Do Firm-Determined Factors Influence Learning and Leakage in Alliances?
The Benefits and Tradeoffs of Using Alliances as Knowledge Acquisition Mechanisms

Short title: Learning and Leakage in Alliances

Miguel Rivera-Santos
Babson College
Management Division
Tomasso 123
231 Forest Street
Babson Park, MA 02457
Tel: (781) 239-5325
Fax: (781) 239-5272
e-mail: mrivera@babson.edu

Pierre Dussauge
HEC School of Management, Paris
Department of Strategy and Business Policy
1, rue de la Libération
78351 Jouy-en-Josas – France
Phone: (+33) 1 39 67 72 79
Fax: (+33) 1 39 67 70 84
e-mail: dussauge@hec.fr

Will Mitchell
Fuqua School of Business
Duke University
1 Towerview Drive
Durham, NC 27708
Phone: (919) 660-7994
Fax: (919) 681-6244
e-mail: will.mitchell@duke.edu

May 4, 2006
Do Firm-Determined Factors Influence Learning and Leakage in Alliances?  
The Benefits and Tradeoffs of Using Alliances as Knowledge Acquisition Mechanisms

Abstract

This paper explores conditions under which firms can use alliances to acquire external knowledge while simultaneously protecting their own valuable resources, irrespective of alliance design and governance decisions made jointly with the partner or made by the partner alone. We argue that firms can one-sidedly develop both the intent to acquire knowledge from their partners and the intent to protect knowledge from undesired loss in alliances, and that these two intents will have both direct effects and cross-effects on learning and leakage. We test our predictions on a sample of 107 e-commerce alliances. Our findings suggest that firms can use alliances as a reliable source of external knowledge, but that they do so at some risk of also losing valuable knowledge.

Keywords: Alliances, Learning, Protection, Self-determined factors
The role of inter-firm collaboration in providing opportunities for firms to obtain knowledge from their partners, while also potentially unintentionally leaking knowledge to these same partners, is an important issue in several literatures. Most focally, the alliance literature views knowledge transfer to and from partners as a key outcome of alliance activity (Hamel, 1991; Inkpen, 2002) and the nascent dynamic capabilities literature (Teece et al., 1997; Zollo and Winter, 2002) is beginning to recognize alliance activities as one of the sets of processes by which firms gain knowledge that they can use to create new capabilities (Capron and Mitchell, 2004). Although alliance research, as well as, more generally, research in the inter-organizational knowledge transfer literature, shows that learning and leakage sometimes arise as unintended side-effects of functional operating activities in alliances (e.g., Mowery et al., 1996), several studies argue that firms can directly influence knowledge transfer outcomes (Kale et al., 2000; George et al., 2001; Gulati and Singh, 1998; Simonin, 1997). In particular, many authors have stressed the importance of a firm’s learning intent as an essential factor in their ability to deliberately use alliances as a source of external knowledge (Hamel, 1991; Johnson and Sohi, 2003; Norman, 2004; Simonin, 2004; Tsang, 2002; Vassolo et al., 2004; Zhao et al., 2005).

Some studies, moreover, argue that learning and protection activities involve trade-offs, such that greater efforts toward learning increase the risk that firms will lose key knowledge to allies, while greater emphasis on protection limits learning opportunities (Baughn et al., 1997; Norman, 2004).

Despite recent progress, we are only beginning to identify what firms can do to enhance their learning from alliances, while even fewer studies have examined firms’ alliance protection activities. In particular, studies on learning in alliances have not disentangled learning and protection factors that derive from negotiations with the partner from factors that the focal firm
can control independently. Indeed, for alliances to become reliable means of obtaining external knowledge, a firm needs to have sufficient independent control over learning and protection in its alliances to justify a systematic use of alliances to learn. If learning and protection are too dependent on joint decisions with the partner in each specific alliance, alliances will not be a reliable mechanism through which firms can build their knowledge base. We thus use the term “reliable” to mean that firms have enough independent control on the learning process that they can learn valuable knowledge via the alliance, irrespective of decisions that need the partner’s consent. Moreover, it is important to determine whether learning and protection conflict with each other in order to understand the role that alliances play in obtaining external knowledge.

This paper explores conditions under which firms can use alliances as a reliable source of knowledge. More specifically, based on the definition above, we investigate whether self determined factors contribute to learning in alliances, as well as to limiting the extent of undesired loss. In addition, we explore to what extent the self determined factors that contribute to learning and those that reduce leakage involve trade-offs.

We argue that the focal firm’s intent to learn is a primary factor that the firm can develop independently in order to learn from its alliances. In the absence of such a deliberate learning intent that contributes to the actual acquisition of valuable knowledge, a firm could still acquire knowledge from its alliances but would lack the strategic control needed to coherently build up and develop its knowledge base. A review of the literature that underlies the notion of a firm’s intent to learn in alliances reveals significant differences among authors in how they approach this concept. Building on several relevant approaches, we conceptualize the notion of learning intent to include both individual and organizational dimensions, with both deliberate and behavioral aspects. We go on to argue that, if firms can develop the intent to learn from alliances,
they can also develop the intent to protect valuable knowledge from leakage to alliance partners. Again, we view the intent to protect as a factor that a firm can develop independently from its alliance partners and which drives its ability to decrease leakage.

We develop several hypotheses around the concepts of learning and protection intent. We predict that greater learning intent contributes to greater learning from a partner, irrespective of decisions made independently by the partner, or of joint decisions made in common with the partner, and which might also affect learning by the focal firm. Similarly, we predict that greater protection intent leads to less undesired loss of knowledge, irrespective of decisions made independently by the partner or of joint decisions made in common with the partner, which might also affect leakage. In parallel, we explore arguments that a firm’s learning intent and its protection intent in alliances may conflict with each other. We argue that, if a firm’s learning intent systematically increases leakage and if its protection intent systematically decreases learning, then alliances are not a reliable mechanism through which firms can build up their knowledge base. We develop a new operationalization of both learning and protection intents, and we test the predictions on a sample of 107 e-commerce alliances based in Europe, North America, and Asia, operating in 2001.

The paper makes two primary contributions. First, we bring together ideas from several literatures to provide a more general understanding of alliance learning and protection activity, which is an important phenomenon in modern business. Second, we revisit the notions of alliance learning intent and protection intent and, on this basis, explore the trade-offs that the literatures rarely compare and test. We propose and test operationalizations of those two intents and examine their impact on both learning and leakage in alliances. In doing so, we provide a
deeper understanding of the composition of inter-organizational learning processes and of how those processes contribute to a firm’s dynamic capabilities.

BACKGROUND AND PREDICTIONS

The intent to learn in alliances

Inkpen (2002) identified four aspects of the concept of learning in alliances: learning to manage alliances, learning about partners, joint learning, and learning from partners. This paper focuses on the fourth of these aspects: how firms learn from their partners and, as a complement, how firms prevent their partners from learning undesired knowledge from them. We define learning in alliances as a transfer of knowledge from one partner to another (Inkpen and Dinur, 1998; Mowery, et al., 1996; Simonin, 1999). Greater learning means obtaining a wider range and depth of useful knowledge from a partner (further transfers within the focal firm or applications of the acquired knowledge are beyond the scope of the study). In turn, we define leakage as undesired learning by a firm’s partner (Hamel et al., 1989).

The alliance literature identifies multiple factors that might influence learning and protection. Several authors have argued that one of the main determinants of learning in alliances is the focal firm’s intent to learn (Hamel, 1991; Johnson and Sohi, 2003; Kale et al., 2002; Norman, 2004; Pucik, 1988; Simonin, 2004; Tsang, 2002). For all these authors, actual learning mechanisms derive from this intent to learn. However, there is little agreement in this literature on what exactly is meant by a firm’s “intent to learn”. For some authors, an intent to learn “refers to the level of desire and will of the parent [firm] with respect to learning from the joint venturing experience” (Tsang, 2002: 839). Authors in this vein consider that a firm has an intent to learn when learning is a deliberate and explicit objective in the alliance. Hamel (1991: 89) states that “intent refers to a firm’s initial propensity to view collaboration as an opportunity to
learn”. Simonin (2004: 409) argues that, at the individual level, “motivation to learn is one of the major determinants of learning” and, in an interorganizational parallel, “learning intent describes the same self-determination, desire and will of an organization to learn from its partner or collaborative environment”. Johnson and Sohi (2003: 759) view a firm’s learning intent as its “desire to learn”; in their view, the learning intent “describes how hungry and ambitious the firm is to learn and build competencies”. All these authors rely on a form of anthropomorphism to transpose an individual-level concept to an organizational level. Indeed, the firm’s learning intent is often measured by the top management’s stated desire to learn from the alliance (Norman, 2004; Simonin, 2004; Tsang, 2002).

Other authors have stressed the gaps that often appear between top management’s intentions and the actual operational behavior of the firm’s members. Pucik (1988: 82), for instance, argues that a firm’s learning intent often fails to be “communicated throughout the firm”, thus preventing the top management’s objectives to translate into effective learning behaviors. Similarly, Inkpen and Crossan (1995: 595) observe that “firms with explicit learning objectives are unable to put into place the appropriate mechanisms and systems to transfer knowledge from the JV to the parent”. Pushing this logic further, Kale, Dyer and Singh (2002: 747) infer a firm’s intent to learn from its decision to create a dedicated alliance function aimed at “coordinating alliance activity and capturing/disseminating alliance-related knowledge”. Even scholars who focus on senior management goals often also argue that the impact of a firm’s learning intent on actual learning is contingent upon the firm’s learning capacities (Simonin, 2004) or its implementation of appropriate learning activities (Johnson and Sohi, 2003).

Thus, it appears that those authors that view the intent to learn as an essential driver of inter-partner learning in alliances differ significantly in the way they define the concept. They
differ, in particular, on the level to which the notion applies: an individual level, which is then that of top management, or an organizational level, which places the behavioral patterns at a more operational level.

Building on these two approaches, we argue that the individual and organizational levels of a firm’s learning intent are two intertwined aspects of the same concept. A learning intent at the top management level only, with no translation into collectively adhered to objectives, is more akin to a mere statement of intent, i.e., wishful thinking, than to a guide for action. Conversely, organizational mechanisms leading to a learning behavior without top management guidelines as to what needs to be learned lacks the strategic intentionality needed to coherently build up and develop the firm’s knowledge base. We argue that a firm’s learning intent necessarily includes both a deliberate intentionality, embodied in a definition of the firm’s learning objectives provided by top management, and a more organizational dimension, the engrained behavioral patterns that translate the learning objectives into actions that capture and incorporate external knowledge into the firm.

Unlike previous authors, we do not view the behavioral patterns leading to learning as simply a consequence of top management’s pre-existing intentions. Rather, we consider that top management’s guiding principles and the behavioral facets of a firm’s intent to learn link to each other. Top management’s declared intentions may arise, for example, from a firm’s learning culture as much as they contribute to modeling this learning culture.

Hence, we argue, in contrast with prior studies, that a measure of the firm’s learning intent needs to include both individual and organizational dimensions. We define this intent to learn as self-determined, i.e., independent from influences that a partner in a given alliance might exercise on the focal firm. If the firm’s learning intent includes both explicit learning objectives
determined by top management and engrained behavioral patterns at a more operational level, we expect the firm’s learning intent to lead to greater learning in an alliance, irrespective of decisions that need the partner’s consent.

Hypothesis 1. The greater a firm’s alliance learning intent, the more it will learn from a partner in a given alliance.

The intent to protect in alliances

The alliance literature also contends that alliances entail significant risks of undesired loss of knowledge to partners, as well as providing learning opportunities (Das and Teng, 1999). We use the term leakage to refer to undesired loss of knowledge to a partner. We argue that if firms can enter an alliance with an intent to learn, they can also do so with an intent to protect their valuable knowledge from leakage. Although the risk of opportunistic behavior in alliances has been extensively studied (Hennart, 1988; Khanna et al., 1998; Oxley, 1997), the notion of intent to protect has, to the best of our knowledge, not yet been explicitly developed. Several authors examine the impact of various factors on protection and leakage in alliances (Baughn et al., 1997; Das and Teng, 1999; Dussauge et al., 2000a; Hamel et al., 1989), but they have not delved into the meaning or impact of a firm’s intent to protect in any detail.

Our argument concerning protection intent parallels our discussion of the firm’s learning intent in an alliance. We suggest that the firm’s intent to protect in an alliance is both determined by top management intentions and engrained in behavioral patterns at a more operational level. A firm’s intent to protect must include a conscious understanding of those pieces of knowledge that are critical to the firm’s success and that need to be protected from appropriation by a potentially opportunistic partner in an alliance. Thus, as is the case for the firm’s intent to learn,
its intent to protect incorporates the strategic intentionality of top management. But, as in the case of the firm’s intent to learn, top management intentions alone are merely wishful thinking. The firm’s intent to protect is not limited to the top management’s declared intentions but needs to also encompass behavioral patterns at a more operational level.

Again, we do not view the patterns leading to protection as a consequence only of top management’s pre-existing intentions. Rather, we consider that top management’s guiding principles and the behavioral facets of a firm’s intent to protect are two components of the same notion, i.e., the firm’s intent to protect. This intent to protect includes both the identification of specific knowledge for which leakage should be avoided and collective behaviors that translate the desire to protect into relevant actions. We define this intent to protect as self-determined, in the sense that it is independent from influences that a partner in a given alliance might exercise on the focal firm. We expect the firm’s intent to protect to influence undesired loss of valuable knowledge to the alliance partner, irrespective of decisions that need the partner’s consent.

Hypothesis 2. The greater a firm’s alliance protection intent, the less the leakage to a partner in a given alliance.

Do learning and protection intents conflict?

Most authors that have considered protection concerns in alliances in parallel with learning objectives emphasize trade-offs between the objectives. There are two traditional arguments. First, greater attempts at learning lead to higher risks of leakage to a potentially opportunistic partner. Second, a stronger focus on protection and control hinders inter-partner learning (Baughn et al., 1997; Hamel et al., 1989). Creating an environment conducive to knowledge transfer requires openness as well as multiple and repeated interactions between the two firms. While such an environment may favor
learning by the focal firm, it will also allow knowledge flows toward the partner. Because
the literature typically assumes openness to be symmetric, both the focal firm and the
partner will benefit from learning opportunities and, conversely, suffer from leakage.

Kale, Singh, and Perlmutter (2000) challenge this view, arguing that learning and
protection often are not conflicting objectives in an alliance. They suggest that protection
concerns can be mitigated by building inter-partner relational capital and using an
integrative approach to managing conflict in the alliance. Kale, Singh, and Perlmutter’s
approach brings together the argument that inter-partner trust and routines enhance
knowledge transfers (Ariño et al., 2001; Zaheer et al., 1997; Zollo et al., 2002) and the
argument that trust and control in alliances complement each other (Das and Teng, 1998).

Nonetheless, while inter-partner relations may enhance learning and protection in
alliances jointly, they fall outside the realm of control of the focal firm. Indeed, inter-
partner relational capital, trust, and control are not self determined factors and therefore,
in this approach, learning and protection objectives can only be reconciled at the inter-
organizational level.

We argue that firms can enter alliances with both a learning intent and a
protection intent. In contrast to the relational view, we note that both intents arise within
the focal firm independently, inasmuch as the partner has no control over them. On this
basis, we develop arguments leading us to predict that the cross-effects of the learning
intent on leakage and of the protection intent on learning are not symmetric.

Several studies suggest that a strong learning intent is associated with wider
openness, intense communication flows, and strong inter-personal bonds (Ariño et al.,
2001; Hamel et al., 1989; Nonaka, 1994; Zollo et al., 2002). This openness risks leading
to greater undesired loss in parallel with greater learning (Baughn et al., 1997). Indeed, even when a firm sets deliberate learning objectives, the nature and location within the partner or the alliance of the knowledge to be acquired is often somewhat ambiguous (Simonin, 1999). Identifying and locating the sought knowledge implies trial-and-error and, in turn, more openness and communication than would be necessary if the nature and location of the targeted knowledge were known to the firm. Therefore, we expect that a greater intent to learn will inevitably entail more undesired loss of information to the partner.

Hypothesis 3. The greater a firm’s alliance learning intent, the more the leakage to a partner in a given alliance.

In a symmetric way, Norman (2004) argues that the level of knowledge protection decreases the focal firm’s learning in an alliance, based on the logic that limitations on knowledge sharing by either partner lead to a spiral in which both partners end up being reluctant to share any knowledge, which results in fewer learning opportunities for both partners. However, Norman’s prediction did not receive empirical support. It can be argued, instead, that protection concerns center around knowledge or skills that the firm has identified as valuable and for which it seeks to avoid leakage (Baughn et al., 1997; Dussauge et al., 2000a; Hamel et al., 1989). Because protection involves a focus on very particular elements of knowledge, the protection efforts may have only a limited impact on the wider openness, intense communication flows, and strong inter-personal bonds associated with more general learning objectives. In this respect, protection efforts would only marginally impact a firm’s learning in an alliance. Oxley and Sampson (2004) argue that leakage concerns will lead a firm to limit the scope of an alliance it is entering; it is
likely, however, that it will limit this scope in a targeted way, so that specific elements of its knowledge it has identified as valuable are not exposed. Unless the partner also has a similarly strong intent to protect, this need not lead to a symmetric reduction in alliance scope by the partner and thus not significantly affect the learning opportunities for the focal firm. Therefore, we anticipate that having a greater protection intent does not significantly reduce the extent of learning in an alliance.

Hypothesis 4. A firm’s alliance protection intent does not reduce the amount of learning from a partner in a given alliance.

These arguments reinforce the idea that firms can directly influence inter-partner knowledge flows in alliances, irrespective of decisions that need the partner’s consent. First, we expect a firm’s intent to learn to lead to greater learning. Second, we expect greater intent to protect to lead to less leakage. Third, while we expect learning efforts to interfere with protection efforts, we do not anticipate that protection efforts will negatively influence learning outcomes. Overall, the arguments suggest that alliances may provide at least a constrained means by which firms can reliably acquire external knowledge.

**METHOD, DATA, AND MEASUREMENTS**

**Data collection and sample**

We chose e-commerce alliances operating in 2001 to test the hypotheses. E-commerce alliances are alliances created between companies in order to conduct activities on the internet. The companies involved in such alliances can be pure e-commerce players as well as brick-and-mortar firms with online activities. For example, Amazon.com and Toys’R’Us entered into an alliance to jointly sell toys online in 2000 (Dussauge et al., 2001). The alliance was formed to combine Amazon.com’s e-commerce expertise with Toys’R’Us’ strengths in the toy business,
and followed disappointing performance by both firms when they each tried to develop the online business on their own in 1999. In this alliance, the learning opportunities for Amazon.com involved deeper understanding of the toy industry, while Toys’R’Us could learn how to manage an online toy business. Extensive leakage would have led to one partner no longer needing the other, likely resulting in the dissolution of the alliance.

We carried out the research in two steps. The first step in the empirical validation of our model consisted of face-to-face and phone interviews with ten CEOs of e-commerce companies in both the US and Europe. The interviews helped us understand how practitioners view alliance learning and protection and what solutions they suggest. Each interview lasted about an hour. The open-ended questions focused on topics that addressed factors identified in the alliance literature, but did not introduce a theoretical model so that we would not bias the interview responses. The second step was the development of a survey based on the theoretical model. We used a survey because the fine-grained information needed to test our hypotheses was not available in secondary sources. We pre-tested this questionnaire in face-to-face interviews with another ten CEO’s of e-commerce companies in Europe, as well as with several industry experts.

We administered the survey online, using English and French versions. We identified target companies from online databases. We contacted respondents exclusively via e-mail. We sent three e-mails to each company, with an interval of about two weeks between each e-mail. The e-mail asked companies to choose one alliance in which they had participated and a resource they had tried to acquire from the alliance, as well as a resource their partner had tried to acquire from them. Thus, each questionnaire covers two potential knowledge transfers, one in each direction. Questionnaire items with seven-point Likert scales (1 = “Strongly disagree”, 7 = “Strongly agree”) measure the variables in the model. We contacted 1,211 companies and
obtained 148 responses, for a 12% response rate. This is comparable to response rates and sample sizes in similar surveys involving senior executives (Lane and Lubatkin, 1998; Schulze et al., 2001). A Kruskal-Wallis test of difference in variable means between early and late respondents suggests that the sample does not have a response bias.

Most respondent companies were small, with a median size of 30 employees (although the presence of a few large companies puts the mean at 378 employees) and were mainly service or software companies. Ninety percent of the respondents were CEOs or VPs of marketing, business development, or alliances. In addition to their own statements, we cross-checked the respondents’ corporate position by the contact e-mail they provided in the questionnaire. The respondents’ alliances had varied geographic operations: 78% in Europe, 40% in North America, and 13% in Asia (the total exceeds 100% because some alliances operated on multiple continents). About half the responses state that both partners tried to learn from the alliance, while the rest are distributed evenly between only one of the partners and none trying to learn. The variable means of the English (59%) and French (41%) responses do not differ significantly.

We used a single respondent from each firm, for both conceptual and empirical reasons. Conceptually, multiple respondents allow researchers studying large organizations to obtain responses that are less biased by the respondent’s position within the organization. In our sample, most firms are small and our respondents, overwhelmingly CEO’s or VP’s, are the most knowledgeable individuals for questions about alliances, thus reducing the benefit of multiple respondents. In addition, requiring multiple responses would have reduced our response rate below acceptable levels. To check for biases, we conducted a Kruskal-Wallis test of potential differences in variable means between respondents with different positions and found no significant differences, which further suggests a lack of single respondent bias. In addition, we
conducted a Harman’s one-factor test for common method variance bias. A factor analysis with
the model variables showed the existence of 9 factors with an eigenvalue over 1, accounting for
67.72% of total variance, suggesting the lack of common method bias.

The study design limits the potential for reverse causality. We need to ensure that
respondents do not simply associate alliances that have substantial learning or little leakage with
questionnaire items that we used to measure the intent to learn and the intent to protect. The fact
that we do not directly ask about alliance learning and protection intent in alliances addresses
this concern. Instead, we measure both concepts with multiple items, several of which do not
have immediately obvious relationships with learning or leakage outcomes in specific alliances.

Table 1 reports summary statistics for the variables that we used in the reported analysis.
Assessing the correlations shows little correlation between specific items and either learning or
leakage, further suggesting that there is little risk of reverse causality. The following section
describes how we measured both types of intent, as well as the other variables in Table 1.

********** Table 1 about here **********

Measurements and Tests

As we argued earlier, both types of intent incorporate deliberate as well as behaviorally
emergent dimensions. Thus, our measures of the firm’s intent to learn and of its intent to protect
draw on a series of items reflecting both the deliberate and the behaviorally emergent facets of
the concept. Some of the measures include both dimensions simultaneously. We first present the
measures relating to the deliberate aspect of both the intent to learn and the intent to protect and
then move on to presenting the measures of the emergent aspects of both intents.

A review of the literature suggests that the deliberate aspect of a firm’s intent to learn
and, by mirror, of its intent to protect, involves four major dimensions: the top management’s
statements of intention (Hamel, 1991; Johnson and Sohi, 2003; Simonin, 2004), the incentives that the firm deliberately creates to induce learning and protection behaviors at a more operational level (Pucik, 1988), the existence of a dedicated alliance function with the deliberate aim of “coordinating alliance activity and capturing/disseminating alliance-related knowledge” (Kale et al., 2002: 747), and by the slack time that it makes available to its participating employees to learn (Nonaka, 1994).

The survey included questions for each of these dimensions. We measure top management’s expressed intentions to learn and to protect, respectively, by the following item: “Gaining access to new capabilities or know-how was one of our main objectives when we created the alliance”, and by a combination of the items: “We let our employees know what capabilities we do not want our partner to access” and “Our employees receive training about how to protect our capabilities in alliances”. We measure the incentives to learn and protect at a more operational level, respectively, by the following items: “We encourage our employees to collect information and acquire capabilities when they collaborate in alliances” and “We encourage our employees to protect our capabilities when they collaborate in alliances”. We measure the existence of an alliance function by the following item: “In our company, we coordinate our alliances centrally”. We note that the literature considers the existence of an alliance function as a measure of the firm’s learning intent (Kale et al., 2002) as much as of its protection intent (Baughn et al., 1997). Taking an exploratory approach, we therefore model the existence of an alliance function as a measure of both intents. Finally, we measure the slack time made available to employees to learn from the alliance with the item: “Our employees in the alliance can allocate time to collect information about our partner and acquire new capabilities”.

17
We note that, even though this series of measures constitutes the deliberate aspect of a firm’s intent to learn or of its intent to protect, several measures could arise from organizational processes as much as from deliberate aspects. For instance, incentives that induce operational employees to learn and protect are deliberate, since they are part of a conscious intention on the top management’s part, but they are also organizational processes, because they impact the behavioral patterns of employees.

Two other organizational aspects of the firm’s intents to learn and protect involve two different dimensions identified in the literature: culture (Fiol, 1991; Hamel et al., 1989) and alliance experience (Kale et al., 2002; Reuer and Zollo, 2005; Simonin and Helleloid, 1993). Both culture and experience create routines and behavioral patterns, which, while not deliberate, are conducive to learning or protection. A learning culture, for instance, will engrain the intention to learn in the minds of employees throughout the organization.

Several questionnaire items address these dimensions. We measure a firm’s learning and protection cultures, respectively, by the items “Learning is a major feature of our corporate culture” and “Protection and confidentiality are major features of our corporate culture”. We measure experience at two levels: the firm’s overall alliance experience and the specific alliance experience of employees.

While most scholars measure experience at the firm level, typically through the number of alliances the focal firm has been involved in (Dussauge et al., 2000b; Kale et al., 2002), several authors argue that employees are the relevant level of analysis to understand intent or, more generally, factors influencing learning and protection in alliances (Baughn et al., 1997; Hamel et al., 1989). We measure these two aspects of experience by the item “Our employees
working in this alliance had previously been involved in alliances” for employee experience and the number of alliances the responding firm has been involved in prior to the focal alliance.

Paralleling our argument about the firm’s dedicated alliance function, experience is a measure of both the firm’s intent to learn and its intent to protect. We model experience as a measure of both intents. We note that, while a firm’s protection culture is clearly an organizational aspect of its intent to protect, other aspects can involve both top management intent and organizational processes. For instance, the employees’ alliance experience is embedded in organizational processes because it creates routines and behavioral patterns without a specific intention, but it is also deliberate because senior management selected the participants.

We now turn to the two dependent variables considered in the theoretical model: learning and leakage in the alliance. We measure both variables with a series of three questionnaire items. The dependent variable “Learning outcome” is measured by: “We have been successful in acquiring the capability described in question 59”, “We consider that we acquired it fully”, and “We consider that we acquired it easily” [Question 59 reads: “Have you tried to acquire a new capability from the alliance?”]. The dependent variable “Leakage” is measured by: “Our partner has been successful in acquiring the know-how/capability described in question 65”, “We believe that our partner acquired it fully” and “We believe that our partner acquired it easily” [Question 65 reads: “Do you believe that your partner has tried to acquire a new capability from the alliance?”]. This variable takes into account only cases when the partner learned without the focal firm’s agreement, measured by the reverse-coding of the item “The partners in this alliance agreed upon certain transfers of capabilities/know-how”.

As control variables, we added five alliance-specific mechanisms that the literature suggests affect inter-partner knowledge transfers. First, knowledge overlap between the partners
could increase both the potential knowledge acquisition from alliances and the knowledge leakage risks (Khanna et al., 1998; Lane and Lubatkin, 1998). Second, interpartner equity sharing could reduce the threat of opportunistic behavior and so reduce leakage (Dyer and Chu, 2000; Mjoen and Tallman, 1997). Third, protective clauses in the alliance contract could reduce leakage (Dyer, 1997). Fourth, the existence of an independent structure could improve both learning through day-to-day interactions (Nonaka, 1994) and at the same time increase leakage (Hamel et al., 1989). Fifth, prior relationships with the same partner could help create trust and knowledge, thereby increasing knowledge transfers while guarding against leakage (Ariño et al., 2001; Das and Teng, 2001). We examined several other control variables in sensitivity analysis.

Overall, we measure a firm’s intent to learn in a given alliance through 7 items and its intent to protect through 6 items. Figure 1 presents the measurement model graphically. We note again that several of the items can be viewed as either discrete choices or the result of ongoing organizational processes, thus reinforcing the argument that a firm’s intent to learn or to protect cannot be reduced to only top management’s stated intentions, leading to the creation of precise learning or protection mechanisms as a consequence of those intentions. Instead, intentions and behavioral patterns reinforce each other and are both integral conceptual parts of the firm’s intent to learn or to protect. We note that three items are measures of both the firm’s intent to learn and its intent to protect. This reflects the fact that learning and protection intents are not necessarily conceptually opposed to one another. This also reflects the fact that conceptual ambiguity remains as to what makes up a firm’s learning and protection intents. An exploratory empirical approach will help disentangle which items constitute the better measures of either intent.

********** Figure 1 about here **********
We test the theoretical model in two steps. The first step develops a measurement model that tests the construct validity of the firm’s intent to learn and of its intent to protect in alliances, both constructed as latent variables. We test the measurement model with a confirmatory factor analysis (CFA) using LISREL-type structural equation modeling (Bollen, 1989). The CFA approach allows us to model the fact that, as the literature suggests, some items could measure both the firm’s learning intent and its protection intent in alliances, making it impossible to use traditional tests of construct validity based on Cronbach’s alpha. After assessing which measures should be dropped from the measurement model, the CFA allows us to compute composite reliabilities for each construct and assess their convergent and discriminant validities. The second step tests our hypotheses by incorporating the measurement model into a structural model that assesses how both intents affect firm learning and leakage. This procedure follows Anderson and Gerbing’s (1988) recommendation to use a two-stage approach when conducting structural equation modeling analyses. We used the CALIS procedure in SAS V9.1 to obtain maximum likelihood parameter estimates.

RESULTS

Figure 1 reports the results of the measurement model and Table 2 presents the summary results of the different models. We were able to use 107 of the responses for the measurement model. Following Maruyama (1998), who suggests using multiple measures to assess goodness of fit of a model, the figure reports several indices. While some measures of fit suggest a reasonable fit, others suggest a need for improvement of the measurement model. The model chi-square value, for instance, is significant (p > .01), $\chi^2 = 129.5$, df = 95, and the Goodness of Fit Index (GFI) = 0.88 is close to but still below the 0.90 rule-of-thumb cut-off point, suggesting a need for improvement. The chi-square over degrees of freedom ratio, $\chi^2$/df = 1.36, however, is
well below the rule-of-thumb cut-off point of 2.0 (Maruyama, 1998) and the RMSEA Estimate = 0.058 is below the 0.06 cut-off-point (Hu and Bentler, 1999). Similarly, while most the loadings on the four latent variables are significant, three paths are either not significant or only marginally significant, suggesting that they should be dropped from the measurement model and that a revised measurement model should be constructed (Hatcher, 1994).

********** Table 2 about here **********

We find that the existence of a dedicated alliance function is a measure of the firm’s intent to protect (loading = 0.45, p <.05), but it only imperfectly measures its intent to learn (loading = 0.24 p <.10). This might be explained by the fact that the link between the employee level patterns embodying the intent to learn (Pucik, 1988) and a dedicated alliance function is too tenuous for the latter to become a strong measure of the firm’s learning intent. We note that, even though it is not significant enough to be included in a revised measurement model, the path is still marginally significant, in line with Kale, Dyer and Singh’s (2002) arguments.

We also find that the alliance experience of employees, although a strong measure of a firm’s intent to learn (loading = 0.72, p <.01), does not measure a firm’s intent to protect significantly. This difference might be explained by the fact that the learning routines created by experience are more general and thus more redeployable than those created through the experience of protecting a specific resource or knowledge. Therefore, the protection experience might be less helpful when applied in a new setting or with different types of resources.

Finally, we find that firm-level experience does not measure either intent significantly. This might reflect the fact that the learning and protection behavioral patterns and routines created by experience will be found at the operational level as opposed to the firm level, in line with arguments by Baughn, Stevens, Denekamp and Osborn (1997) and Hamel, Doz and
Prahalad (1989). Because of the empirical support for the impact of firm-level experience on learning and leakage in the literature, however, we will reintroduce this measure as a control variable in the structural model.

Figure 2 reports the results of the revised measurement model, which drops the insignificant paths. We find a reasonable overall fit for the model. Although the model is still significant ($p>.035$), most other fit indices fall within or very close to rule-of-thumb ranges: $\chi^2 = 108.99$, $df = 84$, $\chi^2/df = 1.30$, RMSEA estimate = 0.053, GFI = 0.89, Bentler’s CFI = 0.97, McDonald’s Centrality = 0.89, Bentler and Bonnet’s NNI = .96.

********** Figure 2 about here **********

The revised measurement model thus measures a firm’s intent to learn in alliances with five items (learning culture, incentives to learn, stated learning goals, slack, and employee alliance experience), its intent to protect in alliances with four items (protective culture, incentives to protect, stated protective goals, and a dedicated alliance function), and both dependent variables, learning and leakage, with three parallel items each. In order to assess whether the measurement model is adequate, we still need to assess the composite reliabilities of the constructs, their convergent validities, and their discriminant validity. We find that the composite reliabilities of all four latent constructs are over the 0.60 cut-off point (Hatcher, 1994): the constructs measuring the firm’s intents to learn and to protect have a composite reliability of 0.60 and 0.61 respectively, while the learning and leakage constructs have a composite reliability of 0.93 and 0.97 respectively. The fact that all the loadings in the revised measurement model are significant further suggests that they all exhibit convergent validity (Hatcher, 1994). Finally, we test the discriminant validity of the intent constructs by running a single-factor model and comparing it to the revised measurement model with a $\chi^2$ difference significance test (Hatcher,
1994). We find a highly significant difference ($\delta \chi^2 = 147.97 - 108.99 = 38.97$, $\delta \text{df} = 85-84 = 1$, $p<0.001$), empirically supporting discriminant validity.

We introduce the structural model after assessing the validity of the measurement model. Figure 3 reports the structural model, while Table 2 presents the summary results of all models discussed in the paper. Most fit indices suggest a very good fit of the model: the model is not significant ($p>0.08$), $\chi^2 = 174.76$, $\text{df} = 150$, the RMSEA estimate = 0.04, GFI = 0.86, Bentler’s CFI = 0.97, McDonald’s Centrality = 0.89, Bentler and Bonnet’s NNI = 0.96, Delta2 = 0.97.

********** Figure 3 about here **********

The structural paths report support for all four hypotheses. H1 predicts that a stronger intent to learn will lead to more learning. The structural path between both constructs is positive and significant (loading = 0.536, $p<0.01$) bringing strong support to our hypothesis. H2 predicts that a stronger intent to protect will lead to less leakage. The loading on this path is negative and significant (loading = - 0.136, $p<0.05$), supporting the hypothesis. These results suggest that a firm can significantly impact the knowledge flows in its alliances and, most importantly, that it can do so in a self-determined way – through its intent to learn and its intent to protect, which are outside the partner’s control. H3 predicts that a firm’s learning intent will lead to more leakage. We find strong support for this hypothesis (loading = 0.184, $p<0.01$).

We also find that, consistent with H4, a firm’s intent to protect does not have a significant impact on its learning from alliances. The results on the cross-effects between both intents and learning and leakage are non-symmetric. This result contradicts conventional wisdom on the subject and suggests that alliances can indeed become a reliable source of external knowledge.

We added several control variables that address the influence of alliance-specific factors on learning and leakage in the structural model. The existence of an independent structure
significantly increases both learning and leakage. Inter-partner trust significantly increases learning. Equity investments moderately reduce leakage.

Sensitivity analysis added seven additional control variables that are common in alliance studies: firm size, date of creation of the alliance, sector of activity of the focal firm, similarity between partners in terms of sector, degree of competitiveness in the sector, geographical location of the alliance, and alliance in the core activity of the focal firm. Having an alliance in the core activity of the focal firm significantly increases leakage, but the introduction of the seven additional control variables resulted in no material change in the results of the core model. We omit the additional variables from the main reported model because the overall fit of the model declined with the second set of control variables (with a significant chi-square value for the weaker fit: $\chi^2 = 322.73$, df = 254, p = 0.002). We note again, though, that the loadings of the core results in both the measurement and structural models did not vary materially.

Overall, then, the model supports our predictions. We find that, operationalized with both their individual and organizational dimensions, the firm’s intents to learn and to protect in alliances, over which alliance partners have little or no control, significantly influence actual learning and leakage in alliances. We further find that a firm’s learning intent moderately increases leakage, but that a firm’s protection intent has no significant impact on learning. The results suggest that firms can use alliances as a reliable source of external knowledge, but that they do so at some risk of also losing valuable knowledge.

**DISCUSSION AND CONCLUSION**

Many authors argue that alliances are a means through which companies can acquire external knowledge, while several studies suggest that firms can deliberately manage their alliances to meet their learning needs. This paper explores the impact of two primary firm-
determined factors that influence learning and leakage in alliances: the firm’s intent to learn and its intent to protect in an alliance.

Building on previous research, we argue that the notion of intent to learn in alliances includes both individual and organizational levels with deliberate and emergent facets. Our results suggest that a firm’s intent to learn incorporates five elements that involve these various levels and facets: organizational slack, the incentives to learn at an operational level, the firm’s overall learning culture, the alliance experience of employees, and the top management’s stated intention to learn in the alliance. It is interesting to note that the measure studies most often use as a proxy for intent – the top management’s stated intention to learn in the alliance – is a more limited measure of the intent to learn than the organizational translation of the top management’s intentions, such as the creation of adequate incentives at the operational level or the allocation of time to the accomplishment of the learning objectives. In line with Inkpen and Crossan’s (1995) argument, this suggests that some top management statements reflect a genuine intent for their firm to learn, but others merely reflect wishful thinking that does not carry over to specific actions. One of the contributions of our study is to clarify the notion of learning intent and to offer a more encompassing definition and operationalization of the concept.

We also introduce the notion that firms can develop the intent to protect, which mirrors their intent to learn in an alliance. While the literature often discusses the need for protection, the notion of a self-determined intent to protect has, to the best of our knowledge, not yet been explicitly developed. Paralleling our discussion of the intent to learn, we find that the intent to protect includes both deliberate and behaviorally emergent facets. Our results suggest that the notion incorporates a series of four items: operational incentives to protect, top management’s stated intention to protect, the firm’s overall protection culture, and the creation of a centralized
alliance function. Again, these findings suggest the behavioral translation of the top management’s intentions is a measure of the firm’s protection intent which is as strong as, or stronger than, the top management’s stated intentions.

We find that the firm’s learning intent affects learning outcomes in an alliance, while the firm’s protection intent affects leakage. These results suggest that a firm can influence inter-partner knowledge flows in alliances, irrespective of decisions that need the partner’s consent. Indeed, both intents are self-determined by the focal firm itself, without reference to a partner. Clearly, this does not imply that partner-specific features, negotiated factors, and relational attributes of the alliance do not affect learning and leakage in the alliance. However, the presence of independent intents demonstrates that firms have a real influence on learning and leakage, irrespective of external influences on these processes. In essence, the firm’s learning and protection intents in their alliances are the backbone of a firm’s strategy of learning in alliances. Our results support the argument that alliances are a mechanism through which firms can build their knowledge base and, as such, are an essential mechanism in the dynamic capability perspective (Capron and Mitchell, 2004; Lorenzoni and Lipparini, 1999; Zollo and Winter, 2002). This is in line with arguments developed by Koza and Lewin (1998) and by Vassolo, Anand, and Folta (2004) who contend that firms can use their portfolio of alliances for exploitation or exploration purposes and that the configuration of the alliance portfolio co-evolves with the firm’s strategic intent. At the same time, firms that place substantial emphasis on learning do so with some risk of losing valuable knowledge, which tempers the learning opportunity.

Our results also provide empirical evidence of the cross-effects of the firm’s learning intent on leakage and of its protection intent on learning. As the literature often expects, we find
that a greater learning intent does indeed increase leakage. We note, however, that this impact is significantly smaller than the impact of the learning intent on learning outcomes. Interestingly, we find that the cross-effects are not symmetrical, because the firm’s intent to protect does not reduce learning. This supports our argument that focused protection does not prevent the extent of openness necessary for learning to take place.

At the same time, the standardized loadings associated with the intent to protect, on both leakage and learning, are much weaker than those associated with the intent to learn. This is consistent with the view that firms have less self-determined control over leakage to their partners in alliances than they do over knowledge acquisition, reinforcing the idea that alliances are inherently risky.

Despite the contribution we hope this study makes to the understanding of how alliances can be a means through which firms build and expand their knowledge base, it also has limitations. First, the work relies on one-sided perceptual measures of learning and protection. While we are confident managers have a clear understanding of the knowledge they were seeking to acquire, or have acquired, from an alliance partner, their perception of what their partner was trying to learn from them, and the extent to which they succeeded in doing so, is likely to be more imprecise. Second, alliances in e-commerce may exhibit specificities that make the generalization of these findings debatable. Activities such as web design and e-commerce software development involve highly codified knowledge, which, in turn, might make learning easier, and protection more difficult, than in other settings.

Our focus in this paper on a firm’s self-determined intents to learn or to protect in its alliances contributes to the more general discussion of a firm’s learning and protection abilities in alliances. Alliance partners also influence what a firm can learn and protect in its alliances.
Previous research has repeatedly shown the importance of decisions made jointly with the partner, such as the formal structure and scope of the alliance (Hennart, 1988; Khanna, 1998; Oxley, 1997; Oxley and Sampson, 2004) and the existence of inter-organizational routines (Zollo et al., 2002), as well as the impact of alliance partner features such as the overlap in knowledge bases (Dussauge et al., 2000b; Lane and Lubatkin, 1998) and the similarity between partners (Parkhe, 1991). While we find that both intents significantly influence learning and leakage, they are complemented by partner-specific features, negotiated factors, and relational attributes of the alliance. Exploring the interactions between the firm’s self-determined learning and protection intents and the relational and context-specific factors identified in the literature appears as a promising avenue for future research.
REFERENCES


### Table 1
Summary Statistics and Correlation Table

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Min</th>
<th>Max</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
<th>V8</th>
<th>V9</th>
<th>V10</th>
<th>V11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Culture</td>
<td>122</td>
<td>5.63</td>
<td>1.64</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Stress</td>
<td>122</td>
<td>5.63</td>
<td>1.64</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Protective Culture</td>
<td>122</td>
<td>5.63</td>
<td>1.64</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Incentives to Protect</td>
<td>122</td>
<td>4.71</td>
<td>1.96</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Protective Goods</td>
<td>122</td>
<td>6.04</td>
<td>0.60</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Alliance Function</td>
<td>122</td>
<td>6.03</td>
<td>1.72</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Firm’s Success Learning</td>
<td>122</td>
<td>3.62</td>
<td>2.34</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Firm’s Full Learning</td>
<td>122</td>
<td>2.98</td>
<td>2.12</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Firm’s Easy Learning</td>
<td>122</td>
<td>2.73</td>
<td>1.96</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Firm’s Performance</td>
<td>122</td>
<td>4.96</td>
<td>1.44</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Parent’s Full Learning</td>
<td>122</td>
<td>1.48</td>
<td>2.34</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Parent’s Easy Learning</td>
<td>122</td>
<td>1.52</td>
<td>1.20</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Equity Investment</td>
<td>122</td>
<td>0.16</td>
<td>0.37</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Contract</td>
<td>122</td>
<td>2.42</td>
<td>0.62</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Independent Org Structure</td>
<td>122</td>
<td>0.35</td>
<td>0.40</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Overtaking Knowledge Basis</td>
<td>122</td>
<td>2.86</td>
<td>2.19</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Firm-level Alliance Experience</td>
<td>122</td>
<td>4.26</td>
<td>1.94</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Alliance in N.Am.</td>
<td>122</td>
<td>0.43</td>
<td>0.92</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Equity Investment</td>
<td>122</td>
<td>0.14</td>
<td>2.81</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Ind Competitiveness</td>
<td>122</td>
<td>2.15</td>
<td>2.33</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Core Business</td>
<td>85</td>
<td>2.09</td>
<td>1.86</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Alliance Creation Date</td>
<td>85</td>
<td>2.00</td>
<td>1.33</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Firm’s Active in Service Sector</td>
<td>85</td>
<td>0.07</td>
<td>0.96</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Both in Same Activity</td>
<td>85</td>
<td>0.07</td>
<td>0.96</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

**Note:** All p-values are two-tailed.

---

### Table 1
Summary Statistics and Correlation Table

<table>
<thead>
<tr>
<th>Variable</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
<th>V8</th>
<th>V9</th>
<th>V10</th>
<th>V11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Culture</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protective Culture</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incentives to Protect</td>
<td>0.22</td>
<td></td>
<td></td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protective Goods</td>
<td></td>
<td>0.15</td>
<td></td>
<td></td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliance Function</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm’s Success Learning</td>
<td></td>
<td></td>
<td></td>
<td>0.19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm’s Full Learning</td>
<td>0.19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm’s Easy Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm’s Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent’s Full Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent’s Easy Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity Investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Org Structure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overtaking Knowledge Basis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm-level Alliance Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliance in N.Am.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity Investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ind Competitiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core Business</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliance Creation Date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm’s Active in Service Sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both in Same Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** All p-values are two-tailed.
### Table 2
Summary Results of the Different Models

#### MEASUREMENT MODELS

<table>
<thead>
<tr>
<th>Path Loadings</th>
<th>Initial MM (non-stand.)</th>
<th>Revised MM (non-stand.)</th>
<th>Revised MM (stand.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intents</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Culture</td>
<td>0.652***</td>
<td>1.152***</td>
<td>0.549***</td>
</tr>
<tr>
<td>Intent to Learn</td>
<td>0.971***</td>
<td>1.152***</td>
<td>0.549***</td>
</tr>
<tr>
<td>Learning Goals</td>
<td>0.841***</td>
<td>0.647***</td>
<td>0.329***</td>
</tr>
<tr>
<td>Slack</td>
<td>1.475***</td>
<td>1.412***</td>
<td>0.686***</td>
</tr>
<tr>
<td>Protective Culture</td>
<td>0.627***</td>
<td>0.671**</td>
<td>0.372***</td>
</tr>
<tr>
<td>Intent to Protect</td>
<td>0.971***</td>
<td>1.152***</td>
<td>0.549***</td>
</tr>
<tr>
<td>Protective Goals</td>
<td>0.251***</td>
<td>0.205***</td>
<td>0.459**</td>
</tr>
<tr>
<td>Employee Alliance Experience</td>
<td>0.720**</td>
<td>0.628**</td>
<td>0.337**</td>
</tr>
<tr>
<td>Centralized Alliance Function</td>
<td>0.241**</td>
<td>0.451**</td>
<td>0.365**</td>
</tr>
<tr>
<td>Firm-level Alliance Experience</td>
<td>0.106</td>
<td>0.126</td>
<td></td>
</tr>
<tr>
<td><strong>Learning &amp; Leakage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Leakage</td>
<td>1.928***</td>
<td>1.928***</td>
<td>0.983**</td>
</tr>
<tr>
<td>Firm’s easy acquisition of capability</td>
<td>2.052***</td>
<td>2.051***</td>
<td>0.981**</td>
</tr>
<tr>
<td>Partner’s successful acquisition of capability</td>
<td>1.797***</td>
<td>1.797***</td>
<td>0.916**</td>
</tr>
<tr>
<td>Partner’s successful acquisition of capability</td>
<td>1.159**</td>
<td>1.190**</td>
<td>0.903**</td>
</tr>
<tr>
<td>Partner’s easy acquisition of capability</td>
<td>1.150**</td>
<td>1.190**</td>
<td>0.903**</td>
</tr>
</tbody>
</table>

#### Covariances Between Latent Variables

<table>
<thead>
<tr>
<th></th>
<th>Initial MM</th>
<th>Revised MM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Intent - Protection Intent</td>
<td>0.0618</td>
<td>0.0641</td>
</tr>
<tr>
<td>Learning Intent - Learning</td>
<td>0.4520***</td>
<td>0.4274***</td>
</tr>
<tr>
<td>Learning Intent - Leakage</td>
<td>0.1945**</td>
<td>0.2034**</td>
</tr>
<tr>
<td>Protection Intent - Learning</td>
<td>0.0055</td>
<td>0.0055</td>
</tr>
<tr>
<td>Protection Intent - Leakage</td>
<td>-0.1361</td>
<td>-0.1361</td>
</tr>
<tr>
<td>Learning - Leakage</td>
<td>0.2456***</td>
<td>0.2456***</td>
</tr>
</tbody>
</table>

#### Fit Indices

<table>
<thead>
<tr>
<th></th>
<th>Initial MM</th>
<th>Revised MM</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFI</td>
<td>0.88</td>
<td>0.89</td>
</tr>
<tr>
<td>Chi-Sq/df</td>
<td>1.36</td>
<td>1.30</td>
</tr>
<tr>
<td>Pr &gt; Chi-Sq</td>
<td>0.0019</td>
<td>0.0016</td>
</tr>
<tr>
<td>RMSEA Estimate</td>
<td>0.0635</td>
<td>0.0538</td>
</tr>
<tr>
<td>Bentler’s Comparative Fit Index</td>
<td>0.569</td>
<td>0.87</td>
</tr>
<tr>
<td>McDonald’s (1999) Criticality</td>
<td>0.0512</td>
<td>0.0090</td>
</tr>
<tr>
<td>Bentler &amp; Bonett’s (1995) Non-normed Index</td>
<td>0.9462</td>
<td>0.9025</td>
</tr>
<tr>
<td>Bollen (1989) Normed Index Delta2</td>
<td>0.9507</td>
<td>0.9025</td>
</tr>
</tbody>
</table>

### STRUCTURAL MODELS

<table>
<thead>
<tr>
<th>Path Loadings</th>
<th>SML (non-stand.)</th>
<th>SML (stand.)</th>
<th>SML (non-stand.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intents</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Intent</td>
<td>0.530***</td>
<td>0.0139***</td>
<td>0.411***</td>
</tr>
<tr>
<td>Protection Intent</td>
<td>-0.0569</td>
<td>-0.1365**</td>
<td>0.0048</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td>-0.0424</td>
<td>-0.1542</td>
</tr>
<tr>
<td>Equity Investment</td>
<td>0.2243</td>
<td>0.9096</td>
<td>0.0056</td>
</tr>
<tr>
<td>Contract</td>
<td>0.0293</td>
<td>0.0152</td>
<td>0.0043</td>
</tr>
<tr>
<td>Independent Org Structure</td>
<td>1.3385***</td>
<td>0.463*</td>
<td>0.267***</td>
</tr>
<tr>
<td>Trust</td>
<td>1.5969</td>
<td>0.1523</td>
<td>0.279***</td>
</tr>
<tr>
<td>Overlapping Knowledge Bases</td>
<td>0.018</td>
<td>0.0152</td>
<td>0.0043</td>
</tr>
<tr>
<td>Firm-level Alliance Experience</td>
<td>0.097</td>
<td>0.0491</td>
<td></td>
</tr>
<tr>
<td>Alliance active in North America (dummy)</td>
<td>-0.0037*</td>
<td>0.0067</td>
<td>-0.0037*</td>
</tr>
<tr>
<td>Size</td>
<td>-0.0030</td>
<td>0.0007</td>
<td>-0.0030</td>
</tr>
<tr>
<td>Competitiveness in industry</td>
<td>-0.0039*</td>
<td>0.0042</td>
<td>-0.0039*</td>
</tr>
<tr>
<td>Alliance in Core Business</td>
<td>-0.0262</td>
<td>0.1131**</td>
<td>-0.0262</td>
</tr>
<tr>
<td>Alliance Creation Date</td>
<td>-0.2137*</td>
<td>0.1445*</td>
<td>-0.2137*</td>
</tr>
<tr>
<td>Firm active in the service sector (dummy)</td>
<td>-0.0091</td>
<td>0.0074</td>
<td>-0.0091</td>
</tr>
<tr>
<td>Both partners in same activity (dummy)</td>
<td>0.0521*</td>
<td>0.0521*</td>
<td>0.0521*</td>
</tr>
</tbody>
</table>

#### Fit Indices

<table>
<thead>
<tr>
<th></th>
<th>SML</th>
<th>SML2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFI</td>
<td>0.86</td>
<td>0.84</td>
</tr>
<tr>
<td>Chi-Sq/df</td>
<td>1.17</td>
<td>1.27</td>
</tr>
<tr>
<td>Pr &gt; Chi-Sq</td>
<td>0.0014</td>
<td>0.0023</td>
</tr>
<tr>
<td>RMSEA Estimate</td>
<td>0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Bentler’s Comparative Fit Index</td>
<td>0.9031</td>
<td>0.9032</td>
</tr>
<tr>
<td>McDonald’s (1999) Criticality</td>
<td>0.8876</td>
<td>0.7163</td>
</tr>
<tr>
<td>Bentler &amp; Bonett’s (1995) Non-normed Index</td>
<td>0.9222</td>
<td>0.9952</td>
</tr>
<tr>
<td>Bollen (1989) Normed Index Delta2</td>
<td>0.9715</td>
<td>0.930</td>
</tr>
</tbody>
</table>

*** p < .001, ** p < .01, * p < .05
Figure 1
Measurement model 1: Preliminary Model

---

Learning Intent

- Learning Culture
- Incentives to Learn
- Learning Goals
- Slack

Protection Intent

- Employee Alliance Experience
- Centralized Alliance Function
- Firm-level Alliance Experience
- Protective Culture
- Incentives to Protect
- Protective Goals

Leakage

- Firm’s successful learning
- Firm’s full learning
- Firm’s easy learning
- Partner’s successful learning
- Partner’s full learning
- Partner’s easy learning

---

p > .01 / χ²/df = 1.36 / CFI = .88 / RMSEA Est. = .058
Bentler’s CFI = .96 / McDonald’s Centrality = .85 / Bentler & Bonnet’s NNI = .95 / Delta2 = .96
Figure 2
Measurement model 2: Revised Model

- Convergent Validity validated by significance of all loadings
- Discriminant Validity validated by test of χ² difference between 2 factor (L.I. & P.I.) and 1 factor models
- Composite Reliabilities: L.I. = .60, P.I. = .81, Learning = .93, Leakage = .97

\[
p > .05; \chi^2/df = 1.30; \text{GFI} = .89; \text{RMSEA Est.} = .05
\]

Bentler's CFI = .97; McDonald's Centrality = .89; Bentler & Bonnet's NNI = .96; Delta2 = .97
Figure 3
Structural Model

Learning Intent

Learning

0.638***

0.1837***

-0.0558

-0.1363**

Protection Intent

Leakage

Control Variables*

- Equity Investment
- Contract
- Independent Structure
- Trust
- Overlapping Knowledge Bases
- Firm-level experience

p > .08 / χ²/df = 1.17 / GFI = .86 / RMSEA Est. = .04
Bentler’s CFI = .97 / McDonald’s Centrality = .89 / Bentler & Bonnett’s NNI = .96 / Delta2 = .97

* See Table 2 for list and description of all control variables.