [external technology] fits with much of their [lines of business'] current thinking regarding a specific domain (e.g. technologies enabling the management of personal content) (Senior Vice President, Technology ) |
| | So their [managers in the lines of business] disadvantage is that they're in a box… they usually are very good and know a lot about their "box" but if it [external technology] contradicts what they believe, they don't want to know about it (VP, Technology) |
| | Sometimes our managers are very difficult to convince because they usually know a lot about a specific technology and they always have something to say about it. Very often if the external technology doesn't build on the technology they have already chosen, nothing will happen (Director, Market Developments) |
| | If managers in the line of business say "yes, there is a really good fit with our vision for this techonological domain" they will come back to us… if they don't see that fit, they simply ignore our memos (VP Technology) |
| | They [managers in the lines of business] have anti-bodies to technologies that contradict their convictions (Director, Research & Venturing) |
| | There is not a lot of receptivity to technologies if they don't fit the vision of the existing lines of business… Maybe we should create a new line of business but that's a very hard sell in the company (Director, Global Scouting Operations). |

**Table 2:** Summary of Measures

| Variable | Brief Description | Source |
|---|---|---|
| **Dependent variable** | | |
| Successful Initiation | Dummy variable which takes the value of 1, if the transfer-memo was acted upon and zero otherwise | Scouting unit's archives |
| **Independent variables** | | |
| Knowledge Dissonance | Score composed by the sum of 5 items measuring the level of dissonance between the business model underlying the external technology and the business model of the recipient unit in a 1-5 Likert scale | Survey |
| Market Proveness | Score composed by the sum of six dummy variables measuring whether the external technology was commercially available, whether it had customers using it and investors funding it | Rock Database |
| External Search | Amount of time spent by scouters in "external search" measured in 1-5 Likert scale (1=insignificant amount of time; 3=reasonable amount of time; 5=a lot of time) | Survey |
| Matching | Dummy variable that takes the value of 1 if the transfer-memo indicates a specific area and/or manager to which the external technology is relevant and zero otherwise. | Rock Database |
| Internal Search | Amount of time spent by scouters in "internal search" measured in a 1-5 Likert scale (1=insignificant amount of time; 3=reasonable amount of time; 5=a lot of time) | Survey |
| Internal Selling | Amount of time spent by scouters in "internal selling" measured in 1-5 Likert scale (1=insignificant amount of time; 3=reasonable amount of time; 5=a lot of time) | Survey |
| **Control Variables** | | |
| Knowledge Relatedness | Dummy variable which takes the value of 1 if the VEIC code of the source of the external technology was in the 1200 (Telecommunications) or 1300 (Wireless Communication) categories and 0 otherwise | Venture Economics |
| Tie strength | Score of the strength of the tie between the scouting unit and the recipient unit--prior to the transfer memo date--measured in terms of frequency and closeness in a 1-5 Likert scale | Survey |
| Motivation of the source | Dummy variable that takes the value of 1 when the external source approached Europ Telco's scouting units and zero otherwise | Rock Database |
| Innovation Dividends | Potential innovation dividends measured in a 1-5 Likert scale | Survey |
| Source age | Number of years of the source of the external technology at the date the transfer of memo was written | Rock Database, Venture Economics |
| Geographic Distance (ln) | Natural logarithm of the geographic distance in miles between the hosting city of the source of external technology and Palo Alto | Rock database |
| Source size (ln) | Natural logarithm of the amount in USD that the source of the external technology had received in investments at the date of the transfer memo | Venture Economics |
| Scouter name | Dummy variable for the scouter who wrote the memo | Rock Database |
| Recipient unit | Dummy variable for the unit which received the memo | Scouting unit's archives |

**Table 3:** Descriptive Statistics

| | Mean | SD | Min | Max |
|---|---|---|---|---|
| *Dependent variable* | | | | |
| Successful Initiation | 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 | 3.08 | 1.21 | 1.00 | 5.00 |
| Matching | 0.38 | 0.49 | 0.00 | 1.00 |
| Internal Search | 2.75 | 1.35 | 1.00 | 5.00 |
| Internal Selling | 2.69 | 1.31 | 1.00 | 5.00 |
| *Control variables* | | | | |
| Tie strength | 6.09 | 2.44 | 2.00 | 10.00 |
| Geographic Distance (ln) | 4.51 | 2.73 | 0.00 | 8.92 |
| Innovation Dividends | 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 |
| Knowledge Relatedness | 0.49 | 0.50 | 0.00 | 1.00 |
| Motivation Source | 0.18 | 0.38 | 0.00 | 1.00 |

**Table 4:** Pairwise Correlations Among Variables

| | | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | Successful Initiation | 1.00 | | | | | | | | | | | | | |
| **2** | Knowledge Dissonance | -0.51 | 1.00 | | | | | | | | | | | | |
| **3** | Market Proveness | 0.29 | -0.08 | 1.00 | | | | | | | | | | | |
| **5** | External Search | 0.27 | -0.47 | 0.04 | 1.00 | | | | | | | | | | |
| **6** | Matching | 0.27 | -0.08 | 0.05 | 0.08 | 1.00 | | | | | | | | | |
| **7** | Internal Search | 0.27 | -0.58 | 0.05 | 0.67 | 0.05 | 1.00 | | | | | | | | |
| **8** | Internal Selling | 0.55 | -0.56 | 0.24 | 0.44 | 0.23 | 0.39 | 1.00 | | | | | | | |
| **9** | Tie Strength | 0.23 | -0.66 | -0.17 | 0.43 | -0.14 | 0.64 | 0.32 | 1.00 | | | | | | |
| **10** | Geographic Distance (ln) | -0.27 | 0.13 | -0.04 | -0.04 | -0.07 | 0.09 | -0.32 | -0.08 | 1.00 | | | | | |
| **11** | Innovation Dividends | 0.34 | -0.38 | 0.23 | 0.16 | 0.29 | 0.12 | 0.50 | 0.04 | -0.17 | 1.00 | | | | |
| **12** | Source Age | 0.02 | 0.05 | 0.45 | -0.11 | 0.10 | 0.15 | -0.09 | -0.16 | 0.02 | 0.17 | 1.00 | | | |
| **13** | Source Size (ln) | 0.25 | -0.05 | 0.51 | 0.04 | 0.15 | 0.01 | 0.22 | -0.12 | -0.10 | 0.36 | 0.29 | 1.00 | | |
| **14** | Knowledge Relatedness | 0.25 | -0.10 | 0.44 | 0.16 | -0.03 | -0.01 | 0.09 | -0.02 | 0.14 | 0.18 | 0.23 | -0.12 | 1.00 | |
| **15** | Motivation Source | 0.13 | -0.03 | 0.13 | -0.01 | 0.24 | 0.00 | 0.20 | -0.17 | -0.06 | 0.23 | 0.03 | 0.17 | -0.12 | 1.00 |

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

**Table 5:** Regression Results
Dependent Variable: Initiation Success

| | Model 1 | ME | Model 2 | ME |
|---|---|---|---|---|
| H1 Knowledge Dissonance | | | -0.42*** | -0.17*** |
| | | | (0.11) | |
| H2 Market Proveness | | | 0.26* | 0.10* |
| | | | (0.13) | |
| H3 External Search | | | 0.00 | 0.00 |
| | | | (0.23) | |
| H4 Internal Search | | | 0.58* | 0.23* |
| | | | (0.25) | |
| H5 Internal Selling | | | 0.39* | 0.16* |
| | | | (0.17) | |
| H6 Matching | | | 1.23** | 0.45*** |
| | | | (0.40) | |
| Knowledge Relatedness | 0.71* | 0.27* | 0.50 | 0.19 |
| | (0.29) | | (0.38) | |
| Tie Strength | 0.14* | 0.05* | -0.15 | -0.06 |
| | (0.07) | | (0.12) | |
| Geographic Distance (ln) | -0.14** | -0.05** | -0.11 | -0.04 |
| | (0.05) | | (0.06) | |
| Innovation Dividends | 0.47** | 0.19** | -0.20 | -0.08 |
| | (0.15) | | (0.21) | |
| Source Age (years) | 0.11† | 0.04† | 0.05 | 0.02 |
| | (0.06) | | (0.08) | |
| Source Size (ln) | -0.04 | -0.01 | 0.10 | 0.04 |
| | (0.10) | | (0.13) | |
| Motivation Source | 0.41 | 0.15 | 0.64 | 0.24 |
| | (0.38) | | (0.49) | |
| _cons | -1.38* | | 7.56 | |
| | (0.65) | | (2.58) | |
| N | 122 | | 110 | |
| Wald Chi2 | 46.71*** | | 42.41*** | |
| Log likelihood | -58.65 | | -34.83 | |
| McFadden's pseudo R2 | 0.30 | | 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.