Abstract: In this paper, we propose that a firm’s capacity to control the transfer of resources in alliances is driven by two essential abilities: a learning ability and a protection ability. To explain learning in alliances, previous research has focused on a wide range of rather diverse factors, such as the firm’s alliance experience, its knowledge base, its intent to learn, the alliance content and governance, or the tacitness and embeddedness of the targeted resource, among others. We argue that many of these factors overlap and that a shift to the micro-level of analysis is necessary to realize that they are components of one or both abilities. Focusing on these abilities suggests the existence of a series of other factors that have been ignored in the literature to date. In particular, the model we develop hypothesizes that the interface between the firm and the alliance, as well as the individuals involved in the partnership, have a significant influence on both the learning and leakage that takes place. The micro-level components we identify are either specific to the firm (interface, experience, and intent) or specific to each alliance (alliance characteristics, personnel characteristics, and governance structure). The empirical setting consists of a database of internet alliances, collected through a web-based questionnaire. We find support for the learning and protection abilities. These abilities significantly explain the actual transfer of resources in alliances.
One of the main motivations for companies to form inter-firm alliances is learning, that is, the integration of a resource, of a routine, or more generally, of knowledge, into a firm. To explain learning in alliances, most research has used firm-level concepts, among which we can cite the absorptive capacity of the firm (Cohen and Levinthal, 1990), its experience in dealing with alliances, its knowledge base, its intent to learn (Hamel, 1991), the alliance content and governance, or the relative scope of an alliance (Khanna, Gulati and Nohria, 1998). We argue that these concepts are partially redundant and a shift to the micro-level of analysis shows that they are based on overlapping components. In this paper, we propose that these micro-level components of inter-partner learning in alliances determine two essential abilities: a learning ability and a protection ability that, in turn, influence the actual transfer of resources between the partner firms.

**Literature review**

Learning is one of the main motivations for a firm to enter an alliance: it provides a way to gain access to missing competences, to combine resources in order to create new resources, or to concentrate scarce resources on an existing business (Hamel, Doz and Prahalad, 1989; Hamel, 1991). In order to gain access to resources and competences, alliances are an alternative to acquisitions, which often involve acquiring unrelated assets (Hennart, 1988), and to a lengthy internal development. In case of information asymmetry, a joint venture also limits the risks of adverse selection in the acquisition process (Kogut, 1991; Balakrishnan and Koza, 1993).

Two types of factors have been identified, which influence the transfer of resources or knowledge between partners in alliance. The type of resource targeted is one of them: acquiring tacit, as opposed to explicit, resources (Nonaka, 1994; Baughn, et al, 1997; Inkpen, 1998) or ambiguous resources (Simonin, 1999) is more difficult and requires more effort. The second type of factors identified in the literature are firm-level, partner-level or alliance-level characteristics, which explain why some firms learn more easily than others. They can be divided into eight major groups of characteristics: the firm’s absorptive capacity (Cohen and Levinthal, 1990; Lane and Lubatkin, 1998), the firm’s learning intent (Hamel, Doz and Prahalad, 1989; Hamel, 1991), its experience in alliances (Anand and Khanna, 2000), the governance structure of the alliance (Hennart, 1988), the scope of the alliance (Khanna et al., 1998, Dussauge, Garrette and Mitchell, 2000), the type of partner in the alliance (Khanna, Gulati and Nohria, 1998; Lane and Lubatkin,
In addition to learning benefits, though, alliances also present dangers to the learning firm. The idea that learning races can be dangerous to the loser (Hamel, Doz and Prahalad, 1989; Hamel, 1991) and that JV instability can be explained by such races (Inkpen and Beamish, 1995) is present throughout the literature, although the argument is sometimes considered extreme (Hennart, Roehl and Zietlow, 1999; Oxley, 1999). The debate as to whether alliances are dangerous or beneficial still goes on (Mitchell and Singh, 1996), although recent research tends to argue that it is possible to protect and learn at the same time. Kale, Singh and Perlmutter (2000), for instance, argue that relational capital, in conjunction with an integrative approach to managing conflict, is a key factor to achieve both learning and protection.

Research on learning in alliances has therefore shown that learning is a major concern in most alliances, and that the characteristics of the resource combined with firm-level, alliance-level and partner-level characteristics, have an impact on the success or failure of learning. Building on these findings and shifting the analysis from the firm as a whole (a macro-level of analysis) to the resource transfer proper (a micro-level of analysis), our paper explores which micro-level determinants and which factors have a direct impact on the transfer itself.

The Learning and Protection Abilities, and their Components

In simple terms, to learn means to acquire new knowledge. In an organizational setting, learning means acquiring a piece of knowledge, a resource, or a routine. We therefore define and analyze learning as a resource transfer, and include what the firm wants to learn as well as what the firm wants to protect from its partner.

The factors identified by previous research all include, or assume, at least implicitly, the necessity to enhance learning and protection at the same time. The intent to learn (Hamel, Doz and Prahalad, 1989; Hamel, 1991), for instance, is implicitly mirrored by the intent to protect. The experience in dealing with alliances (Anand and Khanna, 2000) will logically create both a capacity to learn and to protect better. What’s more, these factors tend to overlap. For example, alliance experience will influence the choice of the partner, of the governance structure, and of the scope of the alliance. The identity of the alliance partner will influence the relative absorptive capacity of the firm, trust, and the scope of the alliance. Similarly, trust will influence, or be influenced by, the alliance governance structure, specifically by its control mechanisms.
There is therefore a need to disentangle protection from learning in those factors and understand how and why they overlap. We propose that the factors highlighted in prior research are actually facets of two core factors: the firm’s ability to learn on the one hand, and its ability to protect on the other hand, which we call the learning and the protection abilities. We define the learning ability as the ability to utilize a given resource by combining it to a pre-existing set of resources in a value creating way (Karim and Mitchell, 2000). It includes the identification of a relevant resource or routine, in order to coordinate it with existing resources or to replicate it (March, 1991; Szulanski, 1996), the adaptation of a resource or a routine to a new environment (Nelson and Winter, 1982; Chandler, 1992), the joint use of complementary resources or routines (Prahalad and Hamel, 1990), and the actual transfer of a resource or routine (Nelson and Winter, 1982; Szulanski, 1996). We define the protection ability as the ability to avoid the replication of the company’s resources and routines by potential competitors (Hamel, Doz, and Prahalad, 1989) and avoid the appropriation of the value of one of the company’s resources and routines by potential competitors. It must be pointed out that in our framework, the analysis is made at the alliance level, since we are trying to explain a transfer between an alliance and a focal partner. The abilities we consider are therefore specific to a firm in a given alliance.

In order to understand the relationship between the learning and protection abilities of the firm, and the factors described in the literature, we need to change the level of analysis. Most research so far has concentrated on firm level concepts: the alliance experience of the firm, the absorptive capacity of the firm, or the type of partner. We argue that it is necessary to go down to the level of the resource transfer itself to uncover the building blocks behind the firm-level concepts, and thus resolve the problems raised by the overlap in firm-level factors. For instance, the concept of alliance experience can be broken down into two elements. On the one hand, we find the firm-level experience, which, as Anand and Khanna (2000) argue, creates capabilities which help the organization manage alliances better over time. On the other hand, going down to the micro level, the alliance experience can also be found among the employees involved in the alliance. A firm can have a broad alliance experience and yet send people who never participated in an alliance before to work with their alliance partner. Applying the same reasoning to all the factors found in the literature, a series of building blocks, which are components of the firm-level factors, are identified. The relationship between the components and the factors is shown in Appendix 1. We argue that these components are the building blocks for the Learning and Protection Abilities we
defined earlier, and explain why firm-level factors tend to overlap and to include both learning and protection facets.

We have divided the components in two types to simplify their presentation. The first group includes those components that are firm-specific, which means that they are independent from any given alliance. The second group includes those components specific to a given alliance. A table summarizing the Learning-Protection (LP) Hypotheses can be found in Appendix 2.

I. Firm-specific Components

Firm-specific components are unique to a firm and independent from any particular partner, and can potentially be common to all the alliances of a given firm. We have identified three major firm-specific components: interface, experience, and intent.

I.a. Interface: The interface is the structure (or structures) inside the firm in charge of dealing with alliances. It is the point(s) of contact between a firm and its alliances. Two dimensions characterize different types of interface: its degree of centralization and its knowledge base. 

Degree of centralization captures the degree to which the interface is centralized (there is one only structure or team in charge of supervising all the collaborative operations of the firm), or decentralized (there is no central structure, and each alliance is supervised and managed independently). The influence of centralization on the learning and protection abilities is ambiguous. First, the more centralized the management of alliances, the more experience in dealing with alliances is accumulated, and the easier resource learning is expected to be (Cohen and Levinthal, 1990; Anand and Khanna, 2000). Moreover, organizations characterized by greater structural differentiation need integrative mechanisms to compensate for differentiation (Lawrence and Lorsch, 1967). The existence of a centralized structure and therefore of at least partially centralized decision-making processes when dealing with alliances compensates for the differentiation introduced by the alliance, and thus also enhances learning. However, a centralization of decisions reduces the diversity of people taking part in the decision process and leads to a greater path dependence, therefore hindering the search routines for new resources (Nelson and Winter, 1982; Cohen and Levinthal, 1990; March, 1991). Centralization is thus expected to hinder identification processes. Finally, a centralized structure diminishes the risks of leakage from micro-bargaining (Hamel, Doz, and Prahalad, 1989) and overall allows an accumulation of experience in dealing with alliances, and thus protecting from partners (Cohen
and Levinthal, 1990; Anand and Khanna, 2000). A centralized structure is thus expected to enhance protection.

*Hypothesis 1a: The higher the degree of interface centralization, the higher the learning ability.*

*Hypothesis 1b: The higher the degree of interface centralization, the lower the learning ability.*

*Hypothesis 1c: The higher the degree of interface centralization, the higher the protection ability.*

**Interface knowledge base** captures the knowledge-base of the group of employees in contact with the firm’s alliances, in terms of their diversity or homogeneity. The greater the knowledge base on which this search is based (Cohen and Levinthal, 1990; Baughn, Stevens, Denekamp et Osborn, 1997), the higher the ability to identify relevant resources is expected to be, especially when exploration processes are involved. The greater the diversity of people working at the firm’s interface, the greater the knowledge base on which the search for new routines when dealing with alliances will be. The employees working at the firm’s interface are in charge of identifying resources transferred back from the alliance as being relevant or not, and thus decide whether a resource will be integrated into the firm’s bundle of resources or not. Therefore, the greater the diversity of the firm’s interface, the higher the ability to identify relevant resources and, consequently, the higher the learning ability.

*Hypothesis 2: The greater the diversity at the firm’s interface level, the higher the learning ability.*

**l.b. Experience** captures a firm’s previous accumulated experience in learning and protecting through alliances. Scholars have long recognized the role of experience as a factor enhancing learning in alliances. Experience in dealing with alliances reduces the adaptation time needed to operate with a partner, enhances the search routines to identify new resources, and helps transfer the resources back to the firm in an easier and quicker way (Cohen and Levinthal, 1990; Anand and Khanna, 2000). Although not stated as clearly in the literature, the same reasoning applies to the relationship between experience and protection: dealing repeatedly with alliance partners helps identify the sources of leakage and diminish them. Therefore, experience will enhance the learning and protection abilities of a firm.
**Hypothesis 3a:** The greater the alliance experience, the higher the learning ability.

**Hypothesis 3b:** The greater a firm’s alliance experience, the higher the protection ability.

I.c. **Intent** is the deliberate intent to learn/protect developed inside the firm. Intending to learn has been shown to be a major aspect of actual learning (Hamel, Doz, and Prahalad, 1989; Hamel, 1991), and the search for new resources and routines itself involves intent in the form of search routines (Nelson and Winter, 1982; March, 1991). This intent to learn can be achieved in two main ways. First, the firm can have a focus on learning developed in its dominant logic system (Prahalad and Bettis, 1986; Bettis and Prahalad, 1995), or it can create the alliance with the intent to learn, making it co-evolve with their exploration or exploitation strategy (Koza and Lewin, 1998). Second, the firm can incite employees to focus on learning. This can be done either by a specific training (which can be formalized with training sessions or informal as would be verbally explaining the importance of learning from partners) or by specific incentives aligned with the firm’s learning needs (Williamson, 1994). Although not stated as clearly in the literature, the same reasoning can be applied for protection.

**Hypothesis 4a:** The more training and/or incentives to learn from alliances a firm gives its employees, the higher the learning ability.

**Hypothesis 4b:** The more training and/or incentives to protect resources from alliances a firm gives its employees, the higher the protection ability.

**Hypothesis 5a:** The more focused on learning a firm is, the higher the learning ability.

**Hypothesis 5b:** The more focused on protecting a firm is, the higher the protection ability.

### II. Alliance-specific components

Alliance-specific components are those components which are specific to each alliance. They can be the result of a negotiation between the firm and its partner or the result of the partner’s characteristics. We have identified three groups of alliance-specific components: alliance characteristics, personnel characteristics, and governance structure.
II.a. **Alliance characteristics** captures the characteristics of the alliance which might affect learning. Two main dimensions can be found: the similarity between the partners, and the potential opportunism of the partner.

*Partner similarity* is the similarity between the partner and the firm. Overlaps in knowledge bases have been shown to facilitate learning between partners (Cohen and Levinthal, 1990; Mowery, Oxley and Silverman, 1996): the closer the knowledge a firm wants to acquire from its partner is from its own knowledge base, the easier it will be for the firm to identify and understand new relevant pieces of knowledge. Lane and Lubatkin (1998) have shown that, in addition to similar knowledge bases, similar organizational structures and dominant logics also facilitate learning. More generally, the more similar the partners are, the easier the learning processes will be: Partners that work in the same industry and have similar activities will be able to identify and understand valuable knowledge in each other, because their experience in the industry will make the search for new knowledge less distant (Nelson and Winter, 1982). Partners with a similar size or coming from the same country will be able to overcome in an easier way the differences in management styles or cultures, which, being Type II differences (Parkhe, 1991), can endanger the very survival of the alliance. Finally, partners that have been involved in alliances together for some time develop collaborative experience, which can include knowledge-sharing routines, and trust in the relationship (Dyer and Singh, 1998), thus facilitating future learning. Following a symmetric reasoning, learning is expected to be easier for the partner as well, thus decreasing the protection ability of the focal firm.

*Hypothesis 6a: The higher the degree of similarity between partners, the higher the learning ability.*

*Hypothesis 6b: The higher the degree of similarity between partners, the lower the protection ability.*

The potential opportunism of the partner captures the probability for the partner in an alliance to have opportunistic behaviors. The potential opportunistic behaviors of its partners are a major concern and a source of danger for a firm involved in alliances (Hamel, Doz, and Prahalad, 1989). Williamson (1994) argues that assuming zero-opportunism impoverishes the analysis of a company’s behavior, but that assuming it does not mean to celebrate it, and as noted earlier, one of the assumptions behind this framework is the existence of opportunism. We therefore expect
the potential opportunism of the partner to impact both the learning and the protection abilities of a company negatively.

*Hypothesis 7a: The higher the potential opportunism of the partners, the lower the learning ability.*

*Hypothesis 7b: The higher the potential opportunism of the partners, the lower the protection ability.*

**II.b. Personnel characteristics** captures the characteristics of the firm’s employees working in the alliance. Three major dimensions can be identified: employees’ alliance experience, slack, and location.

*Employees’ alliance experience* is the number of alliances in which the personnel affected to the alliance has been involved, prior to the focal alliance. The role of experience as a factor enhancing learning through alliances has been discussed at the firm level in a previous section: experience reduces adaptation times, enhances search routines, and facilitates transfers (Cohen and Levinthal, 1990; Anand and Khanna, 2000). However, the experience of a firm in dealing with alliances is not the same thing as the alliance experience of individuals assigned to a specific alliance: a firm can be involved in many alliances, but might still assign to a given alliance individuals who have no alliance experience, and who will still have to adapt to the new environment and to develop specific search routines. The reasoning used at the firm level can be brought down to the individual level to argue that the more alliance experience individuals working in a given alliance have, the easier it will be for them to identify and understand resources in alliances and to protect valuable resources from the partner.

*Hypothesis 8a: The greater the experience of employees affected to the alliance, the higher the learning ability.*

*Hypothesis 8b: The greater the experience of employees affected to the alliance, the higher the protection ability.*

*Slack* is the amount of time that employees working in the alliance can potentially spare, in addition to day-to-day work, in order to learn from the partner. Hannan and Freeman (1977, 1984) have argued that organizations can be split into specialists and generalists: specialists are organizations which have little excess capacity because they use their resources efficiently and generalists are organizations with greater excess capacity, which use their resources less efficiently, as shown by the mere that they have excess capacity, but are also better prepared for
unexpected changes in the environment. A similar reasoning applies at the team level: the more excess capacity a team has, the more easily the team is expected to identify changes in the environment and react to them. We therefore expect a positive relationship between slack and both the learning and protection abilities.

**Hypothesis 9:** Greater slack in the number of employees affected to the alliance will have a positive influence on learning ability.

*Location* is the physical location of the personnel of the firm working in the alliance before being transferred back to the firm. Although a strategic resource cannot be possessed by a given individual, since it would then be acquirable by hiring personnel and would thus not be a resource on which competitive advantage can be based (Wernerfelt, 1984; Amit and Shoemaker, 1993), resources are embodied in individuals and resource transfers require sharing knowledge between individuals. Depending on the type of resource or routine involved, the need for interaction between individuals varies: If the knowledge is explicit, it can be transferred in the form of a blueprint and the individuals involved do not have to interact, but the more the knowledge becomes tacit, the more day-to-day interactions between individuals are necessary in order to transfer it (Nonaka, 1994; Inkpen, 1998). The rotation of employees between the alliance and the learning firm is thus required to ensure that resources and routines acquired in the alliance are transferred back to the learning firm. The higher the rotation rate is, the more learning is expected to take place. However, if rotation is required by the need for alliance employees to interact with employees inside the firm, rotation will also have a negative effect if the rate becomes too high. Indeed, in order for employees to acquire resources inside the alliance, day-to-day interactions over longer periods are also needed (Inkpen, 1998): if the time spent in contact with the partner is reduced by a high rotation rate, no learning can occur inside the alliance anymore, especially when resources are tacit. We therefore expect that the location of the employees inside the learning firm will diminish its learning ability, because it reduces the day-to-day interactions with the partner and makes acquiring tacit resources more difficult, but will also increase it, because it eases the transfer of the resource from the alliance to the learning firm. The employees’ location will also have an impact on protection: a day-to-day interaction with the partner increases the probability of micro-leakage (Hamel, Doz et Prahalad, 1989; Baughn, Stevens, Denekamp et Osborn, 1997), and having the employees localized outside the firm reduces the firm’s ability to
control them (Geringer et Herbert, 1989; Kumar et Seth, 2000). Keeping the employees inside the company should therefore increase the protection ability of the firm.

**Hypothesis 10a:** The location of the employees working in the alliance inside the company will reduce the learning ability.

**Hypothesis 10b:** The location of the employees working in the alliance inside the company will increase the learning ability.

**Hypothesis 10c:** The location of the employees working in the alliance inside the company will increase the protection ability.

**II.c. Structure** is the governance structure of the alliance. It has been widely tested in the literature, which suggests three dimensions: independent structure, financial and non-financial hostages, and type of contract. In our model, we argue that those components actually impact the abilities to coordinate and protect, instead of directly impacting the transfer itself.

*Independent structure* captures whether the alliance has an independent existence or not. Note that a joint venture structure does not necessarily imply an independent structure. One of the major hurdles to cooperation is the lack of trust due to potential opportunism (Hamel, Doz, and Prahalad, 1989). Opportunism arises from the misalignment of incentives between employees coming from different partners: Williamson (1994) argues that, as opposed to a market, a firm has the ability to align incentives, and thus drastically reduce opportunism. By creating a firm-like structure, alliances with an independent structure may be able to align the employee incentives better than alliances without independent structures. Moreover, locating alliance employees in one single location increases the opportunities of repeated interactions and thus facilitates learning and creating (Nonaka, 1994; Inkpen, 1998). However, if learning inside the alliance can be enhanced by an independent structure, learning between the alliance and the learning firm is expected to be hindered for the same reasons: creating a firm-like structure for the alliance reduces the interaction opportunities between the alliance and the learning firm. Because of these two opposite influences, we formulate two contradictory hypotheses.

**Hypothesis 11a:** The existence of an independent structure increases the learning ability.

**Hypothesis 11b:** The existence of an independent structure decreases the learning ability.
Financial and non-financial hostages are the partners’ investments into the alliance or into each other. The transaction-cost theory stream of research on alliances has emphasized the problem of appropriability hazards due to potential opportunism (Hennart, 1988; Kogut, 1988; Oxley, 1997). One of the solutions to deal with opportunism in alliances is to have financial hostages (Kogut, 1988): by possessing a share of its partner or by ensuring that the partner has a financial stake in the alliance, a firm can increase the cost of ‘betrayal’ for the partner. Thus, the greater the financial hostages a firm holds in its partner, the costlier it will be for the partner to break the collaborative deal, which increases the protection ability of a firm. The same reasoning can be applied to non-financial investments such as a patent brought to the alliance, for instance.

Hypothesis 12: The greater the financial and non-financial hostages, the higher the protection ability.

Contract captures the characteristics of the alliance contract and their impact on the learning and protection abilities of the focal company. An important research literature focuses on the way contracts can protect or fail to protect companies in alliances. Williamson (1994), with others, argues that a contract cannot provide a complete protection, because contracts are by definition incomplete, i.e., they cannot take into account all the possible evolutions of a given agreement over time. Although contracts cannot be complete, they do provide some protection through ‘protection clauses’ to the partners in alliances –as the wide use of non-disclosure agreements before starting alliance negotiations seems to show—, and should therefore be present in our model, as having an impact on the protection ability of a company. Following a symmetric reasoning, the existence of ‘learning clauses’ in the contract is also expected to enhance learning between the partners.

Hypothesis 13a: The more learning clauses in the contract, the higher the learning ability.

Hypothesis 13b: The more protection clauses in the contract, the higher the protection ability.

The Resource Transfer Propositions

In the previous section, we discussed the learning and protection abilities of the firm in an alliance, as well as their components. In this section, we introduce our set of resource transfer propositions, which are the propositions linking the learning and protection abilities of the firm
and the actual resource transfer. The basic model can be depicted as shown on the graph (dotted arrows show negative relationships).

**** Figure 1 placed about here ****

The core proposition of this work states that the success in learning from a partner (modeled as a resource transfer) and avoiding undesired partner learning (modeled as an undesired resource transfer to the partner) is influenced by a firm’s learning and protection abilities, as well as by the characteristics of the resources at stake. The successes in learning and in avoiding undesired partner learning are linked together and not necessarily antagonistic (Kale, Singh, and Perlmutter, 2000). Moreover, the learning/leakage dichotomy, which is implicit in many studies of learning in alliances, assumes that there cannot be desired learning by the partner. However, a firm might want its partner to learn the resources needed to make the alliance work. In this study, we therefore shift the dichotomy to learning / partner’s desired learning and partner’s undesired learning, and we argue that if the partner’s learning is desired, the firm’s learning ability will have a positive impact on it. Each of the arrows in the previous model corresponds to a core proposition in our model.

The learning ability of a firm encompasses the four dimensions described above, and all of them influence learning. The first dimension is identification, which is the first step before any adaptation, joint use of resources or transfer. Identification of relevant resources is as crucial internally (March, 1991; Szulanski, 1996) as it is externally (March, 1991; Cohen and Levinthal, 1990). The greater the ability of a firm to identify relevant resources in an alliance, the more successful the actual transfer will be. The second dimension found in learning is resource adaptation. Resources being a bundle of routines, the ability to adapt them for new uses (Nelson and Winter, 1982) should increase the perceived value of an identified resource, and thus make the actual transfer of that resource likelier. The third dimension in learning is the complementary use of resources. Following a similar reasoning, the ability to use resources jointly (Penrose, 1959; Prahalad and Hamel, 1990) should increase the perceived value of a resource, and thus make the actual transfer of that resource likelier. The fourth dimension in learning is the ability to transfer a resource. The easier it is for a firm to transfer a resource, the likelier the actual transfer is expected to be. In addition, the ability to coordinate resources also implies that the resource transfer can be somehow controlled, through the identification of specific routines (March, 1991), their adaptation (Nelson and Winter, 1982), and their complementary use (Penrose, 1959;
Prahalad and Hamel, 1990). We can therefore expect that the better a firm can coordinate resources, the more it will be able to transfer resources voluntarily to its partner if it decides to do so.

Core Hypothesis 1a: The greater the learning ability of a firm in an alliance, the more successful the resource transfer to the firm.

Core Hypothesis 1b: The greater the learning ability of a firm in an alliance, the more successful the desired resource transfer to the partner.

The protection of valuable assets has been argued to be a major incentive to internalize transactions (Williamson, 1994), and firms have been considered mechanisms of protection of knowledge (Porter Liebeskind, 1996). In an alliance, the potential leakage of valuable information is a major danger, because of the ability that this governance structure gives to potential competitors to access the firm’s resources (Hamel, Doz, and Prahalad, 1989). In the same way that learning from external sources requires a specific ability that is unique to each firm (Cohen and Levinthal, 1990), protecting resources from a partner requires a specific firm-specific ability as well.

Core Hypothesis 2: The greater the protection ability of a firm in an alliance, the less the undesired resource transfer to the partner.

A firm’s learning and protection abilities depend on a series of components, which we analyzed in detail in the previous section. Some components are common to both abilities, and others only influence one of them. Most of those components are explicit strategic choices, such as choosing the characteristics of the employees that participate in the alliance or choosing the frequency with which these employees are transferred back to the parent company, and will jointly affect learning and protecting. Because of the possibility for a company to set up those factors in an alliance, and to combine them efficiently, a firm can consider the potential for desired learning and the danger of undesired partner learning jointly.

Core Hypothesis 3a: The greater the resource transfer to the firm, the less the undesired resource transfer to the partner.

Core Hypothesis 3b: The greater the resource transfer to the firm, the greater the desired resource transfer to the partner.

A resource transfer will be influenced by the learning and protection abilities of a firm but, as the literature discusses in some detail, will also depend on the characteristics of the resources at
stake. The literature suggests four main characteristics influencing the ease or difficulty of resource transfer: their tacitness, their similarity with existing resources, the fact they might be patented or filed, and the partner’s agreement on their transfer.

**Core Hypothesis 4a:** The easier to transfer a resource, the more successful the learning by the firm.

**Core Hypothesis 4b:** The easier to transfer a resource, the more successful the learning by the partner.

The model we introduce in this study is therefore a two-stage model: micro-level components influence the firm’s learning and protection abilities in the alliance, and these abilities, in turn, determine the learning and protection abilities of the firm in the alliance.

**Methodology**

The empirical setting chosen to test our model is e-commerce alliances, defined as alliances created between companies in order to conduct activities on the internet. After several rounds of interviews with managers of e-commerce companies and industry experts, a web-based questionnaire was developed, and 124 usable responses were collected. Our sample’s descriptive statistics can be found in Appendix 3.

The measures for the variables used in this study were all based on one or more items of the questionnaire. Interface centralization, diversity at interface, and the experience in learning and protecting, partner potential opportunism, the employees’ alliance experience, and slack are measured by 7-point Likert questions. The general firm-specific alliance experience is also measured by the number of alliances the firm had been involved in prior to the current one (in numbers). The intent to learn and protect is measured by two series of three questions: the incentives of training given to employees participating in the alliance (7-point Likert), the perception of the importance of the learning/protective culture of the firm (7-point Likert), and whether the alliance had been created in order to learn (7-point Likert). The similarity between partners is measured by two variables: a constructed variable and a questionnaire variable. For the constructed variable, the respondent was asked to describe its activity and the activity of the partner. Based on these descriptions, each firm and each partner was placed in a general activity category. A dichotomous variable was then created, with a value of 1 when the general category was the same for both the firm and the partner, and of 0 when not. This measure is completed by a 7-point Likert question asking the respondent to assess the similarity of its employees’ and its
partners’ employees backgrounds. Rotation is measured by three questions: two dichotomous questions asking whether the management and the engineers work in the alliance and the firm at the same time, and one dichotomous question asking whether the employees are still located in the firm’s facilities. The independent structure and the existence of financial hostages are measured by dichotomous questions. The existence of non-financial hostages is measured by a constructed variable: Respondents were asked to check any non-equity investment they made to the alliance. The variable is constructed as the number of non-equity investments made. Finally, the type of contract is measured by three 7-point Likert questions asking whether the firm and the partner are efficiently protected by the contract, and whether the contract enhances resource transfers.

To test for the existence of the learning and protection abilities and for their relationship with the micro-level components we have identified, we have conducted a factor analysis. If the two abilities exist, we should find two major factors underlying the measured components, and the loadings of the components on these two factors should be consistent with our propositions. The resource transfer propositions between the factors extracted with the EFA and the actual learning are tested with linear regression techniques. The dependent variables, the firm’s learning and the partner’s learning, are measured with a questionnaire item each, in the form of a 7-point Likert question. The learning and protection abilities are the scores of the extracted factors. Five characteristics of the transferred resource are measured through 7-point Likert questions: the agreement on the transfer, the difficulty to copy the resource, the fact that it is patented or filed, its closeness to resources already possessed, and its complementarity to resources already possessed. Six control variables are also introduced in the model: the activity of the partners (1 if both partners are software or service providers, 0 if not), the year in which the alliance was created (1 if created in 2000 or after, 0 if before), whether the alliance is in the firm’s core business (7-point Likert question), whether the industry is competitive (7-point Likert question), and the geographical location of the alliance activities (two dummy variables to capture whether the alliance is active in the US or in Europe).

Results

The results of the factor analysis are provided in Appendices 4 and 5. Several methods exist to choose which factors to keep in a factor analysis (Kim, Mueller, 1978). In this study, we use Cattell’s scree-test (1965). This method plots the different factors’ eigenvalues in decreasing
order, and instructs to stop factoring at the point where the eigenvalues begin to level off. The scree plot (Appendix 4) shows a very clear drop after the third factor. We therefore keep the three first factors for the rest of the analysis. The factor loadings of each variable on the three factors after an orthogonal rotation are shown in Appendix 5. It should be noted here that using Principal Factor Analysis instead of Principal Component Analysis as the method to extract factors, or using an oblique rotation instead of an orthogonal rotation after the factors are extracted, does not drastically change the factor loading pattern. In the rest of this analysis, we follow Kim and Mueller (1978) and consider factor loadings of less than .3 as not substantial.

The analysis of the factor loadings on each of the three factors shows that, although the factor analysis finds three factors instead of the two hypothesized, the interpretation of the factors is straightforward. Starting with the interpretation of factor #2, we find that the firm wanted to have access to its partner's resources from the very beginning (obj3=.4, obj5=.5, objlat=0), creates incentives to learn for its employees (incacq=.5), and gives them time to do so (slack=.5); it has experience in dealing with alliances (nball=.5), especially in the acquisition of resources through alliances (acqpast=.4), and so do its employees (emppexp=.5); it tends to centralize at the business level (centrb=.4, centr=.1) and people working at the interface have a broad knowledge base (backg=.4); its partner is a potential competitor (pcomp=.4) and is relatively similar (smpart=.3); however, it feels it does not need protection either by contract (fcntprt=-.3, pcntprt=-.3), by financial or non-financial hostages (equity=.1, xneqf=.2), or by any intent to protect (incprt=.2, cultp=.2). This factor therefore clearly represents a firm's ability to learn without protection.

Factor # 3 seems to be the exact opposite: the firm did not intend to use the alliance to learn (obj3=-.3, obj4=-.4, objlat=-.4, incacq=-.1), considers that it could not learn from alliances in the past (acqpast=-.4) and does not give time to its employees to learn (slack=-.3), but is clearly preoccupied by its management (incprt=.3), and centralizes the management of its alliances at the corporate level (centr=.3), although the partner is surprisingly not really perceived as a potential competitor (pcomp=.2) while being similar (xsimac1=.4); the employees working in the alliance tend to stay within the company (xmgro2=.7, xengro2=.6, locall=.5, indep=-.3). This factor clearly represents a firm's ability to protect, without any intent to learn. After analyzing factors #2 and #3, the meaning of factor #1 becomes clear: the firms creates incentives to both learn and protect for its employees (incacq=.3, incprt=.6), and has a culture focused on both learning and protection (cultl=.3, cultp=.5); it centralizes the management of its alliances (centr=.4), but has a
broad knowledge base at the interface (backg=.4); it has experience in alliances, especially in protecting valuable resources (prtpast=.5); and it relies on contracts for enhancing both protection and learning (fcntprt=.8, pcnprt=.7, cnttr=.4). This factor clearly represents the combination of learning and protecting in an alliance. Thus, while we find support for the hypothesized existence of the learning and protection abilities, we also observe the existence of a third distinct ability: the ability to coordinate and protect simultaneously.

In Appendix 2, we present a summary of the learning-protection Hypotheses. Following the cut-off rule-of-thumb for factor loadings (Kim, Mueller, 1978), we can see that most hypotheses have at least partial support. H1 hypothesized that interface centralization could have either a positive (H1a) or a negative (H1b) impact on learning, and a positive impact (H1c) on protection. We find that corporate-level centralization enhances the protection ability as well as the ability to both learn and protect, while business unit-level centralization enhances the learning ability. H2 hypothesized that interface diversity would enhance learning. It is supported. H3 hypothesized that firm’s experience would enhance both learning and protection. It is supported. H4 hypothesized that the learning and the protecting intents would enhance both learning and protection. It is supported. H6 hypothesized that the similarity between partners would enhance learning and hinder protection. It is only partially supported: similarity does not seem to hinder protection, quite the opposite. It might be due to the fact the more similar the partner, the easier it is for the firm to anticipate and adjust for its moves. H7 hypothesized that the partner’s potential opportunism would hinder both learning and protection. This hypothesis is not supported.

Surprisingly, having a potential competitor for a partner seems to enhance learning. This might be related to the fact that measuring the degree to which a partner is also a competitor captures the similarity between the two firms. H8 hypothesized that employee experience would enhance both learning and protection. It is partially supported: it seems to enhance learning, but not protection. H9 hypothesized that slack would enhance learning. It is supported: slack seems to enhance learning. It might be due to the phrasing of the question, which does not allow for a response stating that too much slack was given to employees in the alliance. H10 hypothesized that the location of employees inside the focal firm could either enhance or decrease its learning ability, and that it would enhance its protection ability. We find that the location of employees does not have a significant effect on the learning ability, which suggests that the negative impact on identification and the positive on internalization cancel each other. As hypothesized, the
location of employees inside the focal firms enhances its protection ability. H11 hypothesized that an independent structure could either enhance or hinder learning. We find that the existence of an independent structure does not have a significant effect on the learning ability, which suggests that the positive impact on learning inside the alliance and the negative impact on learning between the alliance and the focal firm cancel each other. H12 hypothesized that financial and non-financial hostages would enhance protection. It is not supported. H13 hypothesized that contractual clauses could enhance both the learning and protection abilities. Our results show that contractual clauses only impact the ability to coordinate and protect simultaneously. It is interesting to note that protective contractual clauses seem to reduce the firm’s learning ability.

We test our resource-transfer Hypotheses with linear regression techniques. Two regressions were conducted: one with the firm’s learning as the dependent variable, and one with the partner’s learning as the dependent variable. The results of the regressions are provided in Appendix 6. Both regression models are significant. Tolerance tests on each independent variable showed no multicollinearity problems. We find that the ability to learn and protect simultaneously as well as the learning ability, extracted from the micro-level components, have a positive and significant effect on the focal firm’s learning, as hypothesized in our Core Hypothesis 1a. Moreover, we find that the protection ability, which is the ability to protect without learning, reduces the focal firm’s learning significantly. This is consistent with the idea that learning will occur only if a company develops an ability to learn (Hamel, Doz and Prahalad, 1989; Cohen and Levinthal, 1990). Among the five characteristics of the transferred resource, two have significant parameters: The perceived difficulty to acquire a resource, because it is embedded or tacit, reduces a firm’s learning, while the complementarity of the targeted resource with resources already possessed by the learning firm increases its learning, which is consistent with the idea drawn from the resource-based view literature that resources can be more or less easy to learn, and with our Core Hypothesis 4a. We do not find support for the hypothesized impact of the protection ability on the partner’s ability to learn, as stated in our Core Hypothesis 2, although the sign is in the hypothesized direction. This result might be due to the fact that the measure used for the partner’s learning is a perception by the focal firm, which is less reliable. However, we find support for our Core Hypothesis 1b, which states that the learning ability of a firm can increase its partner’s learning, although we do not find support for our distinction
between desired and undesired learning. Finally, we find partial support for our Core Hypotheses 3a and 3b, stating that a firm can increase its learning and its protection at the same time: the EFA does extract a factor representing the combination of both the learning and the protection abilities of the firm, but this factor only has a positive impact on the focal firm’s learning.

**Conclusion**

Building on previous research, we propose in this paper that a firm’s capacity to learn in alliances without losing valuable knowledge to its partners is driven by two essential abilities: a learning ability and a protection ability. We argue that many of the factors discussed in the literature so far are components of one or both abilities, and that their impact on the actual resource transfer is indirect. Focusing on these abilities suggests the existence of a series of other factors that have been ignored in the literature to date. Those factors include firm-specific components such as the type of interface a firm has with its alliances, its experience in dealing with alliances, and its learning and protecting intents, and alliance-specific components, such as the characteristics of the alliance, the characteristics of the employees, and the governance structure. We find in our empirical analysis three factors, instead of two, which correspond to the hypothesized protection and learning abilities, and to a third ability, the ability to coordinate and protect simultaneously. We find at least partial support for most of our hypotheses, which suggests that, as we argued, the micro-level components seem to impact the actual resource transfers indirectly through the learning and protection abilities of the firm.

The contributions of this paper are twofold. First, by identifying the Learning Ability, the Protection Ability and the Ability to simultaneously coordinate and protect, as well as their underlying components, this paper helps disentangle the overlapping and somewhat contradictory nature of the firm-level concepts identified to date. It suggests a more comprehensive framework for modeling both learning and the protection of valuable resources in alliances. Second, our results suggest that, because most of the elementary components of the learning and protection abilities are mechanisms which can be deliberately set up by managers, firms can make explicit choices in order to increase the learning potential of alliances and reduce their potential danger.
REFERENCES


