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Abstract

This paper proposes a framework for understanding knowledge-related asymmetries in strategic alliances. Their effect on alliance stability, on the realizations of the goals and purposes of the alliance, and on partners' individual performance is examined. Information asymmetries are thought to have a negative impact on the stability of the alliance. For their part, knowledge asymmetries seem to have a positive impact while learning asymmetries have a negative impact. A mutually reinforcing link is established between the stability of the alliance, the realization of its purpose, and individual partners' performance. Even if further research is needed, it appears as though a key to growth in an alliance is the careful management and generation of learning, knowledge and information asymmetries.

KNOWLEDGE-RELATED ASYMMETRIES IN STRATEGIC ALLIANCES

Introduction

There is only scant literature on asymmetries in strategic alliances. However, we see

interorganizational collaboration in many fields (business, government, military, etc.) that remain affected by this phenomenon. This paper proposes a framework for understanding knowledge-related asymmetries in strategic alliances. Their effect on alliance stability, on the realizations of the goals and purposes of the alliance, and on partners' individual performance is examined

If only for its own survival, an organization often depends on its relationship with others to survive (Gulati, 1995; Singh and Mitchell, 1996). One type of relationship is the strategic alliance. This relationship is one of cooperation (Brandenburger and Nalebuff, 1998, Garraffo, 2002). More specifically, it is both competitive and symbiotic (Pfeffer and Nowak, 1976; Fuschfeld and Haklisch, 1985; Hamel, 1991). This is explained by the inherent tension that exist in alliances: one one hand, they are a collaborative/cooperative effort (Kotabe and Swan, 1995; Garette and Dussauge, 2000) through mutual forbearance (Buckley and Casson, 1988) but on the other hand, they also bear a competitive (Chen, 1996) or conflictual dimension (Buckley and Casson, 1988).

The existence of strategic alliances has been treated from various standpoints in the literature. They exist for a number of reasons (e.g. Pfeffer and Nowak, 1976; Hennart, 1988; Hagedoorn, 1993; Dunning, 1995; Niosi, 1995; Glaister and Buckley, 1996; Inkpen, 1998) that we have summarized here in four main categories: 1) to share risk (e.g. in new product development or in reaching economies of scale and scope faster than if it was done alone); 2) to gain access to resources (e.g. to exchange/transfer technology); 3) to grow (e.g. to facilitate international expansion or to go around antitrust concerns); and 4) to gain a long term strategic advantage (e.g. to learn or to shape competition). There also may be firm-specific ad-hoc reasons, but they would inevitably fall into one or more of the categories above.

So following those arguments, alliances may exist as a means to reduce uncertainty related to demand and to competition (Burgers *et al.*, 1993). In effect, strategic alliances are often understood as a mechanism to pool skill and resources in order for the organizations involved to reach a limited set of common goals (Ravix, 1990; Varadarajan and Cunningham, 1995). These goals are intimately linked to the strategic objectives of these organizations (Day, 1995; Johansson, 1995) and meeting them is related to the stability of the alliance (Gerlach, 1987; Oliver, 1990; Inkpen and Beamish, 1997). However, a downside of alliances is that in some case, they may bear some anticompetitive effect and thus reduce welfare (Chen and Ross, 2000). Nonetheless, the pay-offs from alliances are often very real and important (Moss Kanter, 1994; Day, 1995; Doz and Hamel, 1998).

It is suggested that the propensity of organizations to ally depends on the strength of their links within a network (Gulati, 1995). Levels of risk and trust influence greatly the architecture of the cooperative relationship (Ring and Van de Ven, 1992). That being said, all firms and organization are not symmetrical even if they sometimes share a great degree of similarity. So explaining the success and failure of interorganizational relationships is then very challenging.

Success, failure and asymmetries

Success in alliances is in part attributed to a strong involvement from management (Devlin and Bleakley, 1988) or to fit between partners (Lorange and Roos, 1991; Douma *et al.*, 2000). The question of fit between partners in an alliance is important but should not necessarily be equated to a need for symmetry, fit may well be driven by specific asymmetries among partners. Fit in an alliance is driven by common factors (Douma *et al.*, 2000) such as a shared vision, a compatibility of strategies, a strategic importance of the alliance for both partners, a mutual dependency, a value for partners and customers and an acceptance by the market. Other factors such as openness to change while considering alliance trade-offs have also been put forward (Moss Kanter, 1994).

Failure of an alliance is the failure to collaborate and may come from an effort to exercise a great degree of control or simply from inadequate internal processes (Ohmae, 1990; Doz and Hamel, 1998). From this flows that important differences exist between cooperating partners. Military doctrine related to asymmetric warfare helps us understand the dynamics involved with asymmetries in a competitive activity; in fact “while asymmetry can be in the ends to be attained or in the ways and means of achieving them, attacks are likely to have a strategic impact [...]” (LaCarte, 2001). In our case, attacks may be associated to preemptive aggressive competitive moves toward one’s competitors even if they collaborate. This makes the concept of competitive asymmetry useful for understanding the interactions and competition among firms in a given market environment (Chen, 1996).

In line with the resource-based view of the firm (Barney, 1991; Hamel and Prahalad, 1994) where the scope of resources accessible to firms is a key determinant of their competitive advantage, it follows that “relationships between firms are not symmetrical” (Chen, 1996: 103). It is interesting to note that firms from developed countries engaged in joint ventures do it because of a skill requirement and such joint ventures are more stable than joint ventures in developing countries formed through government suasion (Beamish, 1985), this would suggest *ceteris paribus* that an initial asymmetry between partners is positive. Not all firms are created equal (Doz and Hamel, 1998). In an alliance, they can be deemed asymmetrical but complementary. For example, using the biopharmaceutical industry as evidence, incumbents cooperating with new entrants to exploit complementary assets outperform the ones exploring new technologies (Rothaermel, 2001).

At this point, we need to dig deeper into the notion of asymmetry and the benefits it may generate. In relation with this preoccupation, this paper explores the effect of asymmetries generated through coevolution in strategic alliances.

Examining asymmetries

The Random House College Dictionary defines asymmetry as “[a] quality or state of being asymmetric [i.e.] not identical on both sides of a central line [...]”. While this definition’s usefulness in management science is a little abstract, a relevant analogy comes from inorganic chemistry where a molecule containing four different groups linked to one central silicon atom would be qualified as being asymmetric (see Butler and Harrod, 1989). Such an analogy may be used to generate insights into the study of alliances. Firms with different linkages, different functions and different relative positions in a network may use it as a lever (Madhavan *et al.*, 1998) and not be viewed as symmetrical. Even if they share through an alliance, they however differ in centrality.

Why do asymmetries exist? First of all, they exist because firms do not possess identical resource endowments which makes them able to generate or maintain a sustainable competitive advantage (Barney, 1991; Hamel and Prahalad, 1994). Second, they do not compete in identical manners since they adopt different alliance behaviors and partners (Vanhaverbeke and Noorderhaven, 2001). In the management literature, asymmetries in interorganizational relationships have been presented and studied from many different standpoints, here are a few examples:

Eclectic asymmetries. This refers to the asymmetry between partners related to such variables like asset size, national origin and venturing experience levels (e.g. Harrigan, 1988). More specifically, eclectic asymmetries refer to asymmetries in OLI, i.e. in ownership, location and internalization, advantages (Dunning, 1995).

Strategic Asymmetries. A strategic asymmetry, in the military strategy academic literature, refers to the ability to act, think, and organize differently from an enemy. By taking advantage of its weaknesses, friendly forces gain initiative and freedom of action. However, it is hard to sustain over a long period of time (e.g. Metz, 2001; LaCarte, 2001; Binnendijk and Kugler, 2001). We included this view on asymmetry because business, like war, is a competitive endeavour dedicated to survival (e.g. Hannan and Freeman, 1984 and following population ecologists). They are also relevant because of the competitive relationship witnessed in alliances.

Competitive asymmetries. In line with strategic asymmetries, competitive asymmetries lie in the level of threat firms pose to one another (e.g. Chen, 1996). With regards to collaborative efforts, this type of asymmetry especially touches the appropriation hazard coming with specific assets (e.g. Pfeffer and Nowak, 1976; Williamson, 1983), especially if they are intangible thus non-rival.

Power asymmetries. They refer to the potential to exercise power over an organization or its

resources (e.g. Oliver, 1990). They may be reflected by size or by control of resources or of interorganizational dependencies (e.g. Veugelers and Kesteloot, 1996). Collaborating organizations do not necessarily possess the same power over a given relationship.

Network asymmetries. A network asymmetry is in part associated to the position of partners in link alliances (see Hennart, 1988) or more generally of organizations occupying different positions within a networks. (e.g. Jarillo, 1988).

Partners asymmetries are believed to have an impact on the performance of a collaborative effort (Dussauge and Garette, 1995). Asymmetries between cooperating firms have often been examined in terms of size or other structural and governance factors (Harrigan, 1988; Veugelers and Kesteloot, 1996). Nonetheless, these specific types of asymmetries may be examined through the lens of asymmetric competences exemplified by relative technological strength (Zanfei, 1994). However, this view is incomplete since it does not account for other types of asymmetries embedded in alliances: knowledge-related asymmetries.

The Concept of Knowledge-Related Asymmetry

Knowledge-related asymmetries are asymmetries in intangible specific assets. Using technological strength as an example (Zanfei, 1994), it follows that the protection [of specific assets] from opportunism is a major concern once embarking an alliance (Williamson, 1979; Williamson, 1981). Especially if these specific assets are knowledge-related because they are then non-rival. Therefore, interdependency has to be managed carefully (Pfeffer and Nowak, 1976). Firms often try to “free-ride” their way into an alliance and engage into opportunistic behavior, so their competitors need a “hostage” in order to increase confidence (Williamson, 1983). But cooperating while only focusing on an egoistic payoff consistently leads to suboptimal payoffs (Thaler, 1992) as well as to negative effects on reputation and trust (Arino *et al.*, 2001). We then need to ask, how would one conceptualize knowledge-related asymmetries? We need some insights.

In practice, at the center of a firm’s preoccupation in alliances remains the question of the protection of its core technology (Baranson, 1990) and specific assets (in our case, intangible assets) rendered crucial by a level of appropriability which is difficult to evaluate because of knowledge-related asymmetries with partners. They arise mainly from differences in resource endowments (e.g. Barney, 1991) and absorptive capacity (Cohen and Levinthal, 1990).

There are many types of knowledge-related asymmetries. As we have shown previously, many strains of the literature take a look at specific types of asymmetries that are

most relevant to them. Transaction cost economics is in part very concerned with asymmetries of information and incompleteness of contracts, for example. When examining types of knowledge-related asymmetries, three natural categories stand out: 1) information asymmetries; 2) knowledge asymmetries and 3) learning asymmetries. Each has a role to play in the process of organizational knowledge creation (Nonaka and Takeuchi, 1995; Ancori *et al.*, 2000). They are also useful in the effort to put the notion of organizational learning in perspective (Hedlund, 1994; Levitt and March, 1988; Fiol and Lyles, 1985).

Information Asymmetries

What is information that it is so important for an alliance? Information can be defined as aggregated data (Ancori *et al.*, 2000). The circulation of information is critical for partners engaged in a relationship (Gulati, 1995). But with information exchange comes the problem of disclosure because, for example, once information is shared, it cannot be taken back and may be distributed without one's knowledge. Also, knowing the value of information is just as difficult (Osborn and Hagedoorn, 1997) precisely because of the extent of the necessary limited disclosure it entails. There exists a principle of parity and mutual trust between partners (Baranson, 1990). This in turn helps reduce opportunism in a given network by reducing asymmetries of information (Dunning, 1995).

This leads us to mention that some form of symmetry of information is critical for alliance success (Moss Kanter, 1994), if only for reasons related to building and maintaining a good reputation (Greif, 1989). This allows trust (Fukuyama, 1995) to develop and affects positively the stability of the alliances since there is no perceived "cheating". Taking the opposite view, asymmetries of information have a negative impact on the relationship, therefore on the stability of the alliances, because there may be a feeling one side is taken advantage of.

Proposition 1 (P1): Information asymmetries have a negative effect on the stability of the alliance.

Knowledge Asymmetries

Knowledge resides at the organizational level, but also in the interorganizational domain (Hedlund, 1994). It is at the heart of strategy in many industries and knowledge management is crucial for alliances (Dyer *et al.*, 2001). Even though evaluating the future value of knowledge is very difficult (Osborn and Hagedoorn, 1997), knowledge is also becoming the key for gaining a competitive advantage (Inkpen, 1998). For example, in the pharmaceutical industry, firms are thought to adopt generic strategies around knowledge: their strategic behavior is often characterized as explorer, exploiter, loner or innovator (Bierly and Chakrabarty, 1996). This generic character may be explained as the result of core rigidities that

are built over time (Leonard-Barton, 1995) and as the result of organizational inertia (Hannan and Freeman, 1984; Hannan *et al.*, 2002). For example, knowledge asymmetries in partnerships between firms from developed countries and developing countries, are beneficial to both sides: one gaining access to local knowledge and other locally determined operating practices (laws, regulations, customs, etc.), the other gaining knowledge of the foreign economic and political environment as well as business practices (Beamish, 1987)

Moreover, knowledge has two basic dimensions: on one hand it may be explicit (i.e. codifiable) but on the other hand it does possess a tacit dimension (i.e. it is intrinsically linked to organizational routines) (Polanyi, 1962; Nonaka and Takeuchi, 1995; Ancori *et al.*, 2000). At the start of the alliance, even if the organizations involved are in similar industries and are therefore submitted to strong isomorphic pressure (Powell and DiMaggio, 1983), knowledge asymmetries exist. They exist because of difference in organizational processes, in human resources endowments, etc. Over the course of the alliance, the generation of the respective knowledge of firms varies over time. The process for generating knowledge, i.e. its dynamics, includes four continuous iterative phases: socialization, externalization, combination, internalization (Nonaka and Takeuchi, 1995); all of which are done within a shared context among organizational actors guided by leadership (Nonaka *et al.*, 2000). It follows that management decision making does have an impact on a firm's direction for growth (Buckley, 1993). Collaborative relationships, like joint venture, are a way to exchange knowledge (Kogut, 1988). If knowledge was symmetric, it would not be necessary for firms to exchange it.

Proposition 2 (P2): Knowledge asymmetries have a positive effect on the stability of the alliance.

Learning Asymmetries

Then if we look at learning as the dynamic process of generating and using new knowledge, learning asymmetries become an important part of knowledge-related asymmetries. Organizations do learn (e.g. Levitt and March, 1988; Fiol and Lyles, 1985) and history teaches us they may sustain growth through continuous learning processes (Chandler, 1992). Along the same lines "[...] in order to be more effective competitors, firms must learn and implement cooperative strategies" (Varadarajan and Cunningham, 1995: 295). Also, learning in an alliances is also learning from partner differences (Parkhe, 1991).

However, partners do not have the same ability to learn from an alliance (Hamel, 1991). But the learning that takes place will be differentiated in accordance with the type of alliance in which the partners are involved (Dussauge *et al.*, 2000). For example, in link alliances, the learning taking place will be more asymmetric than in scale alliances where firm capabilities bear more similarities (following Hennart, 1988). We are able to explain this through the determinants of learning which include intent, transparency, and receptivity. But

in order for learning to become sustainable, a firm needs to be able to foster the necessary conditions: the depth of learning that already has taken place and the ability to pursue practices leading to continuous improvement (Hamel, 1991). Let us consider for example an alliance between an organization involved in single loop learning and another one involved in double loop learning (Argyris et Schön, 1978). The learning taking place through the alliance will take different dimensions for each firm and will be internalized differently. But at the same time, and taking this into account, both firms may benefit from the alliance.

This type of knowledge-related asymmetry is especially critical because of the gap in capabilities between cooperating firms. The learning taking place in an alliance, whether related to local market or to technology, is the cornerstone of successful partnerships (Hitt *et al.*, 2000). But a foreign partner's increase in local knowledge affects negatively the stability of the alliance (Inkpen and Beamish, 1997).

As we state above, learning in alliances is crucial to success as partners interacting are constantly adjusting to one another (Doz, 1996). This does suggest the presence of learning asymmetries between partners. Differences in absorptive capacity (Cohen and Levinthal, 1990) are also a cause of learning asymmetries. More specifically, learning asymmetries may rise from firms' practices around around opposites: external vs internal learning, radical vs incremental learning and learning speeds (Bierly and Chakrabarti, 1993).

Asymmetries of information and knowledge (Beamish and Inkpen, 1995) concerning a local market for instance is a key driver of international alliances: concluding the alliance is a useful way of getting access without internalizing all related costs. However, when a firm seeks to acquire another's core, this becomes a factor of instability caused by predatory behavior often dubbed as a Trojan Horse or the "Kiss of death" (Dussauge *et al.*, 2000).

Proposition 3 (P3): Learning asymmetries have a mixed effect on the stability of the alliance.

More specifically:

Proposition 3a (P3a): Learning asymmetries have a positive effect on the stability of the alliance where predatory behavior for the appropriation of the partner's specific assets is non-existent.

Proposition 3b (P3b): Learning asymmetries have a negative effect on the stability of the alliance where predatory behavior for the appropriation of the partner's specific assets is observed or perceived.

Asymmetries and Performance in Alliances

As discussed above, firms differ from the beginning in an alliance: even if they show some degree of similarity, they still bear knowledge-related asymmetries. Moreover, these firms tend to co-evolve over the course of an alliance (Koza and Lewin, 1998). The exchanges and learning taking place are dynamic and vary according to intraorganizational and environmental changes.

Along this line, fit between partners will evolve over time (Douma *et al.*, 2000) as partners mutually adjust or fall into inertia (Doz, 1996). As firms evolve in an alliance, they are subjected to a tension inherent to partnership: on one hand they benefit from collaboration but on the other hand, they are placed in a precarious position by depending on someone else (Singh and Mitchell, 1996). Over the duration of an alliance, different learning opportunities typically result in different outcomes (Dussauge *et al.*, 2000). These outcomes are reflected in the stability of the alliance, through the realization of its purpose and partners' objective (s) , and finally they will reflect on partners' individual performance.

Stability, objectives and performance

The stability of the alliance may come from the institutionalization of modes of interaction. Going around such modes of interaction with moves such as trying to acquire a partners specific assets and knowledge generates instability (Beamish and Inkpen, 1995). At the other end of the spectrum, partners specific needs from an alliance are argued to be a stabilizing factor for the relationship (Harrigan, 1988).

The use of stability as a gauge of partnership success may be imperfect since alliances may last and still fail (Hamel, 1991). Therefore, stability should not be directly equated to the success of an alliance. However, it may be a precursor or an indicator in some form (Beamish, 1985; Beamish, 1987; Beamish and Banks, 1987; Beamish and Inkpen, 1995). Stability may be viewed in terms of duration of the alliance and there seems to be empirical evidence [for marketing alliances] that the age of the relationship is positively and significantly linked to its effectiveness (Bucklin and Sengupta, 1993).

A hybrid organizational arrangement, like an alliance, facing uncertainty will rely on norms and institutions (i.e. sets of rules, values etc.) for stability (Borys and Jemison, 1989). Such norms and institutions could be the goal of the alliance and the processes to attain them. Commitment to the alliance and the willful coordination of activities related to it are paramount to its success, in line with communication and goal setting (Mohr and Spekman, 1994).

Proposition 4 (P4): The stability of the alliance and the realization of partners objectives and alliance purpose have a mutually re-enforcing positive influence on each other.

Moreover, “[...] strategic partnerships are formed to achieve a set of goals. The attainment of such goals can provide one indicator of relationship success” and at the same time, “success is determined, in part, by how well the relationship achieves the performance expectations set by the partners” (Mohr and Spekman, 1994: 136). There even is evidence of a positive correlation between perceived and actual performance in international joint ventures (Geringer and Hebert, 1991). Also, performance in alliances has been empirically linked positively with the number of alliances involving a firm while an eventual link with size and the number of competitors linked to the firm was not supported (Burgers *et al.*, 1993). This is coherent with the literature on interorganizational relationships stating that the propensity to form alliances is greater for firms experienced in that area (Gulati, 1995).

The example of parent-subsidiary relationships tells us that such cooperative relationships are characterized by some variation (Ito and Rose, 1994) and various degrees of integration. With regards to performance, firms focused on exploitation will benefit from

strong ties whereas firms focused on exploration will benefit from weak ties (Rowley *et al.*, 2000). The link between the realization of goals and performance in alliances is further reinforced by the attainment of a sustainable competitive advantage through the alliance (Varadarajan and Cunningham, 1995; Day, 1995).

Proposition 5 (P5): The realization of partners objectives and alliance purpose and partners' individual performances have a mutually re-enforcing positive influence on each other.

On another note, asymmetries are often thought of as imbalances of power (Hagedoorn, 1990), an imbalance which is theoretically corrected by sharing an equal burden in the alliance or by parties having an equal share in ownership. Knowledge, for example, is thought to impact bargaining power (Hamel, 1991). Using evidence from 50/50 alliances, shared control may only give the illusion of symmetry between firm capabilities (see Veugelers and Kestelroot, 1996) and will impact the odds for success and the duration of the alliance. One must be conscious that knowledge-related asymmetries remain. But however interesting this finding is for short term conflict resolution in the alliance initiation phase, this type of ownership structure is hard to manage and may impact alliance duration negatively. *Au contraire*, stable business relationships may be positively reinforced in an alliance as they are, for instance, a crucial element in Japanese Strategic alliances (Gerlach, 1987). The integrity of partners is another way of raising the odds for partnership success (Moss Kanter, 1994) and, by extension, for an acceptable performance. In the mean time, too much stability (i.e. becoming "comfortable" and failing to form or renew partnerships) impacts negatively performance and survival (Singh and Mitchell, 1996).

Proposition 6 (P6): Partners' individual performances and the stability of the alliance have a mutually re-enforcing mixed influence on each other.

A framework

It is now time to put the pieces of the puzzle together in order to have a coherent model of the influence of knowledge-related asymmetries on alliances. This will allow us to envision the interaction among the various elements of the model. In short, we are suggesting a model to link knowledge-related asymmetries and partners' individual performances.

"Insert Figure 1 Here"

First, as we look at the model, we propose that knowledge-related asymmetries (i.e.

information asymmetries, knowledge asymmetries and learning asymmetries) in the alliance each have a different effect on its stability. Asymmetries of information are thought to have a negative effect on the stability (P1) whereas the effect of knowledge asymmetries are positive (P2) and the effects of learning asymmetries are mixed (P3); they would be negative in the presence of predatory behavior (P3a) and positive (P3b) in the absence of such behavior. This is grounded in the fact that asymmetries of information, that may for instance come from an inadequate sharing of information, are considered as paving the way for opportunistic behavior and will prevent optimal cooperation between partners. Information can never become fully symmetric in an alliance since its meaning appears differentiated depending on its intended use, but such asymmetries may be minimized. However knowledge asymmetries caused by differences in partners resource endowments are thought to have a positive effect on stability since partners cooperate to access knowledge they do not have, if they did have it, then cooperation would be a waste of resources. Learning asymmetries are more problematic: on one hand they may be positive for reasons similar to knowledge asymmetries i.e. in accounting for differences in absorptive capacity. But if there is the presence of predatory behavior on the partners' specific assets, then the alliance will suffer from more instability. That being said, there is a necessity to link together the stability of the alliance, its goals and partners' individual performance.

So stability and the realization of partners' objectives and purpose of the alliance seem to have a positive mutually reinforcing link (P4). If an alliance is stable, it may be because its' partners objectives are met and vice versa. The same can be said about the relationship between the realization of partners' objectives and the purpose of the alliance with partners' individual performances (P5). If partners' objectives and the purpose of the alliance are met then a positive effect will be felt on partners' individual performance and vice versa. However, we believe there is a mixed reinforcing link between partners' individual performances and the stability of the alliance (P6). For example, if the partners' individual performance objectives are met, then the alliance is believed to become more stable, but not necessarily.

Conclusion

We have shown there is reasonable evidence in the literature to assert that knowledge-related asymmetries have an effect on alliances. They do not necessarily have a negative effect on an alliance (Koza and Lewin, 2000). Furthermore, we have proposed a model to better understand their impact.

We posit that knowledge-related asymmetries have some effect on the stability of the alliance. One must bear in mind that alliances generally involve some form of "coopetition": greater stability (and longevity) provides the alliance with better odds to fulfill its purpose, to meet a number goals, and ultimately for partners to achieve better individual performance.

Partial and Preliminary managerial implications

Understanding asymmetries is very relevant to better manage, and benefit from, an alliance. We posit that, to a certain level, knowledge-related asymmetries in alliances may constitute a driver for growth. Knowledge-related asymmetries need to be understood to ensure the common purposes of an alliance are met. Partners learning different things in an alliance do not necessarily engage in opportunistic behavior.

It is often assumed in the management literature that asymmetries are a negative factor in alliances. We show it not always the case. Using knowledge-related asymmetries may be a way to protect a firms' specific assets while gaining valuable knowledge from the alliance without engaging in predatory behavior to appropriate a partners' resources or specific assets.

All alliances are asymmetric by nature with regards to knowledge. The situation where alliances may be the most symmetric is the special case where each partner contributes 50% of the effort. But even that raises tough issues: How is a contribution to an alliance truly measured? Resources are a good start, but many other intangibles aspects are very hard, and some even impossible, to measure yet they exist and we need to take advantage of them. Much research still remains to be done.

Implications for future research.

Starting from the model we are hereby suggesting, we believe future research should focus on the operationalization of the various elements of the model. More precisely, variables should be defined in more depth for them to be precisely measured. Once this is done, further qualitative validation of the model needs to be done before undertaking the task of validating the model statistically. Following this step, it would then be necessary to reformulate managerial implications in line with the findings.

It could also be useful to study this phenomenon from different theoretical approaches. For example, using a political view, we could reevaluate the importance of power in an alliance with regards to knowledge-related asymmetries. On another front, using research on networks, it could be useful to measure the extent of the link between network externalities and knowledge-related asymmetries.

We could then better attempt to help practitioners faced with hard choices such as: Alliance or acquisition? Should some types of asymmetries be maximized in the former while erased in the latter through cultural homogeneity? Is there an optimal cultural distance necessary for all parties to maximize gains from alliances (i.e. maximize creativity and innovation, reap the benefits from diversity, etc)? And so on...

Finally, it would also be interesting to integrate more thoroughly the concept of asymmetric advantage (Sullivan and Harper, 1997 : 136). An asymmetric advantage being rooted in critical capabilities or competencies. “[An] asymmetric advantage facilitates taking an indirect approach [...]. By exploiting your unique competencies, you can control the conditions of the campaign and gain and retain the initiative”. Although very hard to operationalize, this definition and its implications remain useful for both the practitioner and the academic interested in the management of alliances. There is a whole world to discover...

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