



Control–cooperation interfaces in global strategic alliances: a situational typology and strategic responses

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Abstract

This article applies the dialectical logic of loose coupling to interpartner exchanges in order to analyze the dynamics of global strategic alliances. We develop a typology of control and cooperation that defines alliance states or situations according to their level of cooperation under private and collective control. In the private control-cooperation interplay, *contending*, *honeymoon*, and *cooperation* situations arise, depending on the levels of private control and cooperation. In the collective control-cooperation interplay, the *loosely connected*, the *equity hostage*, the *tightly integrated*, and the *trusting* states emerge according to the levels of collective control and cooperation. We illustrate how an individual partner strategically responds to the control-cooperation interplay under each situation or state, and develop hypotheses explicating how these strategic responses are influenced by relational characteristics such as goal congruity, resource complementarity, and bargaining asymmetry between foreign and local partners.
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INTRODUCTION

A loosely coupled system is one whose components are responsive yet maintain a separate identity and physical location (Weick, 1976). The loose coupling concept has been applied to inter-organizational relations, coalitions and federations (Orton & Wcick, 1990), but not to global strategic alliances (GSAs),¹ although alliances display the classic characteristics of loosely coupled systems, i.e., they consist of entities that remain legally independent yet interact with each other across a range of variables. Although the various forms of GSA differ in their looseness (e.g., equity joint ventures are tighter than contractual agreements), each GSA is a loosely coupled system in which investing parties share or exchange resources or jointly develop new assets while maintaining their respective identities and control. The interface between these entities across their system properties is characterized by two seemingly contradictory requirements: each must exercise *control* over key system components in defense of its own interests, while both need to *cooperate* so as not to jeopardize interests tied to common shared variables.

The requirements of control and cooperation are fundamental in GSA research. Control is the process by which one party influences the behavior and output of another via power, authority, and influence (Geringer & Hebert, 1989). Cooperation is a Pareto-improvement process that relies on mutual forbearance and commitment in the allocation and exploitation of resources such that at least one of the parties is better off and neither is worse off than would otherwise be the case (Buckley & Casson, 1988). The control-cooperation requirements are especially onerous in global alliances, because geographic, cultural, and institutional differences spread across partners and operational locus (Shenkar & Zeira, 1992). Prior GSA studies covered the importance, structure, and process of control (e.g., Beamish & Banks, 1987; Choi & Beamish, 2004; Geringer & Hebert, 1989; Killing, 1983; Majoen & Tallman, 1997; Van & Gray, 1994), and its rationale, conditions, and cooperation mechanisms (Buckley & Casson, 1988; Doz, 1996; Dyer & Singh, 1998; Gulati, 1995; Luo, 2001). Control and cooperation are often viewed as tensional (Hennart, 1988; Hill, 1990), but recent studies have called attention to their interactive character (Das & Teng, 1998; Dyer & Singh, 1998). Anchored in dialectics (Orton & Weick, 1990), the loose coupling framework can address the interplay between the two seemingly contradictory forces of control and cooperation.

This study seeks to make a number of contributions to the GSA literature. First, we introduce loose coupling as a theoretical lens to explain the dialectic nature of alliance dynamics, and develop a unifying framework that explains the complex interface between control and cooperation. Second, we go beyond the extant acknowledgement of control (or competition)-cooperation dialectics by decomposing control into private control (adversarial with cooperation) and collective control (complementary with cooperation), and developing the two sets of situational typologies viewing control (private and collective) and cooperation as simultaneous and interactive processes embedded in repeated economic exchanges in a cross-national setting. Along the private control-cooperation interface, we position three alliance states: contending, cooperation and honeymoon. Along the collective control-cooperation interface, we identify four typological situations: loosely connected, equity hostage, tightly integrated, and trusting. Third, by outlining an individual party's strategic responses to various alliance states as well as

relational characteristics that serve as binary links in the two sets of interfaces, we are able to develop managerial ramifications of the framework. Understanding the strategic responses to different control-cooperation situations may help identify the path for individual parties to achieve their own and joint gains in international expansion. Similarly, incorporating relational links in the framework may help unveil what alliance members from different countries will choose from multiple strategic responses, and when.

LOOSE COUPLING AND THE CONTROL-COOPERATION INTERFACE

Loose Coupling

In loosely coupled systems, elements are responsive but retain separateness and identity (Orton & Weick, 1990; Weick, 1976). Any organizational location or coalition contains interdependent elements varying in the number and strength of their interdependencies. These elements are linked, and preserve some determinacy, but are also subject to spontaneous change and retain some independence and indeterminacy. The resulting system is simultaneously indeterminate and rational, but also spontaneous and deliberate (Luke, Begun, & Pointer, 1989; Orton & Weick, 1988). Looseness, arising from each party's freedom to adjust its commitments and maintain its identity, permits private control (for unilateral gains) but requires collective control (for common gains). Coupling, stemming from resource interdependence and joint activities, nurtures cooperation but necessitates reciprocal exchange as well as collective control.²

The loose coupling concept has been applied to a variety of settings, including inter-organizational relations such as federations, service networks and coalitions (Orton & Weick, 1990). While it has not yet been applied to GSAs, we believe that loose coupling holds theory development promise by enabling the consolidation of two hitherto separate research streams, one highlighting control, the other cooperation. We offer that the GSA is a loosely coupled system in which coupling facilitates cooperation and produces stability, while looseness allows private control and opportunism. Parkhe (1993: 796) states that "GSAs fundamentally possess the shared feature of ongoing mutual interdependence, a condition in which one party is vulnerable to another whose behavior is not under the control of the first." Wathne and Heide

(2000: 39) point out that lack of contract detail in a GSA enables one party to exploit loopholes passively (by evading informal obligations) or actively (by engaging in behaviors that unilaterally improve this party's private gains). The GSA system is at the same time open and indeterminate, given each partner's freedom to adjust resource and commitments, and deliberate and closed, given contractual and non-contractual governance mechanisms. This translates into simultaneous use of control (private and collective) and cooperation, since deliberate and closed structures are executed via joint control (Provan, 1983), while openness permits "private interest pursuit with guile" (Macneil, 1981), and interdependence in a coupled structure sticks parties to cooperate in the course of long-term exchange (Ouchi, 1980). In international alliances, control-cooperation pressures are amplified by partner differences in national and organizational identity (Salk & Shenkar, 2001), governance and contract interpretation (Shenkar & Yan, 2002), and regulatory and institutional environments (Killing, 1983).

The dialectical nature of loose coupling makes it possible to reconcile and eventually synthesize the seemingly contradictory forces of control and cooperation. From this perspective the two coexist in a GSA, since shared variables are subject to "asymmetric looseness," that is, sharing entities face divergent and evolving pressures to tighten based on their ability to recover their investment. Co-competitive (simultaneous cooperation and competition or control) behavior arises because parties' interest in shared variables will align (Brandenburger & Nalebuff, 1996). Recent alliance studies have reinforced the simultaneous pursuit of competitive and cooperative gains (Dyer & Singh, 1998). Firms adopt behaviors that support cooperation and trust (Das & Teng, 1998) while competing for competencies generated via partnership (Hamel, 1991), which can be diffused to non-shared variables. This syncretic behavior generates positive-sum, efficiency effects of competition and cooperation (Lado, Boyd, & Hanlon, 1997). Cooperation increases and competition declines if the perceived ratio of private to common benefits decreases (Khanna, Gulati, & Nohria, 1998). Firms achieve competitive advantages by controlling and leveraging their ownership-specific assets in bargaining with partners while achieving collaborative advantages by leveraging strategic opportunities (Buckley & Casson, 1988). International expansion creates more opportunities than domestic expansion for

firms to leverage their ownership-specific assets as well as strategic opportunities (Contractor & Lorange, 1988).

In addition to pinpointing the simultaneity of control (private and collective) and cooperation, loose coupling logic also underlies the interplay between the two. First, collective governance is a means to compensate for looseness and for obviating opportunism but cannot entirely do away with opportunism given its limitations in monitoring unexpected long-term contingencies (Lutz, 1982; Ouchi, 1980; Provan & Skinner, 1989). This explains the simultaneous existence of collective control and private control in alliances. Second, sharing resources, information, and values in the face of loose coupling is a critical source of coupling order (de Rond & Bouchikhi, 2004; Orton & Weick, 1988). In a loosely coupled situation, sharing encourages reciprocity and curbs fear of unilateral exploitation (Kaplan, 1982). This implies that private control and cooperation are negatively interrelated as two end points of a continuum. Third, the compensatory voice in the loose coupling framework suggests that collective control in resources and exchange and joint commitment to inter-organizational exchanges are two compensations used to influence loosely coupled organizations (Gamoran & Dreeben, 1986). It is necessary to concurrently use both because each is effective in compensating a different area of structural dispersion (Luke et al., 1989). Loosely coupled systems are differentiated by varying levels of collective control and cooperation, depending on the degree of looseness and resultant problems (Jones, Hesterly, & Borgatti, 1997). This leads us to propose a matrix configuration between collective control (high vs low) and cooperation (high vs low). Also, depending on the position in this matrix, tactics to enhance organizational effectiveness vary (Orton & Weick, 1988).

Finally, the loose coupling view holds that coupling requires persistent system behavior and is achieved either actively, by having more tightly coupled subsystems, or passively, by limiting certain inputs' access to the system or observing certain rules (Glassman, 1973). In the international arena, each organizational subsystem is also embedded in a different cultural and institutional environment that partially governs input access and sets additional system rules. Thus appropriate strategies should be used and aligned with specific interfaces between control and cooperation. Weick (1982) suggests that strategic responses

should vary to respond to required coupling tightness. This view also maintains that boundary conditions of each loose coupling system are determined by shared or relational variables (e.g., goal congruity, resource complementarity, and bargaining symmetry in the GSA setting). These conditions, some of which will systematically vary in a global context (e.g., between a developed country and a developing country partner), can influence the choice of strategic responses based on the different situations of control-cooperation interplays. Provan (1983) suggests that if a loosely coupling system is interorganizational, strategic responses will change to configure with dyadic relationships between the parties. We detail each below.

Private and Collective Control

A distinction between private and collective control is vital because the two coexist in all alliances but have opposing impacts on joint gains. Private control is the process by which a party ensures the GSA is managed in a manner benefiting its private variables, which may accrue at the expense of the other party's interests or joint gains. Collective control, by contrast, is purposefully and collectively designed by both parties to guide, monitor and oversee a GSA's operations in pursuit of maximum joint payoffs. Both private and collective control are present in a GSA, though their vim varies since collective control cannot totally dispel private control in a loosely coupled system (Provan & Skinner, 1989), nor can private control sustain dominance when both parties rely on each other for resources (Ouchi, 1980) or when a firm's own reputation is on the line (Gulati, 1998). For an individual partner, seeking private control is a viable short-term strategy but can also have detrimental effects on long-term alliance formation opportunities.³ Many GSAs' long-term performance is unstable because cultural, organizational and institutional differences between partners propel their private control pursuit in a dynamic environment (Van & Zeng, 1999).

Private control and collective control differ in underlying intent and mechanisms. Private control is unilateral, aimed at individual gains via controlling (also covertly) key shared areas. Collective control is bilateral, aimed at collective gains via overtly controlling shared variables, especially those crucial to common strategic goals. Private control resides in specific areas using specific measures. Some are covert because they harm the

other party's interests and/or the GSA's joint gains. Examples are:

- (1) controlling and manipulating pricing (e.g., a foreign party overpricing GSA's material procurement from this party's parent);
- (2) self-interest lobbying (e.g., a foreign party promises a local party's officer a future job in the foreign party's headquarters); and
- (3) influencing board decisions (e.g., entertaining other party's delegates).

Some private control measures are permissible under the GSA contract: for example,

- (1) knowledge protection for its own party (e.g., walling-off clause);
- (2) service provision in the most sensitive areas (e.g., financing, information system, export channel); and
- (3) functional control in key activities (e.g., human resources, R&D, accounting).

When such "rights" are controlled tactically, private control will escalate.⁴

Since it is unrealistic to assume a total-trusting relationship in a GSA (Das & Teng, 1998), and collective control is often designed to mitigate uncertainty and cope with various contingencies (Hill & Hellriegel, 1994), collective control is generally the second best option, complementary to cooperation, in helping to generate joint gains. Collective control is overt, since measures are prescribed by both parties and enforced transparently. It can be overall and/or specific, proceeding via jointly stipulated contractual clauses and jointly formalized policies, rules and norms (e.g., job descriptions for senior GSA posts).⁵ Governance that is based on contractual control is both complementary and supplementary to governance based on structural control. It is complementary, since some policies (e.g., budget control) are codified in the GSA contract and detailed in formal policies. It is supplementary, since contracts specify key measures not covered in formal policies but vital to the scope and degree of shared control. Measures of collective control during GSA formation are normally written into the contract, while control measures for subsequent operations are contained in policies challenged by the intermittent, evolving and eventual nature of the impact of shared variables on non-shared variables. Collective control is sufficient to cope with GSA's operations, and is also manifested in contractual terms and other stipulations for handling contingencies.

Mayer and Argyres (2004) suggest that the "learning to contract" effect exists in alliances, and such collective control used to govern collaborations increases incrementally as alliances evolve. To surmount challenges caused by cross-national and cross-organizational differences and new environmental conditions, collective control becomes more essential in an international setting than in a domestic setting.

A TYPOLOGY OF THE CONTROL-COOPERATION INTERFACE

In this section we build a typology positioning GSAs in the control-cooperation interplay, and outline corresponding responses. We treat the typology as a complex theoretical statement that specifies a logical set of relationships among constructs and variables, "intended to predict the variance in a specified dependent variable because the organizational types identified in typologies are developed with respect to a specified organizational outcome" (Doty & Click, 1994: 232). Looseness pressures and/or desired coupling requirements (Orton & Weick, 1988; Provan & Skinner, 1989) serve to determine the "first order" constructs of private control-cooperation and collective control-cooperation, which become the basis for designating alliance settings. Each situation, in turn, has its own repertoire of *ex post* strategic responses available for each party to choose. These responses are not proposed as alliance actions or joint responses by all parties because individual parties may or may not choose the same response in the given state of private control-cooperation and collective control-cooperation interfaces. To the extent that the responses assigned to each typological state are the choices each party can emphasize during a

certain period of time after forming an alliance, rather than the generic options to be considered by all alliances at different evolution stages, they are unique to the corresponding control-cooperation state. Here, we emphasize what strategic responses are available for individual parties to elect, and under what conditions a particular response will be advisable.

Private Control-Cooperation Typology

Private control and cooperation are two dichotomous end points in the continuum of private benefits, with high private gains and high probability of opportunism associated with private control and low private gains and high commitment associated with cooperation.⁶ Private control seeks self-interest and involves a risk of appropriation of shared variables - that is, of opportunism and its associated relational risks and lower confidence in partner cooperation (Majoen & Tallman, 1997). Private control and cooperation are adversarial, since the threat of private control triggers screening and monitoring, increasing transaction costs (Hennart, 1988). Perceived potential for high relational risks arising from private control poses the greatest threat to cooperation and contributes to GSA dissolution (Kogut, 1989). While adversarial, however, low private control does not always generate full cooperation or vice versa. Thus the polar position of private control and cooperation along the continuum of private benefits produces three situations (see Figure 1):

- (1) the contending or bargaining situation, at the apex of private control;
- (2) the honeymoon situation, at the apex of cooperation; and

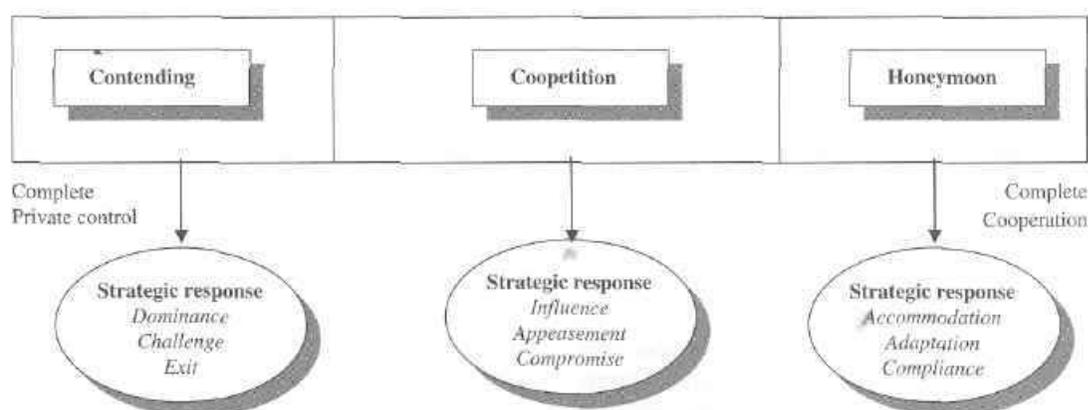


Figure 1 The private control-cooperation typology.

(3) the competition situation, operated at a midpoint.

We suggest that each situation has a different set of strategic responses.⁷ Although it is beyond the scope of this article to assess the antecedents and consequences of these responses, we suggest in the next section that when relational links such as resource complementarity, goal compatibility and bargaining symmetry are heightened, the probability for each party to use certain responses increases.

Contending state. A contending state is one in which partners vie for power, authority, and resources through high private control, maintaining high levels of relational risk and opportunism and low levels of mutual commitment and cooperation. A bargaining situation is characterized by what Williamson (1985) calls "strong form" of opportunism (e.g., misleading or misguiding a partner, falsifying information, shirking obligations, unilaterally using power, refusing to adapt, appropriating key resources and profit). In the Fischer-GM alliance (contractual agreement), Fischer served as an exclusive auto-part supplier for GM, later taking advantage of the cost-plus provision in the agreement for its private gains through unilaterally modifying internal manufacturing processes and providing false expense reports (Wathne & Heide, 2000). Such strong opportunism is even more likely in an international context, where partners often mistrust each other or collude with institutional players, as in the collapse of Ramada Guilin (Shenkar & Yan, 2002).

A contending situation is characterized by a combative, competitive atmosphere and opportunistic behaviors. A contending situation is likely: (1) in early-phase GSAs with low mutual familiarity and trust, conflicting goals (including a race for learning), weak resource interdependence, and/or mutual suspicion regarding capability and commitments; and (2) in established GSAs with incongruent intents and objectives, failure to honor contractual commitments, appropriation of other's proprietary knowledge, declining resource sharing and complementary, and/or nascent competition with at least one partner. Evidence shows that cooperation decreases or opportunism increases when partner familiarity (Gulati, 1995) and resource dependence (Hill & Hellriegel, 1994) are low, goal incongruence (Yan & Gray, 1994) and appropriation hazard (Oxley, 1997) are high, or

under rivalry (Khanna et al., 1998). In a contending situation, legitimate and economic reasons may overtake a party's concern for its reputation or its fear of losing continuing networking opportunities with the current partner.

A party's strategic response in a contending situation may include *dominance*, *challenge*, or *exit*, depending on the party's assertiveness, unilateral commitment, and strategic need to continue the partnership. Specific efforts are exerted to gain control over GSA decisions and contest plans or decisions made by the other party and/or GSA management (in equity joint ventures). Dominance is achieved via equity and/or managerial (overt) controls and by dominating key GSA positions in order to appropriate alliance or partner benefits. Challenge is articulated in renegotiation demands by suspending resource commitment until the other party caves in. Exit is a viable response in a bargaining situation when a party expects dominance and challenge costs to exceed the marginal returns from continued partnership. With diminished strategic needs for continuing the partnership, the marginal gains will descend, further lowering commitment and enhancing the exit option (Hennart, Roehl, & Zietlow, 1999). Of the three strategic responses, assertiveness decreases along dominance, challenge, and exit. The party needs not only to link its selected response to its strategic needs but also to gauge its bargaining and control capacity *vis-à-vis* the other party (Pruitt, 1981). Given need and capability asymmetries, parties may not exert the same level of contentious bargaining nor employ the same strategic response from the above three strategic responses. As Gulati, Khanna, and Nohria (1994) point out, unilateral commitments and confidence-building actions vary across partners, even under threat.

Honeymoon state. A honeymoon state is one in which both parties maintain very high cooperation and very low competition, with little effort exerted towards private control. This is a situation whereby a GSA has a long and tested history of trusting relationships between partners, non-trivial resource dependence and mutual dedication to synergetic gains and common goals (Fichman & Levinthal, 1991). As an example, the equity joint venture between Xerox and Shanghai Movie and Photo Industries Co. has been the dominant leader in China's copier market ever since it was formed in 1987. Its success has to do in large part with the long and trusting relationship between the two

partners (e.g., each party weighs decisions or issues from the partner perspective first) and joint commitments to new products (especially engineering copiers, photoreceptors, and toners) and nationwide distribution, sales, and service networks.

When conflicts or rivalries arise, the honeymoon situation may be transformed into a coopetitor situation. The length of the honeymoon period depends on the levels of

- (1) resource interdependence and mutual sharing;
- (2) cross-cultural justice in procedures, outcome-sharing, and interactions as perceived by both parties;
- (3) sustainability of mutual forbearance; and
- (4) trust.

Provan and Skinner (1989) demonstrate that the length of strong cooperation is positively associated with the length of resource interdependence between dealers and suppliers. Johnson (1997) found that the degree of cooperation and commitment is an increasing function of perceived justice in strategic decision-making involving international joint venture management and operations. Buckley and Casson (1988) suggest that reciprocal forbearance is the essence of cooperation, and limited mutual forbearance can be converted to considerable trust and cooperation in international business. Zaheer, McEvily, and Perrone (1998) present evidence that interorganizational trust determines the longevity of cooperation and the stability of performance. In the international arena, the timing of a shift from the honeymoon to the competitor state is associated with the development curve as well as idiosyncratic characteristics of the country in which a local partner is embedded. For instance, such a shift in the relationship between Kodak and its Chinese partner Lucky Film is related to China's technological progress but also to its disregard for intellectual property rights, which helped the Chinese firm in undercutting Kodak's price for photographic paper.

In the honeymoon state, a party's strategic response may include *accommodation*, *adaptation* and *compliance*. Accommodation is showing responsiveness and contribution to the strategic needs or concerns of the GSA and the other party. It signals commitment to synergy by accommodation and, if illustrated by all parties, is likely to sustain the honeymoon state. Adaptation is displaying efforts to accept, mimic, and apply the other party's culture, behaviors, values, or standards. Adaptation

can significantly reduce the adverse effect of institutional and cultural differences between cross-national partners (Das & Teng, 1998; Shenkar & Yan, 2002). Compliance is observance of jointly stipulated rules and policies. It reduces the GSA's vulnerability to negative conduct and hazardous threats under uncertainty, which prolongs cooperation (Oliver, 1991). Through compliance, GSA partners can anticipate benefits ranging from increased organizational stability to decreased administrative costs. Of the three responses, commitment to sustaining the honeymoon-like cooperation rises with compliance, adaptation, and accommodation. To an individual party, its choice of the three responses depends on the level of its ongoing commitment, which involves both economic (e.g., cost-benefit) and social (e.g., joint values decline under low reciprocity) considerations, as well as depending on the national context. For instance, in Vietnam, Russia and China a compliance state is more vulnerable because a reliable adjudicating authority is lacking, increasing hazards for a foreign partner.

Coopetiting state. A *coopetitor* situation is one in which alliance parties both cooperate and compete with each other, simultaneously maintaining high cooperation and high private control. Contrary to the honeymoon state, the objectives of parties under coopetition do not necessarily converge, and unlike the contending state, coopetition means tight relation, mutuality and reciprocity. Cooperation and interdependence are balanced against competitive elements, as each partner seeks to reconcile the GSA's activities with its own. For example, Fiat of Italy and Peugeot of France contributed equally in R&D, engineering, and investment to their van venture SEVEL, cooperating in management, production, and marketing. Yet Fiat preferred external outsourcing of components while Peugeot wanted to use more of its own parts. The firms also had to compete against each other for market share since both bought the vans from the venture and distributed them independently through their own networks (de la Torre, Doz, & Devinney, 2000: 270-280). A coopetitor state is typical in GSAs spanning developed and developing countries, since partners tend to be unequal in terms of competencies, providing a strong incentive for the advanced partner to seek private control (Beamish & Banks, 1987).

Goal incongruence in a cooperator state may threaten GSA cohesion, compounding integration difficulties and facilitating private control for unilateral gains (Hill & Hellriegel, 1994; Larson, 1992). The need for unilateral control, however, coexists and co-evolves with cooperation and commitment within the same temporal framework. Strategic interdependence and anticipated synergies from resource-sharing support mutual commitment for collective interests. If both parties protect themselves from knowledge spillover, neither will be able to learn from the other (Inkpen & Beamish, 1997). In the cooperating state, a party's strategic response may include *influence*, *appeasement*, or *compromise*. Influence is the shaping of the GSA's strategic direction and policies with which both parties must comply. It can be achieved through active measures such as lobbying GSA management and the other party's representatives, offering services on which the GSA depends, and persuading external stakeholders (including home and host governments) to influence GSA decisions. The latter is likely, for instance, where cross-border cooperation has a political dimension - for example, when it bears on the relations between two nations (for instance, the California-based joint venture between General Motors and Toyota that has been established in the midst of trade tension between the United States and Japan). Appeasement is the promise of commitment to joint activities so as to disarm concerns of the GSA or of the other partner, which is useful when parties see value in continuing collaboration. Compromise balances conflicting interests by partly renouncing one's own. It is an attempt to achieve parity in anticipation of future payoff, and is likely to work when the provision of key resources is dependent on continued cooperation (for instance, in the energy field during times of global shortage). A party's response choice depends on its reliance on the ongoing partnership, the expected response from the other party, and its own bargaining position.

Collective Control-Cooperation Typology

Collective control and cooperation are the two axes in the matrix of interdependent collaboration. Both collective control and cooperation are designed to stimulate joint gains from interpartner exchanges. Neither contradictory nor dichotomous or substitutive, they are complementary, mutually reinforcing GSA success and redressing each other's limits in a repeated exchange. This concordance is

especially vital in a loosely coupled system where elements are interdependent (Orton & Weick, 1990), and in line with the sociological view that inter-party exchange is an evolving process requiring reciprocal dependence and strategic flexibility under uncertainty (Uzzi, 1997). Collective control provides a governing framework for cooperation, while cooperation redresses collective control's limitation in GSA evolution and adaptation. The interplay of high collective control and high cooperation creates common benefits or collective gains, and such common benefits increase along the diagonal axis in Figure 2.

Without cooperation, collective control measures (overall or specific) cannot effectively govern GSA growth, since it is impossible to predict every contingency, and when contingencies occur, collective control alone cannot sustain the relation. Codification helps prolong the exchange but does not guarantee continuance or a mutually acceptable resolution, especially where partners differ nationally (Parkhe, 1991). Cooperation becomes a necessary complement that overcomes collective control's constraints in adaptation and permits continuity and flexibility. Below, we develop a situational typology representing varying configurations of these two axes, including (see Figure 2):

- (1) loosely connected situation;
- (2) equity hostage situation;
- (3) tightly integrated situation; and
- (4) trusting situation.

In a tightly integrated situation, GSAs are likely to work toward more complex tasks specified by alliance partners than in the loosely connected situation, with trusting and equity hostage situations in the middle. The responses outlined below are generic and do not preclude the leeway firms have in making strategic choices that are unrelated to the state of partnership.

Loosely connected state. The loosely connected state is one in which a GSA is characterized by very low partner interdependence, low cooperation, and low collective control (many non-equity-based or contractual alliances fall in this quadrant). International airline alliances are an example (e.g., Star, Oneworld and Skyteam). These alliances are loosely structured, have limited interdependencies, and cooperate in a specific area, typically flight code-sharing and/or in their frequent flyer programs. Although they may benefit from passenger "feeding" by alliance members, they are not

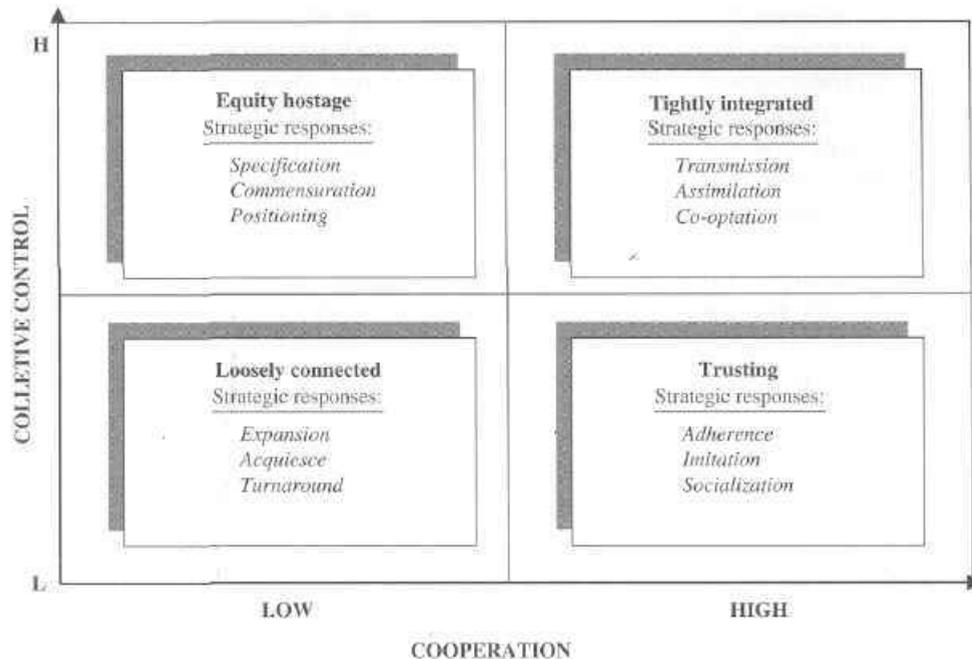


Figure 2 The collective control-cooperation typology.

vertically integrated in the full sense of the term. In this situation, stickiness in resource sharing and exchange is very low, given low vertical integration and low operational interdependence (Contractor & Lorange, 1988). Loosely connected partners collaborate in a predefined area based on contractual arrangements, with partners maintaining high respective authorities. Lado et al. (1997) note that inter-firm connectedness is a function of how integrated the value chain is across partner activities and resources, and competition-cooperation dynamics reflect this connectedness. In the loosely connected situation, GSAs are characterized by low attachment and low coupling. Codification and joint activities' monitoring are less crucial when structural attachment and coupling decline (Jones et al., 1997; Orton & Weick, 1990; Provan & Skinner, 1989). Thus low stickiness reduces cooperation while looseness decreases collective control. Nevertheless, owing to the low complexity of the tasks that partners share, there may exist a good opportunity to develop inter-organizational routines (Reuer, Zollo, & Singh, 2002), which may explain in part why such loosely connected, often cluster- or group-based alliances emerge in industries where international players compete for the market leadership in industrial standards (Gomes-Casseres, 1996).

A party in a loosely connected state may consider *expansion*, *acquiescence*, or *turnaround* as its strategic response, depending on its strategic reliance on the GSA and its strategic interest in the partnership. Although they look generic, seemingly applicable to all alliances along their life cycle, these three terms here refer specifically to the strategic choices that a party in a loosely connected situation can elect at a given period of time rather than to the different phases through which an alliance evolves over time. In a loosely connected situation in which interdependence and collective control are very low, each party must decide whether the alliance should stay, expand or turn around. When this party sees potential in deeper collaboration with the other party, expansion may occur, extending connectedness, interdependence and depth of collaboration (e.g., a technical standard-setting transformed into an R&D consortium). Along such expansion, collective control and cooperation will rise with the sophistication of the exchange. This is in line with the evolutionary notion that GSAs develop with partner familiarity, exchange extensiveness, interdependence intensity, and learning to contract (Doz, 1996; Mayer & Argyres, 2004; Ring & Van de Ven, 1994). If a party is satisfied with the existing level of collaboration and does not wish further expansion, it may opt for acquiescence. Acquiescence is the continuance of the

collaboration at the current level under existing governance; a partner seeks benefits such as efficiency arising from the established exchange structure. If a party is dissatisfied with a loosely connected state, it may consider turnaround. Turnaround terminates the partnership, seeking a new partner for a similar scope. Since the GSA is only loosely connected without involving high collective control, termination cost is deemed low. This cost has been found to be a positive function of interpartner interdependence and exchange sophistication (Hennart et al., 1999). Moreover, new partner search costs for unsophisticated transactions and the costs for follow-up contracting for the similar business are likely to be low (Williamson, 1979). An example is the replacement of General Motors by Toyota as a partner in Fuji Heavy Industries (Subaru manufacturers), which was further facilitated by the switch from an international to a domestic alliance.

Equity hostage state. The equity hostage situation is one in which alliance partners maintain low cooperation but high collective control. It is named as such since high collective control in a low-cooperation atmosphere often takes place in an equity joint venture where parties' interests are so firmly tied together that exit or turnaround is very costly. Examples of equity hostage situations are real estate projects that, once begun, turn partner investments into sunk and unrecoverable cost. Although an equity hostage alliance is typically equity based, it is possible to have a contractual agreement where moral hazard is mitigated (albeit not prevented) not by contract but by the capability of a "tit for tat" response. A case in point is the alliance between Nike and Footlocker for the sale of Nike shoes in Footlocker stores. This long-term alliance, which represented a significant amount of the overall business of both players, began to unravel when Footlocker reduced its purchases from Nike to protest at constraints on models and prices, and Nike retaliated by reducing shipments on a much greater scale than Footlocker desired (*Wall Street Journal*, 2003). The mutual hostage defense can also be undermined in certain institutional contexts. A case in point is a China-based cooperative venture that unfolded when foreign irrecoverable investment in a hotel building became vulnerable to a conflict with a partner, China Youth Travel Service, which was undisturbed by the business consequences (Shenkar & Yan, 2002).

Williamson (1979) saw equity hostage as a special case in a repeated relational contract that involves enormous sunk and exit costs due to opportunism fears, resulting in high collective control. High collective control serves as the leading mechanism to ensure risk commensuration and deter opportunism. Contractual specification provides a legally binding institutional framework under which each party's rights, duties and responsibilities are codified and the goals and strategies underlying the equity GSA are specified. It mitigates moral hazards, reduces uncertainty, and safeguards against *ex post* performance problems by restraining a party's ability to pursue private goals at the expense of common benefits (Geringer & Hebert, 1989; Poppo & Zenger, 2002; Williamson, 1979). Structural specifications regulate joint GSA activities and decision-making. In an equity hostage situation, alliance partners have low cooperation, with low trust resulting from low familiarity, lack of prior collaboration or poor reputation. This situation, exacerbated in an international context by cultural differences and mutual suspicion, essentially wrings out socially embedded cooperation, narrowing it to economic motives.

A party's strategic response in an equity hostage situation may include *specification, commensuration or positioning*. Specification is the rigorous codification of the GSA's contingencies in contractual and governance frameworks. It controls opportunism and stipulates joint management. Studies have confirmed that specification reduces role conflict between GSA boundary spanners (Shenkar & Zeira, 1992), obviates ambiguity (Geringer & Hebert, 1989), and smooths information flow (Hill, 1990); however, it is more difficult to achieve in a weak contractual environment (Luo, 2002; Shenkar & Yan, 2002). Commensuration is the balancing of risk and interests so that no party gains or suffers more than the others. If it fails, the GSA is likely to destabilize. To achieve commensuration, partners contractually align stakes and exit costs. Additionally, positioning confers a collective control advantage. The party with stronger bargaining power may be able to influence the collective control process or policies (Yan & Gray, 1994). For the party viewing an equity hostage as vital to its overall strategy, positioning can help ensure that the GSA evolves in its planned direction and that joint payoffs align with its own interests. An individual party's choice of these responses is determined by its power to influence joint decisions and the expected costs associated with these responses as well as by the

legal environments in which the focal firm, the partner and the activity are situated.

Tightly integrated state. A tightly integrated situation is one in which alliance partners maintain high interdependence, resulting in high collective control and high cooperation (many equity joint ventures fall into this quadrant). In the case of the Ford-Mazda alliance, the two companies share substantial technological and knowledge resources and have been sharing vehicle platforms in an effort to capture synergies. The alliance's roots were in the early 1970s, and cooperation has become embedded to the point of reflecting knowledge assets rather than equity stake and formal control (e.g., the superior technology will be used regardless of which partner is the knowledge holder). Parties pursue joint gains from joint operations that tightly integrate pooled resources. Integration occurs in the form of resource and/or function sharing, and yields operational synergies and knowledge gains for both (Dyer, 1997; Hamel, 1991). Under tight integration, GSAs tend to be long-term oriented because of requisite high cooperation, the need to build confidence over time, and the time required to blend resources and cultures, implying an even longer time range in an international context. Partners need more certainty about cooperation in order to commit themselves to a tightly integrated GSA (Das & Teng, 1998; Hennart, 1988), and are willing to enter only if they are confident in partner cooperation. When integration involves each party's ownership-specific assets high cooperation is needed, owing to asset non-recoverability (Majoen & Tallman, 1997; Parkhe, 1993; Williamson, 1985). Such cooperation in the long run will be incrementally embedded in social exchange, subject to the influence of social norms and principles (Granovetter, 1985), which in turn facilitates interpartner attachment and cooperation (Zaheer et al., 1998). This creates the need for high collective control to streamline integration and avoid appropriation of common assets. Without it, the GSA lacks mechanisms to ensure productive blending of pooled resources (Hill & Hellriegel, 1994).

Exchange parties in a tightly integrated situation may choose *transmission*, *co-optation*, or *assimilation* to respond to high cooperation and high collective control. Transmission is the institutionalization of a party's expertise into the GSA's base through routinized learning, reward systems and formal

standards. As an important part of organizational learning, transmission encodes inferences from history or other firms into routines that guide behavior (Levitt & March, 1988: 320). Contract permitting, it transforms information into knowledge and partisan knowledge into GSA's knowledge. High integration increases gains for both parties and provides a context for reciprocal learning and knowledge contribution, while high collective control triggers institutionalization, routinization and capitalization of expertise from individual parties. Co-optation neutralizes conflict, enhancing common understanding and reciprocal forbearance. Co-optation and cooperation reinforce each other since mutual understanding and reciprocal forbearance are common roots for both (DiMaggio & Powell, 1983). Collective control and co-optation are also complementary in that the former offers frequent contacts through which the latter is achieved, while the latter buffers the former from tension. Finally, assimilation is the absorption and acquisition of complementary knowledge from another party through collective learning and sharing. If this occurs under turbulence, integration can transform into an exit barrier; if a party or parties are well prepared by bilateral assimilation, such hazard will be avoided. Further, as Dyer and Singh (1998) point out, a firm with greater assimilative and integrative capacity contributes more to a partnership and learns more from cooperation. A firm may use one or more of the above tactics, depending on its strategic intent regarding cooperating, its capability of employing these tactics, and its outlook of ongoing gains. At the international level, the choice of tactics will also depend on cultural imperatives such as conflict avoidance (common in many Asian cultures), among other variables. For instance, the routinization of knowledge flow from an industrialized country firm to a developing country partner will sustain cooperation as long as this national context does not materially change.

Trusting state. In the trusting state, alliance partners are bound together by a long history of collaboration and a highly interdependent relationship, resulting in high cooperation but low collective control. In the case of Fuji-Xerox, a four-decade-old joint venture, the Japanese partner has been largely passive, but trusted Xerox as well as the venture's management to defend collective interests and its own private interests. This venture survived dramatic changes in the

business environment and internal restructuring, including an eventual change in ownership distribution resulting from Xerox's financial distress. Under the trusting state, cooperation has a high proportion of social exchange elements precipitated over a long period. Economic exchanges become gradually embedded in social context, constrained by social standards and norms such as restricted reciprocity (Blau, 1964). Trust emerges from social exchanges over time and translates into relational capital if "the relationship provides players with scarce and vital resources. In the presence of relational capital, partners are mutually attracted. They know the capital will disappear if they discontinue cooperation or reciprocity since it is attached to the specific relationship, and is non-transferable if the relationship ends (Emerson, 1976). High cooperation continues as long as parties are economically and socially interdependent. As social exchange norms play an important part in governing exchange, the role of collective control declines. Social norms become an invisible but powerful force, with lower transaction costs than formal control (Birnberg, 1998). Under the reciprocity norm, a party will reciprocate owing to its basic need to maintain this and future exchanges, which would otherwise not take place if this party gained a reputation for failing to reciprocate (Granovetter, 1985).

Exchange parties in a trusting state may consider *adherence*, *imitation*, or *socialization* in responding to high cooperation/low collective control. Adherence is the internalization of social values, norms and behaviors that are pervasive in the course of cooperation. Observing social exchange requirements is a prerequisite for exchange participants to augment their trustworthiness and legitimacy in the long-term (Das & Teng, 1998). In a cross-cultural setting, studies have shown that adherence increases GSA performance (Liebeskind, Oliver, Zucker, & Brewer, 1996; Luo, 2001; Shenkar & Yan, 2002; Zaheer et al., 1998). Violations of social exchange norms will be penalized by social sanctions or other acts that will harm the corporate image (Westphal & Zajac, 1997). Imitation, consistent with the concept of mimetic isomorphism, is the mimicking of values and behaviors of the other party or of another high-legitimacy organization. Through imitation, inter-firm cultural distance is bridged. Oliver (1991) suggests that imitation is a more active and committed tactic than acceptance or adherence in responding to institutional pressures. Imitation reinforces trust as

it cherishes the integrity and unity of firms with different backgrounds. Lastly, socialization unites managers from different parties, enhancing identification with and commitment to the GSA (Fichman & Levinthal, 1991). It reduces boundary-spanning barriers for top alliance managers, which reduces ambiguity (Shenkar & Zeira, 1992). Socialization accommodates high cooperation through interpersonal attachment between boundary spanners (Luo, 2001; Seabright, Levinthal, & Fichman, 1992), and accommodates low collective control through elevated interorganizational attachment, familiarity, and trust (Gulati, 1995; Zaheer et al., 1998), all of which are especially important internationally. A party may emphasize one or more of the tactics depending on the other party's response, its commitment to GSA evolution, and prevailing social norms. Responses will also vary with home culture and the perceived differences from or relationship to the host culture: for instance, where a foreign culture is deemed attractive, imitation is more likely to be chosen by a local player.

As shown in Figures 1 and 2, we separate the two sets (private control-cooperation and collective control-cooperation) because they differ substantially in the nature of interplays (adversary vs complementary) and the required strategic responses to such interplays. Nonetheless, the two sets are related in two ways: (1) they simultaneously occur in each alliance; and (2) both private and collective controls arise under uncertainty, conflict or opportunism. The two controls, associated with exploitation and exploration objectives respectively, are undertaken to align with a party's strategic intent and environmental conditions. Thus the two interplays move together to respond to the perceived uncertainty (internal and external). Although this study did not address the relationship between the two interplays owing to space constraints, future research may use a subgroup approach to diagnose the three-dimensional matrix (private control, collective control and cooperation). For instance, one might examine how the collective control-cooperation interface changes in the high private control group compared with the low private control group.

Finally, our framework is based on the assumption that the strategic responses we propose are set to optimize the dynamics of the quadrant (in Figures 1 and 2) alliance parties are in, without considering the possibility that they may reshape the quadrant they are in and switch to another quadrant. In other words, the above interfaces may

not always be stable. Alliance research suggests that the stability of the control-cooperation dynamic is influenced by unexpected changes in parties' strategies and bargaining power (Parkhe, 1991), the GSA's strategic importance to partners (Yan & Gray, 1994), and regulatory or industry conditions (Contractor & Lorange, 1988), which can also vary internationally. Below-par performance also triggers instability of control and cooperation, and an unsatisfied party may restructure private control and escalate intervention (Arino & de la Torre, 1998; Beamish & Banks, 1987; Killing, 1983; Luo, Shenkar, & Nyaw, 2001; Yan & Zeng, 1999). A partner's relative progression in a "race to learn" (Hamel, 1991) creates pressure for altering collective control and cooperation (Inkpen & Beamish, 1997). Interpartner jockeying for private control and power may follow from the fast learner raising its "price" for ongoing collaboration (Doz, 1996). Likewise, while not formally denoted here, change in the business environments of the partners and the activity that is subject to cooperation as well as changes in global "ground rules" (e.g., change in a tariff regime that will alter the value of certain resources and contributions) will also have an impact on the choice and activation of strategic responses.

RELATIONAL LINKS AND SITUATIONAL TYPOLOGY

The space of a loosely coupled system is one of continuously shifting elements that influence and react to each other (Orton & Weick, 1990). Loosely coupled systems vary in tightness (coupling) based on the activity of shared variables: the looser the system (the lesser the sharing of variables), the more likely it is to maintain separateness while ignoring perturbations in other parts of the system (Glassman, 1973). Loosely coupled systems also vary in the boundary conditions separating each system from the outside world as well as in the internal boundaries governing subsystems. For instance, Kaplan (1982) refers to an under-bounded system as having highly permeable outer boundaries and underdeveloped relations between system members. These variations influence the manner in which loose coupling enables behavior persistence in the face of instability pressures and hence the strategy used by the system to maintain stability. There are two "grand strategies" utilized to uphold system stability under loose coupling. The first strategy (termed active or self-adjusting) is to have a tightly coupled sub-

system that is buffered from, and compensates for, a given input category via negative feedback; the second is a passive strategy limiting the access of certain variables into the system (Glassman, 1973).

In GSAs, like other loosely coupled systems, the choice of a grand strategy of adaptation is based on the nature of coupling across shared variables, which determines the option of tightening a particular subsystem. Coupling in a CSA system is determined by three key "binary" variables that are dyadically relational in nature. First, resource complementarity, which is binding the parties' resources together, defines "system gravity" and determines the scope, interface and interdependence in resources. Second, the boundary conditions in GSAs are influenced by goal congruence, which may limit permeability of outside inputs to those which are in line with the interests of all parties. Alliance research agrees that the congruity of parent goals affects the extent to which they behave cooperatively during GSA operations (Beamish & Banks, 1987; Hill, 1990; Inkpen & Beamish, 1997; Parkhe, 1993; Zaheer et al., 1998). Third, bargaining asymmetry decides the potential reach of each system member over variables and resources that are in common space or those that are currently under the control of another member. In international alliances these three conditions are partly codetermined by national-level variables. For instance, alliances that bring together partners from developed and developing countries commonly contribute complementary resources (e.g., technical know-how and local contacts, respectively) but are susceptible to contrasting objectives (e.g., access to local market and technology transfer, respectively) and are subject to bargaining asymmetry. Change in the bargaining position of these partners along time can also have a major system coupling.

The above three relational variables determine the tightness of various bundles of components in loosely coupled systems (Provan, 1983) and knit a complex web of relational links among partners (Hill & Hellriegel, 1994). Other relational variables reported in the alliance literature include culture (Medcof, 1997), commitment (Duysters, Kok, & Vaandrager, 1999; Park & Ungson, 2001), attachment (Luo, 2001), prior ties (Gulati, 1995; Luo, 2002), trust (Parkhe, 1998) and nesting within social networks (Gulati, 1998), among others. Still, we focus on resource complementarity, goal congruity, and bargaining asymmetry since they

govern subsystems critical to a loosely coupled system (Glassman, 1973) and because they all pertain to the control over or distribution of strategic assets, which underlie both cooperation and competition (Lado et al., 1997). Below, we develop the propositions that illustrate how the three relational variables affect strategic responses under each alliance type. The choice of strategic responses discussed above is particularly influenced by the state that reflects how alliance partners are linked along resources, objectives, and power. When such dyadic links strengthen, the likelihood of using a preferred strategic response by each party as we propose below will increase. However, it is possible that different parties of an alliance may prefer different responses at the same focal point, an issue not addressed here but warranting future assessment. Such response variance may be conditioned upon a given party's peculiar motives and expectations. For this reason, we suggest that fortified links in resources, objectives and bargaining power will impact on the convergent propensity of using the same strategic response.

Contending **State and Relational** Links

Among the three strategic responses that may be used in the contending state, we expect that challenge is particularly susceptible to resource complementarity, exit is sensitive to goal congruity, and dominance is prone to bargaining asymmetry. When unilateral control by self-interest-pursuing parties dominates in a loosely knit system, the entire system will be vulnerable to key shared variables such as resource mix, goal compatibility, and power balance (Birnberg, 1998; Lutz, 1982). First, challenge is an active strategy in a bargaining situation because the member organizations that challenge the surrounding pressures attack in defiance of these pressures, and may indeed make a virtue of their insurrection (Oliver, 1991). Kaplan (1982) suggests that if members of a loosely coupled system have trouble acting collectively, or if it is difficult for a newly assembled body to work effectively owing to weak connections between members, intervention or challenge will rise. In the setting of GSAs, these weak connections are largely determined by resource incompleteness (Chi, 1994; Khanna et al., 1998). This incompleteness also reduces the domain similarity endemic to the system, propelling individual members to challenge the system's rules, norms, or expectations (Kaplan, 1982; Weick, 1982). Second, when goal congruence is higher, the loosely connected system

will be more coherent and hence more stable and integrative (Orton & Weick, 1988). If not, the member organizations will have very little "domain similarity" (Kaplan, 1982: 429). Goal incongruity causes divergence in the interests of exchange parties that will pursue private goals (Hennart, 1988; Williamson, 1985). Because a GSA lacks a solid foundation for cooperation and for sustaining exchange in the contending situation, both parties are likely to choose an exit strategy if goal divergence exceeds a certain high limit and/or if such divergence is viewed as unlikely to be reduced. In other words, goal incongruity increases the probability of using the exit strategy by either party, *Ceteris paribus*. Finally, dominance is likely to be the strategy chosen under bargaining asymmetry. This asymmetry often exists because the member organization connected by weaker variables is more loosely coupled in the system (Glassman, 1973: 85). The member that has greater bargaining power in the system will use dominance to manipulate the direction and organization of the system (Gamoran & Dreeben, 1986). In a contending situation where the unilateral pursuit of private gains is endemic, a stronger player will leverage its bargaining power for a dominant position to either safeguard its own interests or secure a bigger share of joint gains (Inkpen & Beamish, 1997; Yan & Gray, 1994). A weaker party may instead be more likely to choose exit and collect its belongs in this situation. We thus propose:⁸

Hypothesis 1a: In the contending situation, resource incompleteness increases the probability of the use of challenge by each party.

Hypothesis 1b: In the contending situation, goal incongruity increases the probability of the use of exit by each party.

Hypothesis 1c: In the contending situation, bargaining asymmetry increases the probability of the use of dominance by a stronger party and the use of exit by a weaker party.

Honeymoon State and Relational Links

Of the three strategic responses under the honeymoon state, commitment to sustaining the honeymoon-like relation rises with adaptation, accommodation, and compliance. These responses are what Glassman (1973) calls "active strategies", since they encourage persistent behavior in a

loosely coupled system. Each contributes to stability by containing more tightly coupled subsystems relating to shared variables, which compensates for external pressures that trigger instability (Glassman, 1973). First, adaptive coupling rises if resource interdependence between member organizations increases (Luke et al., 1989). Resource complementarity fosters this interdependence (Park & Ungson, 1997; Parkhe, 1991) and hence adaptive coupling. Adaptive coupling is advanced by each member's effort to adapt to other members' culture or environment (Orton & Weick, 1988), especially pronounced in an international context (Parkhe, 1991). Adaptation is thus spurred by resource complementarity. Second, studies agree that goal congruity reduces costs incurred in information exchange between parties because it reduces each party's perceived uncertainty regarding what other players will do; this in turn encourages responses that lead to high payoffs at both the joint and individual levels (Eisenhardt, 1985; Flamholtz, Das, & Tsui, 1985; Park, 1996). Thus accommodation in the honeymoon situation may amplify in response to increased goal congruity. Lastly, despite the fact that the cooperation atmosphere and the commitment spirit dominate in the honeymoon situation, bargaining power is inevitably asymmetric to some extent between parties. This asymmetry is unlikely to increase the likelihood of the use of adaptation or accommodation by both parties because asymmetry implies resource and power imbalance (Harrigan & Newman, 1990) and unequal importance attached to the GSA by each party (Inkpen & Beamish, 1997). However, since each party realizes the importance of extending the honeymoon period, compliance will be preferred by both parties under bargaining asymmetry. Although less committed than accommodation and adaptation, compliance at least prolongs the exchange relationship. We thus expect: -

Hypothesis 2a: In the honeymoon situation, resource complementarity increases the probability of the use of adaptation by each party.

Hypothesis 2b: In the honeymoon situation, goal congruity increases the probability of the use of accommodation by each party.

Hypothesis 2c: In the honeymoon situation, bargaining asymmetry increases the probability of the use of compliance by each party.

Coopetition State and Relational Links

In this state, parties may use compromise, appeasement, and influence as strategies to respond to the mixture of private control and cooperation and to the simultaneous occurrence of competition and interdependence. First, compromise may be used to align with resource complementarity. The loose coupling logic argues that the degree of coupling, or interaction, between two system members depends on the activity of the variables they share (Orton & Weick, 1990). The complementarity of resources pooled by GSA partners ties them in long-term cooperation and reciprocity maintenance (Buckley & Casson, 1988; Doz, 1996; Parkhe, 1993). Doz (1996) states that joint payoffs from a GSA are an increasing function of this complementarity. Yan and Gray (1994) suggest that self-interest pursuit may decline and compromise may heighten if resource complementarity is greater. Khanna et al. (1998) observe that the scope of competition decreases while the scope of compromise increases when resource interdependence rises. Second, appeasement is expected to align with goal congruity. System members are often confronted with inconsistencies in expected efficiency and autonomy (Kaplan, 1982). Appeasement helps remove concerns pertaining to these inconsistencies. If parties share more common goals, they are more likely to consider appeasement because continuing the relationship will enable an appeasing party to collect its payoff at a later date. Third, influence is expected to be employed when system members vary in their bargaining power. Influence tactics tend to be directed toward a situation of simultaneous competition and cooperation (DiMaggio & Powell, 1983), and more frequently used when bargaining power is highly asymmetric between system members (Provan, 1983). A party's bargaining power is its ability to favorably change the bargaining equation and win concessions from the other party. Power asymmetry may skew GSA interests towards the dominant party, thus fortifying this party's intention to use influence to increase its gains. A weaker party, however, may heighten its appeasement propensity in the relationship with its dominating partner to cope with the coopetition situation. We thus posit:

Hypothesis 3a: In the coopetition situation, resource complementarity increases the probability of the use of compromise by each party.

Hypothesis 3b: In the cooperation situation, goal congruity increases the probability of the use of appeasement by each party.

Hypothesis 3c: In the cooperation situation, bargaining asymmetry increases the probability of the use of influence by a stronger party and the use of appeasement by a weaker party.

Loosely Connected and Relational Links

In this situation, the parties may opt for expansion, turnaround, and acquiescence as strategic responses to respond to the control-cooperation interplay. First, expansion is more likely when resource complementarity is high, since this increases the desire to share resources and exploit synergies, *Ceteris paribus* (Dyer & Singh, 1998; Provan & Skinner, 1989). This in turn encourages partners to deepen cooperation and expand connectedness. Because both task complexity and inter-organizational coordination costs are relatively low in a loosely connected state (Reuer et al., 2002), resource complementarity allows alliance parties to reap benefits from collaborative opportunities without incurring high extra costs. Second, turnaround is more likely to be adopted if strategic goals substantially vary between partner firms. Goal congruity makes a system's parts more richly interconnected, and goal incongruity makes a system's coupling more possibly maladaptive (Glassman, 1973). In the loosely connected situation, a GSA has a highly permeable boundary and an underdeveloped relationship among subsystems (Kaplan, 1982). Such permeable boundaries make turnaround a feasible solution when goals of system members are vastly different. Lastly, acquiescence is more likely to be chosen if bargaining symmetry exists. Acquiescence aims to continue the current framework of collaboration and governance and to maximize possible gains from a loosely organized but mature and stable relationship. As Glassman (1973: 94) notes, "the coupling between two systems has been selected, because there is a need for it, but it must not be such a situation that one party fears to be exploited by the other party." Bargaining power symmetry reduces these fears and motivates partner firms to acquiesce. We thus anticipate:⁹

Hypothesis 4a: In the loosely connected situation, resource complementarity increases the probability of the use of expansion by each party.

Hypothesis 4b: In the loosely connected situation, goal incongruity increases the probability of the use of turnaround by each party.

Hypothesis 4c: In the loosely connected situation, bargaining symmetry increases the probability of the use of acquiescence by each party.

Equity Hostage and Relational Links

From a loose coupling perspective, the equity hostage alliance system is tightly coupled but over-bounded, with boundaries that are not permeable and prevent entry of inputs that are threatening or otherwise undesirable to a particular party. This system will rely on some common variables to maintain stability: that is, the behavior of critical subsystems will be constrained by strict regulatory and relational mechanisms (Brown, 1980; Kaplan, 1982). These relational variables, in turn, will influence the equity hostage alliance's choice of strategic response from the repertoire of commensuration, specification, and positioning. First, commensuration involves careful alignment of vested stakes and exit costs that necessitate blocking the entire system to inputs. It balances risk and interests to the point where neither party gains or suffers more than the other party. This strategy is applicable under high resource complementarity, because this balance implies that key subsystems can be held at a tighter level, which satisfies the needs for sharing complementary resources between parties. Second, since specification invokes rigid contractual and governance codification, it is an effective tactic to guide collective control and cooperation between partners whose goals behind alliance formation significantly differ. Goal incongruity naturally inspires conflicts and unilateral behaviors unfavorable to the other party (Parkhe, 1993). Specification helps alleviate these problems because it provides a safeguard against *ex post* performance problems by restraining each party's ability to pursue private goals at the expense of common benefits. Finally, positioning enables the party with the stronger bargaining position to control outside inputs and is hence likely under bargaining asymmetry. Positioning under bargaining asymmetry is in line with the logic of mutual hostages, where parties making less transaction-specific investments behave opportunistically (Hill, 1990) and the dominant party needs to use positioning to mitigate the other party's opportunism and protect its own interests (Williamson, 1979). Owing to the lack of bargaining power, a

weaker party may not be able to use positioning but can rely more on contractual specification to protect its important stake. We thus suggest:

Hypothesis 5a: In the equity hostage situation, resource complementarity increases the probability of the use of commensuration by each party.

Hypothesis 5b: In the equity hostage situation, goal incongruity increases the probability of the use of specification by each party.

Hypothesis 5c: In the equity hostage situation, bargaining asymmetry increases the probability of the use of positioning by a stronger party and the use of specification by a weaker party.

Tightly Integrated and Relational Links

Three strategies can be used in the tightly integrated situation characterized by high levels of joint control and cooperation: assimilation, transmission, and cooptation. First, assimilation is more applicable under high resource complementarity. Since interdependence is extremely high in the tightly integrated situation, resource complementarity will nurture joint gains from shared variables. For either party, assimilation through absorbing another party's complementary skills and through joint learning and capability upgrading is both the end underlying interfirm exchange and a means for retaining tight integration. As resource complementarity increases, so does coupling; the fusion in resources, knowledge, inputs, value chains, and business policies will deepen. This engenders more opportunities for either party to obtain gains from assimilative knowledge-sharing. Second, transmission is more likely to be used under goal congruity. Transmission is an active strategy that institutionalizes each party's major expertise into the GSA's knowledge base through joint sharing and development. It is possible only when the systems are very richly interconnected and any overriding objectives are common to all parties. Goal congruity in a tightly integrated alliance implies that no party will gain without the attainment of joint payoffs. Congruity thus propels a party's willingness to transmit its own expertise and knowledge to the alliance's repertoire. Finally, cooptation is more likely to be adopted under bargaining asymmetry. Aiming at conflict neutralization and forbearance enhancement, cooptation is a less active and more indirect strategy than assimilation and transmission. Power asymmetry is normal even in the

tightly integrated situation. Possible conflicts and tension resulting from bargaining power asymmetry are buffered by cooptation efforts of both parties. We thus envisage:

Hypothesis 6a: In the tightly integrated situation, resource complementarity increases the probability of the use of assimilation by each party.

Hypothesis 6b: In the tightly integrated situation, goal congruity increases the probability of the use of transmission by each party.

Hypothesis 6c: In the tightly integrated situation, bargaining asymmetry increases the probability of the use of cooptation by each party.

Trusting State and Relational Links

A trusting state implies long and intense collaboration, high interdependence, and low control. Because trusting alliances contain a high proportion of social exchange elements present over a long period of time, and since all three strategies (imitation, socialization, and adherence) involve some degree of social commitment, it is possible that all three will be used concomitantly to respond to the control-cooperation interface in the trusting situation. However, the degree of emphasis on each is likely to vary according to specific relational situations. First, resource complementarity may increase the likelihood of imitation. Under high complementarity, mutual interests will become more inseparable, with operational synergies gradually developed (Hamel, 1991). According to Kaplan (1982), the important task in a tight system is to promote learning and reciprocity. Imitation, which mimics the best practices of the partner, is a legitimate way to accomplish this. Resource complementarity offers greater potential for each party to benefit from imitation. Second, goal congruity may increase the likelihood of socialization. Goal congruity improves the consistency, transparency, and accuracy of GSA goals, and thus helps define the scope and structure of cooperation. Since goal congruity enhances the connectedness of systems (Weick, 1982) and the interparty binding of gain-sharing (Provan & Skinner, 1989), parties in a trusting alliance are motivated to strengthen their bilateral attachment, both structurally and socially (Luo, 2001). This increased socialization further bolsters interorganizational trust (Zaheer et al., 1998). Finally, bargaining asymmetry may increase

the likelihood of emphasizing adherence. Even in the trusting situation, bargaining power is barely symmetric between partner firms. In order to stay in a trusting alliance and continue to benefit from the partnership, a party, whether with strong or weak bargaining power, must adhere to social exchange requirements and related values, norms, and behaviors that underline mutual trust. Adherence is described as a passive strategy in the loose coupling literature because it contributes to stability by allowing persistent behavior of the system through observing necessary norms and standards (Glassman, 1973). We thus hypothesize:

Hypothesis 7a: In the trusting situation, resource complementarity increases the probability of an emphasis on imitation by each party.

Hypothesis 7b: In the trusting situation, goal congruity increases the probability of an emphasis on socialization by each party.

Hypothesis 7c: In the trusting situation, bargaining asymmetry increases the probability of an emphasis on adherence by each party.

It is worth noting that alliance executives play an important role in shaping the effectiveness of control and cooperation and influencing the implementation of strategic responses noted above. In an international setting, the alliance teams become even more important because they observe, assess, report, and analyze interparty exchanges, and subsequently represent their constituents in communicating, negotiating, and implementing corporate plans. The top management team in a GSA is made up of boundary-spanning executives from different countries who work at the organizational-organizational interface and perform the roles demanded by their respective parent organizations as well as by the alliance charter or constitution (Salk & Shenkar, 2001). Cultural clashes at the parent, group, and employee levels are often concentrated in and absorbed by boundary-spanning executives, who may transform their perceived control-cooperation situations into parent actions in and commitment to alliance development. A superior boundary-spanning team may sometimes suppress a parent firm's desire for private control owing to improved bilateral openness or transparency and mutual understanding. Some covert behaviors or actions in the private control process may be blocked by the team,

especially when its members are confident in the expected achievement of joint operations. Healthy personal attachment or relationships between cross-cultural team members can also complement formal control mechanisms for joint activities and foster cooperation via knowledge- and information-sharing. Such relationships provide social elements that foster the enactment of structural elements in joint governance and cooperation (Fichman & Levinthal, 1991; Luo, 2001).

CONCLUSION

This paper addressed the control-cooperation interplay in GSAs and developed a framework of analysis built on the premise that private control-cooperation and collective control-cooperation represent two distinct yet related and reconcilable sets of inter-party dynamics. The present study uses this distinction to dialectically provide insights into strategic responses associated with the various typological states identified by the control-cooperation axes, inclusive of interpartner actions and the responses they generate. Summarily, we proposed that:

- (1) a GSA is a loosely coupled system in which both parties interdependently share existing resources or jointly develop new resources (coupling) while retaining their respective identity, resource control, and parent-alliance separation (looseness);
- (2) looseness permits private control, coupling - helps cooperation, and collective control is needed to mitigate opportunism associated with looseness and to guide cooperation linked to coupling;
- (3) control and cooperation coexist and co-evolve, since in loosely coupled systems, elements preserve independency, spontaneity and indeterminacy as well as interdependence deliberation and determinacy;
- (4) each loose coupling system varies in the strength and pattern of both looseness and connectedness, and differs in pressure for tightness and stability, resulting in different typological states;
- (5) coupling requires persistent behavior of the system, and it is achieved either actively, by having more tightly coupled subsystems, or passively, by limiting certain inputs access to the system or observing certain rules and norms; and

- (6) boundary conditions of each loose coupling system are determined by shared or relational variables such as goal congruity, resource complementarity, and bargaining symmetry.

These conditions in turn influence the choice of strategic responses under each typological situation in response to the control-cooperation dualism.

In our model, we suggest that private and collective controls can coexist and that it is rare to have total private control or total collective control; however, each alliance has a varying degree of the two. More importantly, cooperation elements always coexist and co-evolve along with these two controls, leading to different control-cooperation combinations and different strategic responses based on varying levels of private control, collective control, and cooperation. Viewing private control and cooperation as dichotomous and contradictory, we identified contending, cooptation, and honeymoon states to characterize an alliance's position on the relational risks continuum. With collective control and cooperation as two mutually reinforcing axes for synergy, we typified loosely connected, equity hostage, tightly integrated, and trusting states to illustrate heterogeneous configurations between the two. These distinct typological situations should be empirically verified in future research, together with the level of convergence of parties' strategic responses and the relational variables that may influence this convergence. For instance, Mayer and Argyres (2004) suggest that contractual control is an incremental learning process subject to boundary conditions such as communication and trust. It is interesting to see the evolutionary transformation of situational types along the private control-cooperation continuum or within the collective control-cooperation matrix. A wealth of alliance research suggests that control and cooperation change with time to cope with new needs or new environments as the alliance evolves. To incorporate the time or evolution dimension in our framework, future research may elucidate the internal and external conditions under which the control-cooperation interfaces change. Further, the separation of private and collective control may allow future research to examine varying sets of antecedents or determinants of private and collective control. Knowing these different sets of antecedents (strategic, behavioral, and environmental) can help international executives to identify actual needs of private control and collective control, respectively.

We documented strategic responses for individual parties under each typological situation to fulfill their respective goals. Each GSA inevitably involves a private control-cooperation dilemma, with collective control mitigating private control hazards or reinforcing cooperation gains. As such, strategic responses should be different under different situations.[^] Even within a typological situation, responses may still differ. We offered multiple yet distinct *in situ* and *ex post* strategies under each situation in the two sets of control-cooperation interplay, and proposed that the use of these strategic responses under each situation is further shaped by relational characteristics, such as bargaining asymmetry, goal congruence, and resource complementarity, though we acknowledge the role played by other variables (e.g., previous relationship) in the control-cooperation interplay, as well as the effects of the three relational links we examined in alliance governance and performance (Gulati, 1999; Park & Ungson, 2001; Rosenkopf, Metiu, & George, 2001). The control-cooperation dualism and its related responses cannot be isolated from these relational features because the latter are likely to affect changes in private or collective control and the degree of coupling between system members.

Global Dimensions

While we present a generic framework that can apply to both domestic alliances and cross-border alliances, variability between the two alliance types prevails; indeed, a byproduct of the present paper is the opportunity to highlight some of the important differences between the two. From a loose coupling perspective, global system elements are more dispersed - geographically, culturally and institutionally - than domestic alliances, and are more likely to retain their identity and spontaneity of action and reaction. Because organizational identities are codetermined by cultural, linguistic, and institutional affiliations, the boundaries of global alliances are more susceptible to tension and conflict (Salk & Shenkar, 2001). Independence and spontaneity of action will also be higher in an international context because elements are embedded in highly diverse systems (e.g., national entities) that are independent of each other. As a result, private and collective control pressures, which are associated with looseness, tend to be stronger in cross-border than in domestic alliances. Private control will be especially pronounced in a global context, since partners have a broader array of mechanisms to

exercise it, using both overt mechanisms (e.g., limiting knowledge flow via use of one's own language for certain communications) and covert mechanisms (e.g., manipulating cost via transfer pricing, secretly lobbying one's government for beneficial provisions on their added value). To compensate, a greater burden is placed on collective control mechanisms, for example, codification of routines and procedures.

Global alliances are also more likely to have asymmetries in bargaining {due to variations in skills and resources; this is especially the case where partners come from a mix of developed and developing economies) as well as in transparency, and hence control (because the local partner is closer to the operational scene than the foreign partner physically, culturally and institutionally, as argued by Luo et al., 2001). This asymmetry is exacerbated by the lower trust that characterizes global alliances, as stereotyping lays a layer of suspicion on the relationship. Situational probability will also vary across alliance types, with a contending situation more likely for a GSA than for a domestic alliance. Since bargaining asymmetry is also more likely to occur in an international context, dominance and exit, respectively are more likely to be enacted as strategies by partners in a contending state. The same is true for the strategies undertaken under other situations (e.g., acquiescence in a loosely connected situation).

While international alliance characteristics such as bargaining asymmetry can be accommodated within the existing typology, it might also prove useful in the future to add mediating national-level variables that affect both system looseness and tightness. Such variables include, but are not limited to, geographical, cultural, and institutional differences both among partners and between each partner and the locus of alliance activity (e.g., where a joint venture is located), as well as asymmetries and complementarities in resource endowments, intellectual property regimes, and the like. In addition, geopolitical relations among home and host nations as well as the extent to which transactions are governed by rules overseen by international organizations (e.g., the WTO) will also need to be considered, since they are likely to have an impact on the dialectics of alliance establishment and operation in a global context.

Finally, as we have noted, for instance, in the case of shifting from a honeymoon to a contending state, environmental change is an essential ingredient affecting the strategies undertaken by firms

and their partners. A GSA may evolve over time into a different state of control-cooperation interface as environmental, organizational, and inter-organizational conditions drastically change. General systems theory suggests that open systems exchange information, energy, or materials with their environments, and these systems can be viewed as an evolving transformation device that receives various environmental inputs and transmits these inputs in some way into deliberate responses (Kast & Rosenzweig, 1972). A GSA is a cooperative, complex, and open "system containing both economic or structural and social or cultural subsystems that work together for sharing complementary resources and generating synergetic advantages for alliance parties. As an open system, a GSA needs to remain in a dynamic equilibrium through the continuous inflow of environmental inputs and the continuous match between new organizational needs and new environmental settings. A longitudinal perspective is especially vital in the case of international alliances, since change can span multiple environments as well as their relative standing. For instance, a rising technology level of an emerging economy partner will narrow its knowledge resource asymmetry with a developed country partner, leading to a change in strategic responses on both sides. The dynamics of such a change, say a shift away from dominance in a contending situation, are difficult to manage, and it is possible that the stability of the alliance will be undermined. Since social exchange is very much shaped by historically repeated exchange (Blau, 1964), the sequence of situations is one issue to be considered in future research.

Managerial Implications

Several managerial implications arise from the present analysis. We provide managers with the distinctions between private control and collective control and the ways to distinguish between the two. We explain that private control by an individual party and collective control by all parties together have very different implications for joint returns from cooperation. Second, our discussions on the interfaces between private control and cooperation and between collective control and cooperation may help executives better understand the dilemma between control and cooperation and identify what situations they are in so that they can be better prepared with appropriate strategies. In addition, the strategic responses proposed in each typological state provide executives

with options to balance private control and cooperation and to optimize the complementary gains from collective control and cooperation.

Our suggestions on how relational links may shape the control-cooperation configurations and related strategies may help executives to match the dyadic conditions and specific strategies they should choose. An important message here is that the control-cooperation interplays and corresponding strategies cannot be isolated from the current state of inter-party relationships, international executives need to integrate their resource commitment, strategic goals and bargaining power with their intention and strategies underlying control and cooperation if they seek the optimal private and collective gains at the same time. Finally, this study illuminates some conditions that are more likely to occur in global vs domestic alliances, thereby illustrating the limits of applying learning from domestic to international alliances and vice versa. That these conditions are constantly changing requires managers to be vigilant about monitoring change, not only in the multiple environments in which they operate but also in the environments in which their partners are embedded, even if those partners are remotely located from the locus of alliance activities.

Further Research

Apart from empirical verifications of the propositions outlined in this paper, future research should also examine the global extension of the framework, adding the proposed as well as other national-level variables, before testing them empirically, ideally in a longitudinal context. The longitudinal investigation can also unveil situational changes and internal and external factors causing these changes. Although previously proposed control-cooperation portfolios maintain some degree of a steady state during a certain period of time, these portfolios are largely an open system that interacts with and embraces in environmental changes. Future research should also investigate whether collective control suppresses the private control-cooperation tension, what the important antecedents (external and internal) and consequences of the choice of strategic response are, and in what ways ongoing commitment changes the influence of these variables on the dynamics of control and cooperation. It is interesting to investigate alliance outcomes of the strategic response heterogeneity between parties, as this heterogeneity may deter resource-sharing and joint planning

between partners. Future research should particularly address the extent to which the incongruence in such responses causes skewed value appropriation between partners. Additionally, future research might look at the specific roles played by alliance team, as we noted above, in shaping the control-cooperation interfaces and strategic responses in different situations. This team often has its own self-interests and agenda, which may deviate from those of one or both parents, hence creating two vertical control and cooperation links (team vs local parent and team vs foreign parent) in addition to the horizontal or partner link this study has addressed.

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NOTES

¹This article defines CSAs as equity joint ventures or cooperative arrangements established by two or more partners from different nations in order to achieve certain common strategic goals. To help our discussions on dyadic links, we assume there are only two partners in every GSA. We also note that some forms of GSA are more transitory than others, thus varying in the degree of control. Further, equity joint ventures inherently contain stronger coupling (or weaker looseness) than cooperative arrangements. Since this study focused on an overarching framework for GSAs in general, it did not specifically compare different forms of alliances. We leave this issue to future research.

²The role of the alliance or joint venture management team in the control-cooperation dualism is not directly included in our framework. The "party" throughout the article thus refers to either parent or partner, which are used interchangeably. Moreover, this study assumes that foreign and local parties will react to the control-cooperation interfaces equally or similarly, without considering the possible partner asymmetry in such reactions.

³Although it is beyond the limit of this paper, knowing the antecedents of private and collective control is important. Both the desire and ability to maintain private control vary by firm. For instance, those caring more about future networking opportunities and organizational reputation may exert a lower level of private control in GSAs they build. Similarly, a partner's international experience and internal governance in managing GSAs may also be an important

antecedent of private and collective control. Those who have accumulated greater international experience and capabilities in governing alliances overseas may place lower collective control, *Ceteris paribus*, over alliance activities. Such experience and capabilities are found to be critical in managing alliances and creating alliance values (Anand & Khanna, 2000; Kale, Dyer, & Singh, 2002; Sampson, 2005).

⁴The control literature also grouped control measures or modes into behavioral (i.e., process) control, output control, and social (e.g., informal norms) control (Eisenhardt, 1985) and applied these modes in GSAs (e.g., Das & Teng, 1998). In illustrating private and collective control, we blend these modes on the same list of various measures. Among private control measures, some are process-based (e.g., budget control) and others are output-based (e.g., transfer pricing) or social-based (e.g., socialization).

⁵Apart from these two primary channels, which together build a formal institutional framework for collective control, some informal control measures, such as shared corporate philosophies and corporate culture norms, are also a part of collective control and are supplementary to this institutional framework.

⁶Private control is not a sufficient condition for opportunism. A party may institute various forms of private control, but may not necessarily avail itself of

them if it finds the other party is cooperating. Moreover, some private control measures may be permissible under the alliance agreement and thus not opportunism in a legal sense.

⁷Typological states here describe a general pattern of private control and cooperation in an alliance, which do not fully capture a possible difference in actual levels of control and cooperation between parties. As it focuses on an overarching view of control and cooperation interfaces at the alliance level, this study leaves the unilateral view of such interfaces to future research.

⁸Owing to the space limitations, this study did not address 2x2 interactions that reflect the joint presence of relational characteristics. Such interaction effects may exist, however. For instance, in the contending state, the probability of using exit is much higher if goal incongruity and resource incomplementarity coexist.

⁹There are opportunities to extend the hypotheses further in this entire section. For instance, one may also posit a positive relationship between goal congruity and the use of expansion as a strategic response in the loosely connected situation. With compatible goals, alliance partners are more likely to share common outlook and future orientation, thus preferring the path of expansion.

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APPENDIX

Mathematical Illustrations of Collective and Private Control

Model assumptions

We develop a model of a cooperative arrangement between two firms from different countries. Firm 1 (foreign partner) has the technology to make the product, and wants to expand into different global markets, but lacks knowledge and expertise about local markets. Firm 2 (local partner) can develop the local market, and enters into an alliance with Firm 1. It is assumed that the firms independently make decisions to invest in product technology and market development effort, respectively. Once the product and market development has taken place, the alliance sets the selling price and the two firms share the profits.

The normalized demand (D) for the product depends on the technology provided by Firm 1, the selling effort expended by Firm 2, and the retail price. That is:

$$D = x - p + \theta + e \quad (\text{A.1})$$

where y , is the base market size potential, p is the retail price for the product, θ measures the impact of Firm 1's choice of technology on demand, and e measures the impact of Firm 2's selling effort (market development efforts) on demand. It is assumed that the choice of product technology and selling effort level has a linear impact on demand. However, the costs of these investments are assumed to be convex increasing to model the diminishing impact of investment on demand.

In the optimal solution to the model, we consider two different mechanisms: collective control and private control.

Collective control

We start with collective control, where both firms make decisions to jointly maximize the total alliance profits in stage 1; then, in stage 2, the

total profits are divided between the two firms. Firm 1 invests in the choice of technology (θ) that may include new high-precision equipment with high reliability, fast or flexible equipment, organizational training and restructuring, etc., which improve the demand potential of the product. Let c be the unit cost of production, and the cost of technology be $\frac{\eta\theta^2}{4}$.

Firm 2 invests in developing the market and in the promotional efforts (e). The cost of promotional effort is $\frac{\gamma e^2}{4}$. Now the centralized profits for the alliance (denoted by superscript c) are

$$\Pi^c = (\alpha - p + e + \theta)(p - c) - \frac{\eta\theta^2}{4} - \frac{\gamma e^2}{4} \tag{A.2}$$

The optimal decision for the alliance is to set the retail price (p) and determine the optimal investment in choice of technology (θ) and the promotional effort (e). On solving the above, the optimal parameters are

$$\theta^c = \frac{\gamma}{\eta\gamma - \eta - \gamma}(\alpha - c) \tag{A.3}$$

$$e^c = \frac{\eta}{\eta\gamma - \eta - \gamma}(\alpha - c) \tag{A.4}$$

$$p^c = c + \frac{\eta\gamma}{2(\eta\gamma - \eta - \gamma)}(\alpha - c) \tag{A.5}$$

Substituting from above into (A.1) and (A.2), we get

$$D^c = \frac{\eta\gamma}{2(\eta\gamma - \eta - \gamma)}(\alpha - c) \tag{A.6}$$

$$\Pi^c = \frac{\eta\gamma}{4(\eta\gamma - \eta - \gamma)}(\alpha - c)^2 \tag{A.7}$$

It is easy to see from the above that as the cost of technology (η) or the promotional cost (γ) increases, the optimal investment by the two firms (θ^c and e^c) would decrease, and the profit for the alliance (Π^c) would also be lower.

Since the alliance profit is system-wide optimal, the next task is to divide the profits between the two firms. Let f_1 ($0 < f_1 < 1$) be the share of Firm 1's profit, and f_2 (equal to $1 - f_1$) be the share for Firm 2. Then, Firm 1 makes a profit of $f_1\Pi^c$ and Firm 2 makes a profit of $f_2\Pi^c$.

Private control

We now consider the case of private control, when each firm makes decisions in order to maximize their individual profits. Firm 1 selects its optimal choice of technology, and Firm 2 selects the

promotional selling effort based on a predetermined negotiated sharing of the total profits between the two firms. Subsequently, the alliance sets the retail price, and profits are realized and shared between the two firms.

In order to analyze this problem, we start backwards with the stage 2 analysis and make the optimal pricing decision assuming that the technology choice and promotional effort decisions are already made. Then we solve for the optimal choice of technology and promotional effort.

For a given choice of technology (θ) and effort (e), the alliance profits are

$$\Pi = (p - c)(\alpha - p + \theta + e) \tag{A.8}$$

which is maximized by choosing $p = (v + \theta + e + c)/2$. On substituting above, we get $\Pi = (\alpha + \theta + e - c)^2/4$.

Since f_1 is the fractional share of the profit for Firm 1, Firm 1's objective function is to select the choice of technology (θ) in order to maximize ITS net profit:

$$\Pi_1 = \frac{\beta(\alpha + \theta + e - c)^2}{4} - \frac{\eta\theta^2}{4} \tag{A.9}$$

Similarly, the objective for Firm 2 is to select the optimal promotional effort, and ITS profit is

$$\Pi_2 = \frac{(1 - \beta)(\alpha + \theta + e - c)^2}{4} - \frac{\gamma e^2}{4} \tag{A.10}$$

On solving (A.9) and (A.10) simultaneously, the optimal decisions (denoted by superscript $*$) are

$$\theta^* = \frac{\beta\gamma}{\eta\gamma - \eta\beta - \gamma\beta}(\alpha - c) \tag{A.11}$$

$$e^* = \frac{\beta\eta}{\eta\gamma - \eta\beta - \gamma\beta}(\alpha - c) \tag{A.12}$$

Therefore we get

$$p^* = c + \frac{1 + \eta\beta + \gamma\beta}{2(\eta\gamma - \eta\beta - \gamma\beta)}(\alpha - c) \tag{A.13}$$

and

$$\Pi_1^* = \frac{\beta(1 + \eta\beta + \gamma\beta)^2(\alpha - c)^2}{4(\eta\gamma - \eta\beta - \gamma\beta)^2} \tag{A.14}$$

$$\Pi_2^* = \frac{\beta(1 + \eta\beta + \gamma\beta)^2(\alpha - c)^2}{4(\eta\gamma - \eta\beta - \gamma\beta)^2} \tag{A.15}$$

It is easy to see from the above that $\frac{\partial \Pi_1^*}{\partial \beta} > 0$ and $\frac{\partial \Pi_2^*}{\partial \beta} > 0$: that is, Firm 1's investment in choice of technology increases as its profit share (β) increases;

Firm 2's investment in promotional effort increases as β increases, that is, as its share of profit increases. Also, we note that the two firms will reduce their investment in choice of technology (o^*) and promotional effort (e^*) if the cost increases, that is, both o^* and e^* decrease as γ or t_j increase.

In summary, we note that $o^* < o^c$ and $e^* < e^c$: that is, under private control, Firm 1 would under-invest in Technology, and Firm 2 would provide less promotional effort as compared with the investments in the collective control case. Further, the profit for each firm is lower in the private control case: that is, $\pi_1^* < \pi_1^c$ and $\pi_2^* < \pi_2^c$, for all β . Also, $\pi_1^* + \pi_2^* < \pi^c$: that is, the total system profits are also lower for the private control case. The intuition for this result is that while the system as a whole would prefer that the firms invest more, since each firm is only interested in maximizing individual profit, the choice of investment in technology/selling effort is only sub-optimal. With collective control, however, firms would invest more in the technology and also exert more selling effort in order to reach the system optimal solution. The system profit is higher here, and each firm benefits by getting higher profit.

In our model, the bargaining power is related to the fraction of the profit-sharing division between the two firms. It is easy to see that in the case of collective control the investment made by both firms is the system optimal, and does not depend on the sharing of the profit between the two firms. Therefore the impact of bargaining asymmetry is muted for the case of collective control. In the private control case investment by both firms is dependent on the nature of bargaining power: that

is, each firm makes its investment decision as a function of its individual share of the total profit.

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