How Do Firm-controlled Factors Influence Learning and Leakage in Alliances? The Partial Tradeoff between Knowledge Acquisition and Protection

Miguel Rivera-Santos
Babson College
Management Division

Pierre Dussauge
HEC School of Management, Paris
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

Abstract

This paper explores the extent to which firms can independently control knowledge transfers to and from their alliance partners. We argue that the primary firm-controlled factors influencing knowledge transfers in an alliance are a firm's intent to learn and its intent to protect. We explore their impact both on learning and on the unintentional leakage of knowledge, and we assess whether intent to learn and intent to protect conflict with or reinforce each other.

We test our predictions on a sample of 107 e-commerce alliances. We gathered the data through a questionnaire addressed to senior managers of e-commerce firms from around the world, whose firm was engaged in at least one alliance. We test the theoretical model we put forth 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 using LISREL-type structural equation modeling. 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.

Our findings suggest that firms can use alliances as a reliable source of external knowledge, but that trade-offs between learning and leakage exist.

Keywords: Alliances, Learning, Protection, Firm-controlled determinants of learning

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The inter-organizational knowledge transfer literature has demonstrated that alliances provide opportunities for firms to obtain knowledge from their partners (Hamel, 1991; Inkpen, 2002; Mowery *et al.*, 1996; Zollo *et al.*, 2002b), while also arguing that firms need to protect valuable knowledge from unintentional leakage to their partners (Hamel *et al.*, 1989). Among the determinants of learning in alliances, scholars have begun to discuss the idea of a firm's intent to learn as an essential firm-controlled factor underpinning a firm's ability to use alliances as a source of external knowledge (George *et al.*, 2001; Gulati *et al.*, 1998; Johnson *et al.*, 2003; Kale *et al.*, 2000; Norman, 2004; Simonin, 1997, 2004; Tsang, 2002; Vassolo *et al.*, 2004; Zhao *et al.*, 2005). However, this literature has three limits. First, the notion of intent to learn has received only partial conceptual and empirical development, particularly in distinguishing between individual and organizational factors that might contribute to a learning intent. Second, the literature rarely addresses the parallel notion of an intent to protect knowledge in alliances. Third, scholars have only begun to consider the extent to which attempts to protect knowledge may either conflict with (Baughn *et al.*, 1997; Norman, 2004) or reinforce (Kale *et al.*, 2007; Kale *et al.*, 2000) a firm's ability to learn from its alliances.

This paper examines the firm-controlled mechanisms that underlie both a firm's intent to learn and its intent to protect knowledge in alliances, and explores whether the learning intent and the intent to protect knowledge are conflicting or reinforcing mechanisms. We argue that the focal firm's intent to learn is an essential firm-controlled factor that influences the firm's ability to learn from its alliances. A review of the literature exploring 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 encompass both individual and organizational dimensions, including 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. We argue that the intent to protect knowledge in alliances is an essential firm-controlled factor that influences the firm's ability to decrease unintentional leakage of knowledge in its alliances.

We develop several hypotheses around the concepts of learning and protection intents. 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 that might also affect learning by the focal firm. Similarly, we predict that greater protection intent leads to less unintentional leakage of knowledge, irrespective of decisions made independently by the partner or of joint decisions made in common with the partner that might also affect leakage. In parallel, we explore whether a firm's learning intent and its protection intent in alliances conflict with or reinforce each other. We develop a new operationalization of both learning and protection intents, and we test the predictions on a sample of 107 e-commerce alliances from 2001 that were based in Europe, North America, and Asia.

The paper makes two primary contributions. First, we revisit and operationalize the notion of a firm's intent to learn in its alliances, while introducing the parallel concept of a firm's intent to protect knowledge in its alliances and exploring whether both intents conflict with or reinforce each other. Second, we explore the impact of firm-controlled mechanisms on inter-organizational knowledge transfers. If alliances are to become a reliable source of external knowledge for a learning firm, on par with the internal development of knowledge or the acquisition of a firm possessing valuable knowledge, the learning firm needs to have a sufficient degree of control over knowledge transfers in its alliances. While the literature on inter-organizational knowledge transfer has provided many insights on the mechanisms facilitating knowledge transfer in alliances, we are only beginning to disentangle the impact of firm-controlled mechanisms from the impact of mechanisms that the alliance partners set up jointly. In doing so, we provide a deeper understanding of inter-organizational learning processes.

BACKGROUND AND PREDICTIONS

The intent to learn in alliances

Inkpen (2002) identified four aspects 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 obtaining knowledge the firms do not wish to transfer to their allies. We define learning in alliances as a transfer of knowledge from one partner to another (Inkpen *et al.*, 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 transfer of knowledge to a firm's partner (Hamel *et al.*, 1989). Of course, a firm may wish to transfer some knowledge to its partner or may be indifferent to the transfer of non-essential knowledge. Our definition of leakage includes only the undesired loss of knowledge.

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 what we refer to as the focal firm's intent to learn, such that firms with greater intent to learn will gain more knowledge from their inter-organizational partners (Hamel, 1991; Johnson *et al.*, 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 that gaps 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 management function aimed at "coordinating alliance activity and capturing/disseminating alliance-related knowledge". Kale and Singh (2007) demonstrate that such an alliance management function can play an effective role in articulating learning objectives throughout a firm. 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 broader set of learning capacities (Simonin, 2004) or its implementation of appropriate learning activities (Johnson *et al.*, 2003). Such arguments suggest that the notion of a firm's intent to learn in alliances does not reflect only top-management intentions.

Thus, it appears that authors who 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: at the individual level, focusing on top management, or at an organizational level, which places the behavioral patterns throughout the activities of the firm.

Building on these two approaches, we argue that the individual and organizational levels are reinforcing aspects of the learning intent 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 that are distributed throughout the firm but lack top management guidelines as to what needs to be learned lack 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 in the form of engrained behavioral patterns that translate the learning objectives into actions that capture and incorporate external knowledge into the firm.

Thus, unlike previous research, we do not view the behavioral patterns leading to learning as simply a consequence of top management's pre-existing intentions. Rather, we consider a link between top management's guiding principles and the broader organizational facets of a firm's intent to learn. 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 to prior studies, that a measure of the firm's learning intent needs to include both individual and organizational dimensions. This intent to learn is firm-controlled, i.e., independent from influences that a partner in a given alliance might exercise on the alliance. We expect that firms with greater intent to learn, where intent to learn includes both explicit learning objectives determined by top management and more broadly distributed organizational elements, will achieve greater learning in an alliance, irrespective of decisions that need the partner's consent.

Hypothesis 1: The greater a firm's intent to learn in alliances, the more it will learn from a partner in a given alliance.

The intent to protect in alliances

The inter-organizational learning literature also contends that, while alliances provide learning opportunities, they also entail significant risks of knowledge leakage to partners (Das *et al.*, 1999). As we noted earlier, leakage refers to undesired transfer 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 developed. Several authors examine the impact of various factors on protection and leakage in alliances (Baughn *et al.*, 1997; Das *et al.*, 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.

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 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. However, 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. This intent to protect is firm-controlled, in the sense that it is independent from influences that a partner in a given alliance might exercise on the focal firm. We should note that a firm may wish to transfer some knowledge to its partner, or may be indifferent to the loss of non-essential knowledge in an alliance. In this analysis, however, we only explore how firms protect themselves from the undesired loss of knowledge. 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. We expect that firms with greater intent to protect, where intent to protect includes both top management objectives and broader organizational processes, will incur lesser leakage (i.e., undesired loss of knowledge) in an alliance, irrespective of decisions that need the partner's consent.

Hypothesis 2: The greater a firm's intent to protect in alliances, the less the leakage to a partner in a given alliance.

Do learning and protection intents conflict with or reinforce each other?

Most authors that have considered leakage concerns in alliances in parallel with learning objectives emphasize trade-offs between learning and protection. There are two traditional arguments. First, greater attempts at learning may lead to higher risks of leakage to a potentially opportunistic partner (Oxley, 1997). Second, a stronger focus on protection and control may hinder 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 the partner to gain knowledge. 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 the trade-off view, arguing that learning and protection often are not conflicting objectives in an alliance. They suggest that firms can

address protection concerns by building inter-partner relational capital and using an integrative approach to managing conflict in the alliance. This approach brings together the argument that inter-partner trust and alliance routines enhance knowledge transfers (Ariño *et al.*, 2001; Zaheer *et al.*, 1998; Zollo *et al.*, 2002a) and the argument that trust and control in alliances complement each other (Das *et al.*, 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 firm-controlled 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 from the partner's intents. 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 associates with wider openness, intense communication flows, and strong inter-personal bonds (Ariño *et al.*, 2001; Hamel *et al.*, 1989; Nonaka, 1994; Zollo *et al.*, 2002a). This openness risks 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 of the knowledge to be acquired within the partner or the alliance 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 firm exactly knew the nature and location of the targeted knowledge. 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 intent to learn in alliances, the more the leakage to a partner in a given alliance.

In parallel, Norman (2004) argues that the level of knowledge protection decreases the focal firm's learning in an alliance. The prediction draws from the idea that limitations on knowledge sharing by either partner cause a spiral in which both partners become reluctant to

share any knowledge, which results in fewer learning opportunities for either partner. However, Norman's prediction did not receive empirical support.

Indeed, an alternative logic suggests that approaches to learning and to protection are not symmetric. As we argued above, learning requires openness because the nature and location of the sought knowledge are not perfectly identified by the learning firm. Protection concerns, in contrast, 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 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 which 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 intent to protect does not significantly reduce the extent of learning in an alliance.

Hypothesis 4: A firm's intent to protect in alliances 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 without giving up valuable proprietary 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 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. Because of the value of these capabilities for both partners' respective strategies, these two learning opportunities would also create the potential for leakage between the partners.

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 CEOs 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. A seven-point Likert scale (1 = "Strongly disagree", 7 = "Strongly agree") measures 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 *et al.*, 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, though, 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 need for multiple respondents. Indeed, seeking multiple respondents might have introduced bias by requesting information from less knowledgeable people. In doing so, we are consistent with prior studies on knowledge transfer that rely on single respondents (Zander *et al.*, 1995). 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. This suggests that the responses were not influenced by the position of the respondent in the company. Finally, we conducted a Harman's one-factor test to check for common method variance bias. A factor analysis with the model variables showed the existence

of 9 factors with an eigen value over 1, accounting for 67.72% of total variance, suggesting that common method bias is not a serious issue.

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 learning and protection intents 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 association 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

We measure the dependent variables for learning and leakage in an alliance with a series of questionnaire items. The dependent variable for learning includes three items: (1) "We have been successful in acquiring the capability described in question 59" (question 59 reads: "Have you tried to acquire a new capability from the alliance?"); (2) "We consider that we acquired it fully"; and (3) "We consider that we acquired it easily".

The dependent variable for leakage (undesired loss of knowledge) also includes three items: (1) "Our partner has been successful in acquiring the know-how/capability described in question 65" (question 65 reads: "Do you believe that your partner has tried to acquire a new capability from the alliance?"); (2) "We believe that our partner acquired it fully"; and (3) "We believe that our partner acquired it easily". The leakage variable is set to "no leakage" if the partners agree to the transfer of knowledge, measured by the item: "The partners in this alliance agreed upon certain transfers of capabilities/know-how", so that the variable has a positive value only in the case of undesired loss of knowledge.

We created multi-item measures for the independent variables for learning intent and protection intent. As we argued earlier, both types of intent incorporate deliberate as well as 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 intents to learn and to protect involves four major dimensions: the top management's statements of intention (Hamel, 1991; Johnson *et al.*, 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 the slack time that a firm makes available to its participating employees (Nonaka, 1994).

The survey included questions for each of these dimensions. We measure top management's expressed intention to learn by the following item: "Gaining access to new capabilities or know-how was one of our main objectives when we created the alliance", and its intention to protect 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 by the following two 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 well 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".

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 different dimensions identified in the literature: culture (Fiol, 1991; Hamel *et al.*, 1989) and alliance experience (Kale *et al.*, 2002; Reuer *et al.*, 2005; Simonin *et al.*, 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 scholars often 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 it is more appropriate to consider experience of the employees engaged in an alliance in order to understand intent or, more generally, factors influencing learning and protection in alliances (Baughn *et al.*, 1997; Hamel *et al.*, 1989). Therefore, we measure both employee and firm experience. The item "Our employees working in this alliance had previously been involved in alliances" assesses employee experience, while the number of alliances the responding firm has been involved in prior to the focal alliance assesses firm experience.

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.

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 *et al.*, 1998). Second, inter-partner equity sharing could reduce the threat of opportunistic behavior and so reduce leakage (Dyer *et al.*, 2000; Mjoen *et al.*, 1997). Third, protective clauses in the alliance contract could reduce leakage (Dyer, 1997). Fourth, the existence of an independent organizational structure for the alliance could improve learning through day-to-day interactions (Nonaka, 1994) but 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 *et al.*, 2001). We also examined several other control variables in sensitivity analysis.

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. This reinforces 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 determine which items constitute superior 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 suggest a reasonable fit, others suggest a need for improvement of the measurement model. The model chi-square value, for instance, is highly significant (χ^2 = 129.5, df = 95; p>0.01), 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, χ^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 *et al.*, 1999). Similarly, while most of 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<0.05), 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, generally consistent 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 <0.01), does not provide a significant measure of a firm's intent to protect. 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 rather than 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, though, 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: χ^2 = 108.99, df = 84, χ^2/df = 1.30, RMSEA estimate = 0.053, GFI = 0.89, Bentler's CFI = 0.97, McDonald's Centrality = 0.89, and Bentler and Bonnet's NNI = .96.

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

The revised measurement model thus assesses 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 χ^2 difference significance test (Hatcher,

1994). We find a highly significant difference ($\delta \chi^2 = 147.97 - 108.99 = 38.97$, δ 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 ($p>0.08$), $\chi^2 = 174.76$, 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, and 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 influence the knowledge flows in its alliances and, most importantly, that it can do so independently – 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, $p<0.01$). The results also support H4, showing that a firm's intent to protect does not have a significant impact on its learning from alliances. Thus, the results on the cross-effects between both intents and learning and leakage are asymmetric.

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, however, that the loadings of the core results in both the measurement and structural models did not vary materially.

Overall, 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, and several studies suggest that firms can deliberately manage their alliances to meet their learning needs. This paper studies the impact of two primary firm-controlled factors that influence learning and leakage in alliances, the firm's intent to learn and its intent to protect in an alliance, and whether these intents conflict with or reinforce each other.

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 prior research most often uses 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 firm-controlled 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 that the behavioral translation of the top management's intentions is a measure of the firm's protection intent, which is at least as strong as 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, a firm can develop and control both intents, 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 impact of firm-controlled 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 *et al.*, 2004; Lorenzoni *et al.*, 1999; Zollo *et al.*, 2002b). 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 exploration or exploitation 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.

The 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 asymmetric, because the firm's intent to protect does not reduce learning. This supports our argument that focused protection does not prevent the openness necessary for learning to take place.

At the same time, the standardized loadings associated with the intent to protect (i.e., the magnitude of the coefficient values), 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 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 that 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 firm-controlled 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 *et al.*, 2004) and the existence of inter-organizational routines (Zollo *et al.*, 2002a), as well as the impact of alliance partner features such as the overlap in knowledge bases (Dussauge *et al.*, 2000b; Lane *et al.*, 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 independent learning and protection

intents and the relational and context-specific factors identified in the literature appears to be a promising avenue for future research.

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Table 1
Summary Statistics and Correlation Table

	Variable	N	Mean	Std Dev	Min	Max	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
V1	Learning Culture	122	5.63	1.64	1	7	1.00										
V2	Incentives to Learn	122	5.63	1.64	1	7	0.28***	1.00									
V3	Slack	122	4.39	1.97	1	7	0.19**	0.45***	1.00								
V4	Learning Goals	122	5.31	1.93	1	7	0.03	0.21**	0.23***	1.00							
V5	Employee Experience	122	4.20	1.97	1	7	-0.03	0.11	0.40***	0.03	1.00						
V6	Protective Culture	122	5.22	1.73	1	7	0.24***	0.05	-0.01	0.15	-0.01	1.00					
V7	Incentives to Protect	122	4.71	1.86	1	7	-0.01	0.11	0.01	0.04	0.02	0.35***	1.00				
V8	Protective Goals	122	0.64	0.60	0	2	-0.08	0.12	0.11	-0.01	0.11	0.11	0.45***	1.00			
V9	Alliance Function	122	5.80	1.72	1	7	0.27***	0.09	0.09	0.08	-0.01	0.25***	0.24***	0.02	1.00		
V10	Firm's Successful Learning	112	3.52	2.34	1	7	0.07	0.34***	0.22***	0.33***	0.05	0.13	-0.06	-0.06	-0.02	1.00	
V11	Firm's Full Learning	122	2.88	2.12	1	7	0.11	0.24***	0.19**	0.26***	0.06	0.14	0.00	0.04	0.02	0.81***	1.00
V12	Firm's Easy Learning	122	2.73	1.98	1	7	0.05	0.30***	0.23**	0.26***	0.09	0.15*	0.00	0.08	0.02	0.77***	0.89***
V13	Partner's Successful Learning	114	1.66	1.44	1	7	-0.07	0.07	0.08	0.16**	0.13	0.08	-0.17*	-0.08	-0.08	0.19*	0.18*
V14	Partner's Full Learning	122	1.49	1.24	1	7	-0.08	0.06	0.12	0.13	0.16*	0.10	-0.20**	-0.08	-0.15*	0.28***	0.28***
V15	Partner's Easy Learning	122	1.52	1.28	1	7	-0.03	0.10	0.16*	0.16*	0.18**	0.10	-0.10	-0.01	-0.17*	0.22**	0.20**
V16	Equity Investment	122	0.16	0.37	0	1	-0.02	-0.06	0.05	0.15	0.05	-0.03	-0.04	0.12	-0.01	0.04	0.03
V17	Contract	122	2.42	0.82	1	3	-0.03	0.07	0.09	0.16*	0.01	0.17*	0.19**	0.11	0.12	0.12	0.07
V18	Independent Org Structure	122	0.20	0.40	0	1	0.09	0.05	-0.08	0.13	0.03	0.14	0.12	0.16*	-0.01	0.13	0.27***
V19	Trust	118	0.17	0.38	0	1	0.06	0.10	-0.01	0.04	-0.10	0.01	-0.05	0.00	-0.06	0.20**	0.23**
V20	Overlapping Knowledge Bases	122	3.86	2.18	1	7	0.03	0.17*	-0.07	0.04	0.07	0.08	0.21**	0.01	0.15*	-0.04	-0.03
V21	Firm-level Alliance Experience	122	4.20	1.94	1	8	-0.20**	-0.04	0.08	0.04	0.25***	0.07	0.10	0.06	-0.17*	-0.04	-0.03
V22	Alliance in N. Am.	122	0.43	0.50	0	1	-0.32***	-0.03	-0.05	-0.13	0.09	-0.22**	-0.05	0.05	-0.07	-0.13	-0.14
V23	Size	122	5.14	2.00	1	8	-0.18**	-0.06	0.00	-0.14	0.15*	-0.04	0.03	0.06	-0.11	-0.03	-0.05
V24	Ind.Competitiveness	121	6.15	1.14	2	7	0.19**	0.02	-0.01	0.07	0.07	-0.10	-0.13	0.09	-0.05	0.01	0.00
V25	Core Business	122	5.09	1.00	1	7	-0.01	-0.13	0.07	-0.01	0.21**	0.10	-0.06	0.01	0.06	0.04	0.05
V26	Alliance Creation Date	122	2000	1.33	1993	2001	-0.03	0.02	0.11	0.00	0.00	0.00	-0.01	-0.01	-0.05	0.02	-0.03
V27	Firm's Active in Service Sector	122	0.57	0.50	0	1	0.14	-0.06	0.14	0.21**	0.03	0.06	-0.17*	-0.21**	0.02	-0.06	-0.03
V28	Both Partners in Same Activity	122	0.52	0.50	0	1	-0.03	0.09	-0.04	-0.08	-0.04	-0.06	-0.01	0.06	0.12	0.06	-0.05

*** $p < .01$; ** $p < .05$; * $p < .10$

	Variable	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27	V28
V12	Firm's Easy Learning	1.00																
V13	Partner's Successful Learning	0.19**	1.00															
V14	Partner's Full Learning	0.28***	0.87***	1.00														
V15	Partner's Easy Learning	0.22**	0.92***	0.90***	1.00													
V16	Equity Investment	-0.02	-0.15*	-0.12	-0.06	1.00												
V17	Contract	0.16*	0.00	0.00	0.04	0.21**	1.00											
V18	Independent Org Structure	0.21**	0.06	0.09	0.07	0.12	0.13	1.00										
V19	Trust	0.26***	0.02	0.02	-0.01	-0.08	0.00	0.00	1.00									
V20	Overlapping Knowledge Bases	-0.02	0.01	-0.07	-0.06	0.02	-0.15	-0.06	0.05	1.00								
V21	Firm-level Alliance Experience	-0.01	0.04	-0.05	0.01	-0.06	0.02	-0.05	0.17*	0.04	1.00							
V22	Alliance in N. Am.	-0.15*	-0.07	-0.10	-0.11	0.02	-0.01	-0.13	0.03	0.15*	0.40***	1.00						
V23	Size	-0.05	0.00	-0.07	-0.02	-0.06	-0.16*	-0.08	0.16*	0.25**	0.58***	0.36***	1.00					
V24	Ind.Competitiveness	0.00	-0.04	-0.03	-0.03	0.12	-0.09	0.08	0.10	0.33***	0.11	0.09	0.23**	1.00				
V25	Core Business	0.09	0.11	0.14	0.16*	0.15*	0.11	0.02	0.10	0.23**	0.03	0.00	0.09	0.23**	1.00			
V26	Alliance Creation Date	-0.04	0.15	0.16*	0.16*	-0.06	0.08	0.00	-0.14	-0.25***	-0.05	-0.11	-0.14	-0.14	-0.12	1.00		
V27	Firm's Active in Service Sector	-0.02	0.00	0.05	-0.01	0.02	0.01	-0.12	-0.10**	-0.15*	-0.31***	-0.33***	-0.36***	-0.17*	-0.12	-0.02	1.00	
V28	Both Partners in Same Activity	-0.04	0.03	0.02	0.02	-0.11	-0.14	-0.15	-0.16*	0.04	-0.06	-0.08	0.03	0.07	0.11	0.14	-0.19**	1.00

*** $p < .01$; ** $p < .05$; * $p < .10$

Table 2
Summary Results of the Different Models

MEASUREMENT MODELS						
Path Loadings	**Initial MM (non-stand.)**		**Revised MM (non-stand.)**		**Revised MM (stand.)**	
Intents	**Learning Intent**	**Protection Intent**	**Learning Intent**	**Protection Intent**	**Learning Intent**	**Protection Intent**
Learning Culture	0.5326***		0.5461***		0.3429***	
Incentives to Learn	1.0713***		1.1150***		0.6513***	
Learning Goals	0.6413***		0.6479***		0.3293***	
Slack	1.4751***		1.4129***		0.6954***	
Protective Culture		0.6272***		0.6715***		0.3778***
Incentives to Protect		1.8170***		1.6933***		0.9249***
Protective Goals		0.2517***		0.2665***		0.4591***
Employee Alliance Experience	0.7207***	0.0262	0.6793***		0.3377***	
Centralized Alliance Function	0.2413*	0.4514**		0.5143***		0.3109***
Firm-level Alliance Experience	0.1062	0.1296				
Learning & Leakage	**Learning**	**Leakage**	**Learning**	**Leakage**	**Learning**	**Leakage**
Firm's successful acquisition of capability	1.9284***		1.9288***		0.8302***	
Firm's full acquisition of capability	2.0524***		2.0519***		0.9613***	
Firm's easy acquisition of capability	1.7975***		1.7978***		0.9183***	
Partner's successful acquisition of capability		1.3574***		1.3573***		0.9206***
Partner's full acquisition of capability		1.1991***		1.1990***		0.9503***
Partner's easy acquisition of capability		1.1900***		1.1902***		0.9982***

Covariances Between Latent Variables	**Initial MM**	**Revised MM**
Learning Intent - Protection Intent	0.05169	0.08481
Learning Intent - Learning	0.40387***	0.42204***
Learning Intent - Leakage	0.19926**	0.20534**
Protection Intent - Learning	0.01065	0.02811
Protection Intent - Leakage	-0.13572*	-0.13591*
Learning - Leakage	0.24557***	0.24554***

Fit Indices	**Initial MM**	**Revised MM**
GFI	0.88	0.89
Chi-Sq/df	1.36	1.30
Pr > Chi-Sq	0.0108	0.0348
RMSEA Estimate	0.0585	0.053
Bentler's Comparative Fit Index	0.959	0.97
McDonald's (1989) Centrality	0.8512	0.8898
Bentler & Bonett's (1980) Non-normed Index	0.9482	0.9625
Bollen (1988) Non-normed Index Delta2	0.9601	0.9707

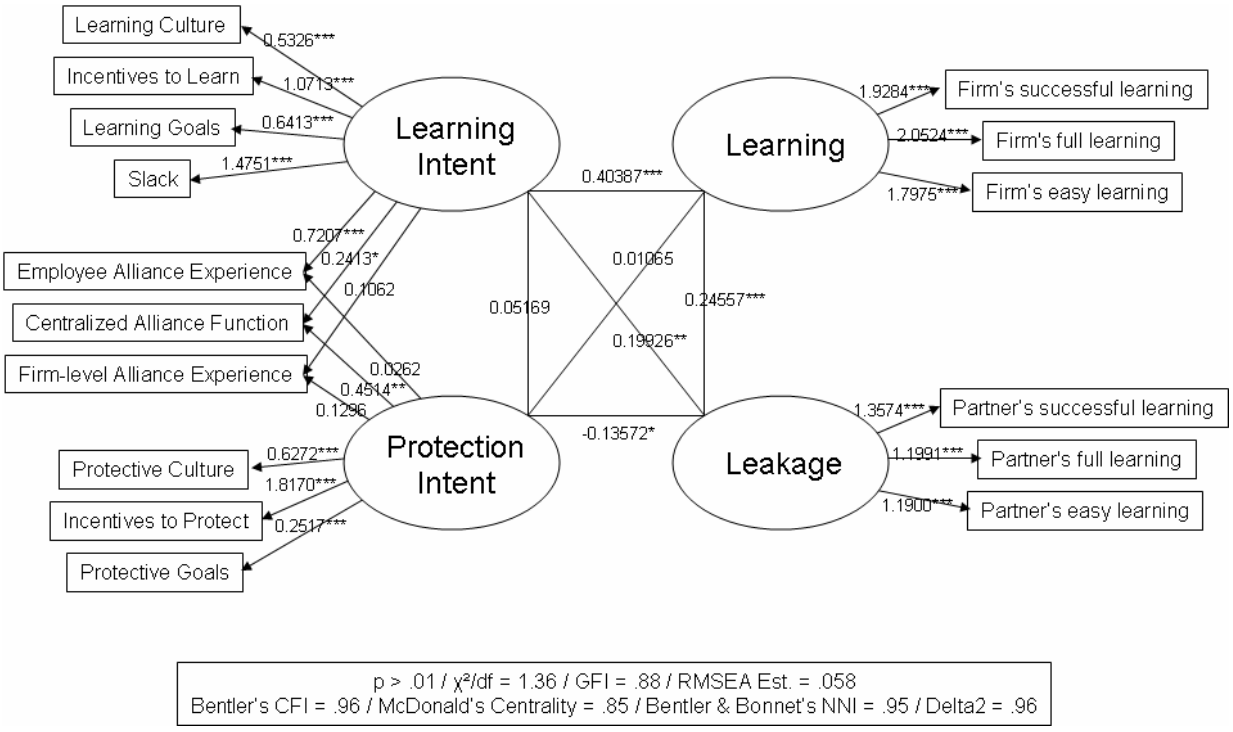
*** p < .01 ; ** p < .05 ; * p < .10

STRUCTURAL MODELS						
Path Loadings	**SM1 (non-stand.)**		**SM1 (stand.)**		**SM2 (non-stand.)**	
Intents	**Learning**	**Leakage**	**Learning**	**Leakage**	**Learning**	**Leakage**
Learning Intent	0.536***	0.1837***	0.4118***	0.2386***	0.4609***	0.1251**
Protection Intent	-0.0559	-0.1363**	-0.048	-0.1978**	-0.1089	-0.1408**
Control Variables						
Equity Investment	-0.2405	-0.5169*	-0.0424	-0.1542*	-0.2327	-0.5656**
Contract	0.2243	0.0901	0.0896	0.0609	0.3517*	0.0826
Independent Org Structure	1.3388***	0.463*	0.2673***	0.1563*	1.3799***	0.4776*
Trust	1.5861***	0.1523	0.2798***	0.0454	1.6190***	0.2148
Overlapping Knowledge Bases	0.018	0.0192	0.0193	0.0348	0.0707	0.0381
Firm-level Alliance Experience					0.0997	0.0491
Alliance active in North America (dummy)					-0.6828*	-0.2567
Size					-0.0533	-0.007
Competitiveness in industry					-0.0939	-0.0442
Alliance in Core Business					-0.0562	0.1131**
Alliance Creation Date					-0.2131*	0.1445*
Firm active in the service sector (dummy)					-0.0797	0.0471
Both partners in same activity (dummy)					0.5622*	0.0293

Fit Indices	**SM1**	**SM2**
GFI	0.86	0.84
Chi-Sq/df	1.17	1.27
Pr > Chi-Sq	0.0814	0.0023
RMSEA Estimate	0.04	0.05
Bentler's Comparative Fit Index	0.9701	0.9302
McDonald's (1989) Centrality	0.8878	0.7163
Bentler & Bonett's (1980) Non-normed Index	0.9622	0.8962
Bollen (1988) Non-normed Index Delta2	0.9715	0.938

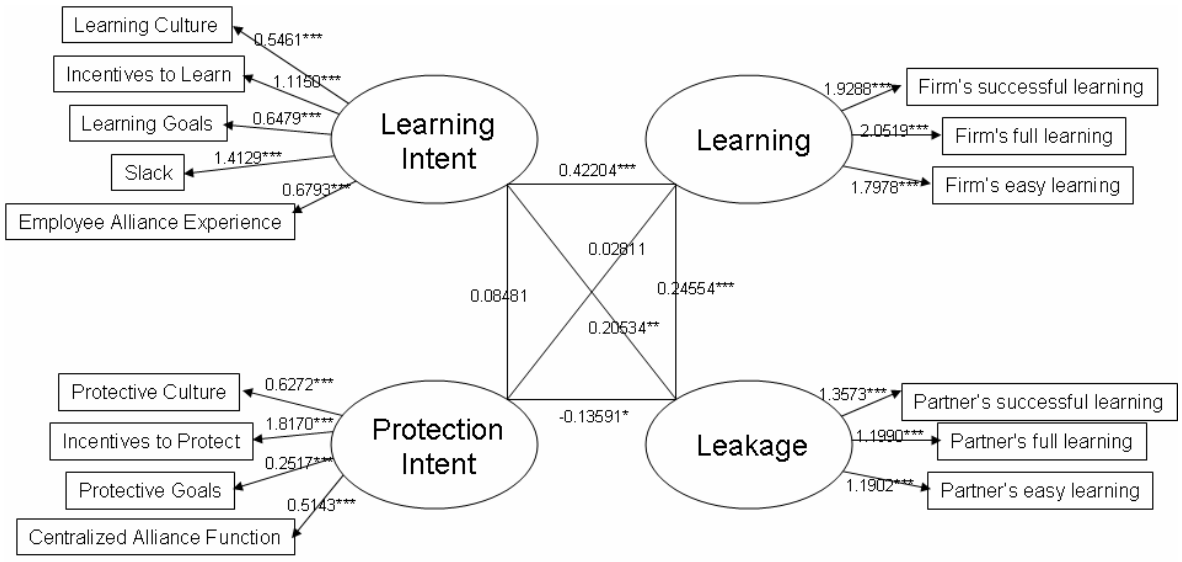
*** p < .01 ; ** p < .05 ; * p < .10

Figure 1
Measurement model 1: Preliminary Model



p > .01 / χ²/df = 1.36 / GFI = .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 χ^2 difference between 2 factor (L.I. & P.I.) and 1 factor models
- Composite Reliabilities: L.I. = .60 / P.I. = .61 / Learning = .93 / Leakage = .97

p > .035 / χ^2/df = 1.30 / GFI = .89 / RMSEA Est. = .05
Bentler's CFI = .97 / McDonald's Centrality = .89 / Bentler & Bonnet's NNI = .96 / Delta2 = .97

Figure 3
Structural Model