Governance structure choice in strategic alliances
The roles of alliance objectives, alliance management experience, and international partners

Bing-Sheng Teng
Cheung Kong Graduate School of Business, Beijing, China, and
T.K. Das
Department of Management, Zicklin School of Business, Baruch College, City University of New York, New York, New York, USA

Abstract
Purpose – Strategic alliances have a variety of governance structures that can be broadly classified as joint ventures, minority equity alliances, and contractual alliances. This paper seeks to empirically examine the roles of four key determinants of governance structure choice, namely, joint R&D and joint marketing objectives, alliance management experience, and international partners.
Design/methodology/approach – Several hypotheses are developed regarding governance structure choice and are tested with data from 765 alliances. A multinomial logistic regression (logit) model is used for statistical analysis, with five control variables.
Findings – All hypotheses are supported, so that the roles of alliance objectives, alliance management experience, and international partners are demonstrated as being significant as determinants of governance structure choice in alliances.
Research limitations/implications – Limitations stem from the data being from a single source, one that also relies on press announcements that may be biased toward larger alliances.
Practical implications – Briefly, alliance managers should find it useful to assess the relative presence of the four determinants of structural choice studied in this investigation in order to make an informed selection of the appropriate governance structure.
Originality/value – The study contributes to the knowledge of the key determinants of governance structure choice in strategic alliances by examining empirically, with a large sample of alliances from various industries, the significant roles of four factors, namely, joint R&D and joint marketing objectives, alliance management experience, and international partners.

Keywords Strategic alliances, International business, Joint ventures

Paper type Research paper

Introduction
Strategic alliances serve the strategic objectives of partner firms (Doz and Hamel, 1998). Due to factors such as globalization and emerging technologies, it is increasingly difficult to obtain sustainable competitive advantage in rapidly changing markets (D’Aveni, 1994). Any one firm, by itself, often does not possess all the necessary resources and capabilities to compete effectively. Strategic alliances offer an alternative to such firms, whereby they could join forces with other firms in the pursuit of opportunities that would otherwise be beyond the firm’s current capabilities.
In essence, alliances allow partner firms to creatively combine resources in the establishment of joint competitive advantage.

Strategic alliances come in a variety of structures, including such popular arrangements as joint ventures, minority equity alliances, enhanced buyer-supplier partnerships, joint production, joint bidding, and code-sharing in the airline industry. Alliance structure is a critical determinant of alliance performance (Parkhe, 1993a). Yoshino and Rangan (1995) report that virtually all managers they interviewed believed that an alliance’s success depended on its structure. Killing (1988) and Teece (1992) believe structural decisions are among the most important decisions alliance partners make. The reason is that structural decisions impact almost all aspects of the alliance, including operational process, control mechanisms, and even exit possibilities (Das and Teng, 1996).

Researchers have been studying alliance structures for some time, particularly from the perspective of transaction cost economics (Oxley, 1997; Pisano, 1989). In this view, alliance structural choice reflects the need to deal with behavioral uncertainty such as opportunism and reduce transaction costs between the partners. Equity arrangement can be used to align the partners’ interests when the risk of opportunism is significant (Gulati, 1995). Further, Gulati and Singh (1998) find that both coordination costs and appropriation concerns influence alliance structural choices.

Other theories that have been used to understand alliance structures include game theory (Parkhe, 1993b), risk perception (Das and Teng, 1996, 2001), agency theory (Reuer and Miller, 1997), network theory (Rowley et al., 2000), and resource-based view of the firm (Das and Teng, 2000). For instance, Parkhe (1993b) finds that alliances perform better when payoff patterns are structured to punish cheating in alliances, as they often represent a prisoner’s dilemma situation. Das and Teng (1996, 2001) reason that alliance partners’ perception of relational risk and performance risk significantly influences their structural decisions. Thomas and Trevino (1993) demonstrate through several cases that alliance structuring is a process of information processing.

In this study we empirically test several key factors that may influence governance structure choices: alliance objectives (including joint R&D and joint marketing), alliance management experience, and international partners. While two of the factors (namely, joint R&D and international partners) were examined in a previous study (Gulati and Singh, 1998), we aim to provide additional evidence regarding their effects. We also include in our study two more factors, namely, joint marketing and alliance management experience. While much research has been done on R&D alliances (Carson et al., 2003; Hoang and Rothaermel, 2005), joint marketing as an important alliance type has not received adequate attention in the literature (Bucklin and Sengupta, 1993). Alliance management experience is included in this study on account of its close relationship with alliance performance (Lane et al., 2001; Sampson, 2005). Whereas previous studies have often used the total number of prior alliances between two partners as an indicator for alliance management experience (Goerzen, 2007), our investigation includes all the prior alliances formed by the partners and is reflective of the notion of “collaborative know-how”.

Our results regarding the roles of these four factors as determinants of governance structure are, we believe, valuable in their own right. This study not only confirms that joint R&D alliances and international partners tend to have more equity involvement, but also reveals the significant roles of joint marketing activities and alliance
management experience. Thus, this study makes a contribution in identifying new determinants of alliance structures.

**Three types of alliances**

While strategic alliances have a great variety of forms, many researchers agree that the basic forms of alliance include joint ventures, minority equity alliances, and contractual alliances (Das and Teng, 1998; Gulati and Singh, 1998; Yoshino and Rangan, 1995). Joint ventures refer to separately incorporated entities jointly owned by partners. Minority equity alliances include an acquisition of equity shares by either one or more partner firms, while contractual alliances involve no equity transaction or creation of a new entity in the agreement.

Researchers have emphasized the role of equity arrangements in differentiating alliance structures (Hennart, 1988; Pisano, 1991). Most empirical studies have focused on the structural choice between equity-based alliances (including both joint ventures and minority equity alliances) and contractual alliances, primarily from a transaction cost perspective (Gulati, 1995; Osborn and Baughn, 1990). According to Gulati and Singh (1998), although joint ventures and minority equity alliances have the common characteristic of shared ownership, they ought to be separated along the dimension of hierarchical control. Alternatively, the three alliance types can be differentiated through the notion of equity involvement. According to Nooteboom (1999), inter-firm relations differ in terms of the strength of the linkage between the firms, and equity involvement is concrete manifestation of that strength of inter-firm linkage.

Furthermore, equity arrangements are believed to help align the interests of partner firms (Gulati, 1995). When there is shared equity, partner firms realize that their interests are intertwined and hence opportunistic behavior tends to be discouraged. In addition, shared equity serves as a mutual hostage for partners to retaliate and punish an opportunistic party (Kogut, 1988). Since equity arrangements are not easily terminated, it is difficult for an opportunistic party to quickly exit the alliance after taking advantage of the other party. In sum, an equity arrangement can ease partners’ concern over opportunism in alliances.

Shared equity often facilitates the coordination and control of the collaborative effort. Partner firms may accomplish their work separately as in a joint bidding agreement or they can have integrated processes and centralized control as in a joint venture. According to Larson (1992, p. 91) the coordination of partner firms through “dense communications and administrative systems” can be called “operational integration”. When partner firms work together in a joint venture, their behavior can be directly observed and measured. Centralized procedures and policies can also be developed, which provide a uniformed standard for all parties. Thus, joint ventures are preferred in more complex types of collaborations (Garcia-Canal, 1996).

Joint ventures are the most integrative form of alliances. A joint venture represents a new entity (i.e. equity creation) that combines partner firms in a selected area. Not only do firms have shared equities, but their operation is also combined in the selected area. Centralized control and collaboration are the hallmark of joint ventures.

Minority equity alliances, by comparison, have a modest level of structural integration. When one firm owns a meaningful portion of another firm, the two are partially integrated through ownership. However, the equity arrangement is partial because only a limited portion of equity is involved. As compared to joint ventures in
which all equities for the new entity are shared, minority equity alliances feature limited equity exchange and thus represent a lower level of equity exchange. In addition, in contrast to joint ventures, minority equity alliances usually do not have integrated processes and centralized control. Without forming a new entity, partner firms carry out their cooperative activities separately.

Contractual alliances have the lowest degree of structural integration among the three alliance types. The partner firms do not have an integrated entity to carry out the joint activities, nor do they have any equity arrangements. Contractual alliances are operated merely based on the agreements for the partner firms to work together in a certain way, such as in pursuing joint research and joint marketing. Again, such tentative structures lack centralized control that come with a joint venture.

Alliance objectives

Joint R&D alliances

To the extent that structure follows and implements strategy, the objectives of alliances have several implications for alliance structure. In this paper, we deal with two alliance objectives – joint R&D and joint marketing – that are common in alliances (Glaister and Buckley, 1996; Hagedoorn, 1993). As to joint R&D, the key lies in the transfer of a critical resource – technological knowledge. In two contrasting ways, knowledge transfer and learning affect the choice of alliance structure. The reason is that both knowledge acquisition and protection are important. The challenge is to facilitate legitimate learning while simultaneously deterring illegitimate (or opportunistic) learning, in order to protect one's core competences (Das and Kumar, 2007; Kale et al., 2002; Larsson et al., 1998).

Strong governance is desirable for effective joint R&D activities, since legitimate knowledge transfer and learning are essential for their success (Khanna et al., 1998; Powell et al., 1996). When firms collectively conduct research, a certain level of common knowledge and process is a prerequisite. As such, joint R&D often requires the partners to work side-by-side in one R&D setting, because physical proximity and face-to-face meetings facilitate knowledge transfer and learning (Athanassiou and Nigh, 2000; Galbraith, 1990). Clearly, equity-based governance in alliances helps create a common setting in which learning can take place. In this sense, it is believed that joint ventures are the most effective form of alliance for learning and knowledge transfer purposes (Kogut, 1988). Empirical research confirms that more integrative alliance forms facilitate knowledge transfer between partners (Mellewigt and Das, 2007; Mowery et al., 1998).

Furthermore, if knowledge acquisition is done without the consent of the knowledge owner, it is considered opportunistic. Thus, illegitimate knowledge transfer can be a serious threat. Firms in alliances often try to get ahead of their partners through learning races, which may result in the loss of firm-specific knowledge for some firms (Bleeke and Ernst, 1995; Hamel, 1991). If partner firms are direct or potential competitors, one may use what it secretly learned from the other to compete against it in the marketplace (Dussauge et al., 2000). Thus, partners employ various control mechanisms to deter opportunistic learning and protect their intellectual capital (Das, 2005; Inkpen, 1998). A key control mechanism is equity (Baughn et al., 1997). As noted earlier, shared equity ownership aligns partners’ interests, as a result of which partners are more likely to refrain from self-serving activities at others’ expense. In addition,
equity positions serve as a mutual hostage for partners so that they can be used to punish opportunistic parties. In sum, joint R&D activities require more equity-based governance structures because equity integration deters illegitimate knowledge transfer.

*H1a.* Alliances formed to conduct joint R&D will have more equity-based governance structures.

**Joint marketing alliances**

Joint marketing, i.e. combining firms’ marketing activities in a given market, is another popular objective in alliances (Bucklin and Sengupta, 1993). For example, telecom firms have formed a number of global alliances (e.g. Concert by British Telecom and AT&T) to jointly sell worldwide telecom services to multinational corporations. A key feature of joint marketing alliances is that partner firms usually combine their marketing efforts by offering a unified image in the given marketplace. Their brand names thus become integrated to a certain extent. For example, in the alliance between KLM and Northwest Airlines, the two firms combined their brand names and logos. Similarly, when Coca-Cola recruited Danone of France to jointly market its Minute Maid orange juice in Europe and Latin America, both firms’ logos were used. Such an integrated market image is distinctive in joint marketing alliances.

The combination of brand names may complicate the allocation of “residuals” in joint marketing alliances. Such outcome allocation is important in alliances and is about developing a compensation structure that divides the payoffs of the alliance. This issue is particularly relevant when the alliance is to be terminated. In joint marketing alliances, outcome allocation tends to be more difficult since brand names and images of the partners are intermingled. As compared to physical, human, and financial resources, marketing resources such as reputation and brand image are more intangible and, once mixed, more difficult to separate and allocate proportionately between partners. Hence, *ex ante* contractual provisions tend to be insufficient in specifying the contingencies (Teece, 1992).

Thus, there is a high degree of residuals in joint marketing alliances that cannot be easily attributed and allocated to a given party. Partners need “a compensation structure under which they each bear some of the residuals from their exchange” (Chi and Roehl, 1997, p. 280). To that end, an equity-based governance structure provides a much-needed mechanism to apportion residuals. Shared equity can “provide a mechanism for distributing residuals when *ex ante* contractual agreements cannot be written to specify or enforce a division of returns” (Teece, 1992, p. 20). With shared equity, there is an understanding that residual allocation starts with equity positions, which reduces the concerns of partners prior to alliance formation.

The benefit for residual allocation is particularly significant in joint ventures, since there is separate equity creation in joint ventures and only partial equity arrangement in minority equity alliances. As Kogut (1988, p. 321) put it, joint ventures help “both parties share in the residual value of the venture” since partners’ equity positions in the joint venture serve as an undisputed basis for residual allocation. In contrast, in minority equity alliances partners will eventually need to negotiate for residual allocation. In sum, since there are considerable residuals in joint marketing alliances, equity arrangement is particularly needed.
H1b. Alliances formed to conduct joint marketing will have more equity-based governance structures.

Alliance management experience
A valuable resource in alliances is a firm’s alliance management experience, which comprises a firm’s overall experience in forming and managing strategic alliances (Hoang and Rothaermel, 2005; Sampson, 2007). Simonin (1997) argues that firms differ in their “collaborative know-how”, or the capability in managing alliances. Through past alliances, partner firms accumulate valuable knowledge about alliance management (Hagedoorn and Duysters, 2002). Kale and Singh (2007) find that alliances offer great learning opportunities for firms to develop firm capabilities. Other research has found evidence that firms learn to manage alliances more effectively over time (Anand and Khanna, 2000; Barkema et al., 1997). Gulati (1999) reports that the greater a firm’s alliance experience and capability, the more likely that it will form a new alliance in the future. Understandably, firms are interested in taking advantage of their collaborative know-how by forming additional alliances.

When firms develop collaborative know-how in alliances, the need for more equity-based governance structures tends to decrease. The argument here is that firms need more equity-based governance structures (such as joint ventures) to align the interests of partner firms when interfirm trust is insufficient (Gulati, 1995). Trust can be defined as “a type of expectation that alleviates the fear that one’s exchange partner will act opportunistically” (Bradach and Eccles, 1989, p. 104). Trust is critical in strategic alliances as it is directly associated with the challenging issues of alliances – incomplete contracts and opportunism (Krishnan et al., 2006; Carson et al., 2003). Since interfirm trust provides confidence (Das and Teng, 1998) that opportunistic behavior is unlikely, trust effectively reduces the need for contractual safeguards and thus lowers transaction costs (Dyer and Chu, 2003; Lui and Ngo, 2004).

Therefore, partner firms need more equity-based alliance structures if they do not have sufficient trust in each other (Das and Teng, 1998). Alliance novices are made more comfortable by equity-based governance structures. As we noted, shared equity helps align partners’ interests and deter opportunistic behavior such as cheating and shirking (Pisano, 1991). For alliance novices, such a mechanism is much needed and provides confidence in partner cooperation. As the firm learns how to deal with partners in alliances, it will be able to rely less on equity arrangements and more on intangible factors such as reputation and interfirm trust. Thus, a high number of prior alliances between two firms has been found to encourage the use of less equity-based governance structures (Gulati, 1995).

Although equity-based structures such as joint ventures take more time and effort to forge as well as to terminate, they are particularly worthwhile for new players in the alliance field. As time goes on and the firm learns how to deal with alliances, more flexible arrangements will become more attractive. After all, contractual alliances, with a non-equity governance structure preserve much of the flexibility that will be valuable in case spin-offs are called for. Thus, the aggregated alliance experience of the partner firms predicts the alliance structure:

H2. The greater the previous alliance management experience of the partner firms (between themselves or with any other firms), the less equity-based will be their alliance structures.
International partners
Partner nationality is found to moderate the relationship between alliance structure and alliance performance (Parkhe, 1993a), and also affects the relative importance of various strategic motivations in alliances (Glaister and Buckley, 1996). International alliances are exposed to an additional risk called international risk, which has its roots in national differences in terms of cultures, regulations, technological standards, and business practices (Brouthers, 1995).

Partners of different nations tend to have a low degree of resource similarity, or a high level of resource heterogeneity. The kinds of human, technological, physical, and organizational resources held by firms of different nations are more likely to be dissimilar, and therefore lack compatibility. It has been found that partner firms in international alliances have different needs and offer different resources and capabilities (Hitt et al., 2000).

We suggest that resource heterogeneity requires more deliberate resource integration efforts in alliances, and an equity-based governance structure is an important step in that direction. Equity involvement helps create a formal structure within which centralized control could take place. For instance, if two firms employ vastly different technologies, an integration of the two technologies is a must for any co-production alliance. An equity-based governance structure brings the parties together in one entity, often with one physical setting that facilitates better utilization of resources. Research suggests that face-to-face meetings are more effective than distant communication for knowledge transfer (Athanassiou and Nigh, 2000). Thus, more equity involvement would reduce resource heterogeneity between firms.

When two firms are from two different institutional environments, they usually follow different norms of business operation (Kostova, 1999). Consequently, there tends to be a lack of understanding and trust between international partners, as compared to domestic partners (Gulati, 1995). For instance, intellectual property protection regimes vary significantly across nations and can be a source of concern in international alliances (Oxley, 1997). Since equity arrangements deter opportunistic behavior, they are preferred when interfirm trust is insufficient. Empirically, Gulati and Singh (1998) find some evidence that cross-region alliances (three regions including USA, Japan, and Europe) are likely to have more equity-based alliances than domestic (or within-region) ones. Thus:

\[ H3. \] International alliances will have more equity-based governance structures than domestic alliances.

Methods
Data
The data for this study were drawn from an alliance database published by Alliance Analyst, a bi-weekly publication specializing in alliance-related issues. Alliance Analyst offers one of the most complete and publicly available alliance databases, as it covers a wide range of publications such as New York Times Index and Wall Street Journal Index. The collection of press announcements as a source of alliance data has been widely used by researchers to generate research databases of strategic alliances (e.g. Glaister and Buckley, 1996; Reuer and Miller, 1997). The Alliance Analyst database provides the following information: names of the partners and their nationalities,
industry of the alliance, alliance type, alliance objectives, and a fairly detailed description of the alliance agreement.

We used five selection criteria to construct the data set used in this study. First, the time frame covered was between September 1994 and May 1997 (the publication ceased a short time thereafter). We started with the date that *Alliance Analyst* was launched, i.e. September 1994. During the initial 3-year period, 1994-1997, there were significant strategic alliance activities (*Alliance Analyst*, 1994-1997). Second, only those alliances that were actually formed during that period were included. Numerous announcements of intentions to form strategic alliances were not used because many of them did not materialize. Modifications of existing alliances were not included either.

Third, only two-party (or dyadic) alliances with at least one US partner were included in the data set. Although most of our argument applies to multi-partner alliances, a focus on dyadic alliances simplifies the empirical tests. Limiting the data to alliances with at least one US partner is based on the concern that *Alliance Analyst* is probably more comprehensive with alliances involving US firms. Fourth, while strategic alliances between not-for-profit organizations are booming, this study focuses on alliances between for-profit companies. Some of the arguments here may not be applicable to other types of organizations, such as government agencies and universities.

Fifth, we included eight common types of strategic alliances: joint ventures, equity alliances, joint production, joint marketing and promotion, joint R&D, enhanced supplier partnerships, sponsored R&D, and licensing agreements. Arm’s length agreements such as subcontracting and regular supplier agreements were not included. Whereas the first two types – joint ventures and equity alliances – are clear in our three-part typology discussed earlier, the other six types of alliances were classified as either equity-based or contractual-based, depending on whether or not there was any equity arrangement in the deal.

These five criteria led to a data set of 765 alliances. Like the *Alliance Analyst* database, our data set includes eleven major industrial groups: airline and aerospace (3.0 percent), automotive (4.8 percent), business services (1.4 percent), consumer product/retail/food and beverage (36.9 percent), computers and communication (7.3 percent), energy and natural resources (6.8 percent), entertainment and leisure (5.0 percent), financial services (13.3 percent), healthcare/chemical (17.3 percent), industrial machinery and equipment (3.5 percent), and transport (0.6 percent). As compared to similar studies on alliances (Gulati and Singh, 1998; Parkhe, 1993b), this study covers more industries and thus is possibly more representative of the alliance population.

**Variables**

The dependent variable in this study is alliance structure choice, which measures the level of equity arrangement in the alliance. Since joint ventures have the highest degree of equity involvement, they are coded 3. Minority equity alliances are coded 2 due to its moderate level of equity arrangement. Finally, contractual alliances involve no use of equity and are thus coded 1.

There are four independent variables. Joint R&D and joint marketing are two important objectives in alliances. The *Alliance Analyst* database provides information regarding these two objectives based on public announcements made by the alliance partners. Since the objectives of an alliance are known, it is coded 1 if it has a joint R&D
component and 0 if not. The same rule applied to the joint marketing variable. The variable alliance management experience is about the total alliance experience the two partner firms had prior to the formation of the particular alliance. Thus, it is measured as the total number of previous alliances that the two partner firms had formed since September 1994, between themselves or with any other firm. As noted earlier, previous studies often focused on the impact of partner-specific alliance experience (Goerzen, 2007). By comparison, our measure reflects the overall alliance management experience of partner firms. The variable international partners is about whether the partner firms are of the same nation, and is coded 1 for international alliances and 0 for domestic ones.

There are five control variables in this study, all of which are used to account for external trends regarding alliances. The first two variables, percent minority equity and percent joint ventures, measure the percentage of alliances in the 1994-1997 period that were minority equity alliances and joint ventures, respectively. To some extent, these two variables account for the external environment which may favor one type of alliance over another, as well as the institutional view that firms mimic popular strategies of other firms (Gulati and Singh, 1998). In addition, the temporal trend is controlled by including three dummy variables for each year (Y95, Y96, Y97) in the 1994-1997 period, with the default year being 1994.

**Statistical model**

Logistic regression can be used to test structural choices between equity alliances and non-equity alliances. However, since our dependent variable has trichotomous responses (i.e. three categories) and the independent variables include both categorical and continuous ones, the appropriate statistical approach is a multinomial logistic regression (logit) model. An ordinal model would be inappropriate since the three choices are nominal in nature. A multinomial logit model allows us to test a single choice among three alliance structures: joint ventures, minority equity alliances, and contractual alliances. The general specification of the model used was as follows:

\[
\ln(P_j/P_o) = a + b_jX_j
\]

where \(p_j\) is the probability of an event-taking place for the \(j\)th case. In models 1-2 the two possible events are:

1. a minority equity alliance; and
2. a joint venture.

\(P_o\) is the probability of the default condition, taken here to be either a contractual alliance (models 1-2) or a joint venture (model 3). \(X_j\) is the vector of independent variables. The CATMOD procedure of the SAS program was used to run the logit model.

**Results**

Table I reports the basic descriptive statistics and correlations for all variables included in this study. It shows that the average number of prior alliances was 2.8, and that 47 percent of the alliances were international. While 55 percent had a joint R&D component, 71 percent had a joint marketing component in the alliance. During the period, 14 percent and 40.5 percent were formed as minority equity alliances and joint
Table I. Descriptive statistics and correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Low</th>
<th>High</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alliance structure choice</td>
<td>1.95</td>
<td>0.93</td>
<td>1</td>
<td>3</td>
<td>–</td>
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<tr>
<td>2. Joint R&amp;D</td>
<td>0.55</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
<td>0.14</td>
<td>–</td>
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<tr>
<td>3. Joint marketing</td>
<td>0.71</td>
<td>0.45</td>
<td>0</td>
<td>1</td>
<td>0.19</td>
<td>0.01</td>
<td>–</td>
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<td>4. Alliance management experience</td>
<td>2.80</td>
<td>5.54</td>
<td>0</td>
<td>46</td>
<td>−0.21</td>
<td>0.09</td>
<td>0.01</td>
<td>–</td>
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<td></td>
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<tr>
<td>5. International partners</td>
<td>0.47</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
<td>0.24</td>
<td>−0.07</td>
<td>−0.05</td>
<td>−0.15</td>
<td>–</td>
<td></td>
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<tr>
<td>6. Percent minority equity</td>
<td>14.00</td>
<td>5.75</td>
<td>0</td>
<td>40</td>
<td>−0.06</td>
<td>0.03</td>
<td>−0.09</td>
<td>0.03</td>
<td>0.03</td>
<td>–</td>
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<tr>
<td>7. Percent joint ventures</td>
<td>40.52</td>
<td>16.06</td>
<td>0</td>
<td>75</td>
<td>0.32</td>
<td>−0.04</td>
<td>0.04</td>
<td>−0.18</td>
<td>0.10</td>
<td>−0.38</td>
<td>–</td>
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<tr>
<td>8. Y95</td>
<td>0.50</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
<td>−0.08</td>
<td>0.01</td>
<td>−0.01</td>
<td>−0.14</td>
<td>0.05</td>
<td>0.04</td>
<td>0.01</td>
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<tr>
<td>9. Y96</td>
<td>0.23</td>
<td>0.42</td>
<td>0</td>
<td>1</td>
<td>−0.03</td>
<td>0.10</td>
<td>−0.01</td>
<td>0.32</td>
<td>−0.09</td>
<td>−0.02</td>
<td>−0.01</td>
<td>−0.55</td>
<td>–</td>
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<tr>
<td>10. Y97</td>
<td>0.08</td>
<td>0.27</td>
<td>0</td>
<td>1</td>
<td>0.01</td>
<td>0.08</td>
<td>0.03</td>
<td>0.07</td>
<td>−0.05</td>
<td>−0.10</td>
<td>0.03</td>
<td>−0.29</td>
<td>−0.16</td>
<td>–</td>
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</table>

Notes: n = 765. Correlations with absolute value > 0.07 are significant at the 5 percent level, > 0.09 significant at the 1 percent level.
ventures, respectively, which leaves 45.5 percent as contractual alliances. The correlations show that multicollinearity is not a serious problem for the data.

Table II provides results for the multinomial logistic regression analysis on alliance structure choice. Since the choice is among three alliance governance structures (e.g. joint ventures, minority equity alliances, and contractual alliances), in models 1-2 we used contractual alliances as the base category and contrasted it against the other two. The differences between joint ventures and minority equity alliances were further examined through another regression (model 3) in which joint ventures were set as the base category. The coefficients in the models show the effects of the variables for each alliance type relative to their effects for the base category.

To examine the robustness of the results, we gradually entered variables in the models. Model 1 included the control variables only. The results show that the institutional and temporal trends had a significant impact on alliance structural choices. For example, joint ventures were less likely in years 1995 and 1996 as compared to year 1994. Overall, the model is highly significant, as is evident in the goodness-of-fit results (chi-square of likelihood ratio = 63.20). The p-value (0.58) is much higher than 0.05, indicating a good fit with the data.

In model 2 we added the four independent variables. The model is highly significant, based on the high goodness-of-fit number. Besides, there is significant improvement from model 1 to model 2 (chi-square of likelihood ratio increased from 63.20 to 771.00 and p-value from 0.58 to 0.99), indicating that the four independent variables indeed contribute to the explanatory power of the model. Model 3 and model 2 have the same independent and control variables, except that they have joint ventures and contractual alliances as the base category for the dependent variable, respectively. In other words, model 2 compares its base category of contractual alliances against minority equity alliances and joint ventures. Model 3 compares the base category of joint ventures against the other two forms. Thus, the coefficients for joint ventures in model 2 and those for contractual alliances in model 3 have the same values but opposite signs, since both compare joint ventures with contractual alliances. For example, a positive and significant coefficient under joint venture in model 2 (such as joint R&D) suggests that joint R&D alliances are more likely to be joint ventures rather than contractual ones (the base category). Throughout models 1-3, the effects of the control variables are quite consistent.

H1a proposes that the alliance objective of joint R&D would encourage more equity-based governance structures. This hypothesis is consistently supported by the results in models 2 and 3. With a joint R&D component in alliances, joint ventures were found to be more likely than minority equity alliances (p < 0.05 in model 3), which in turn were more likely than contractual alliances (p < 0.05 in model 2). Accordingly, the difference between joint ventures and contractual alliances is even more significant (p < 0.001 in model 2).

H1b predicts that the alliance objective of joint marketing would lead to more equity-based governance structures. Consistent with this hypothesis, the positive coefficient in model 2 suggests that joint ventures are more likely than contractual alliances when there is a joint marketing component (p < 0.001). The negative coefficient in model 3 further confirms that, with joint marketing, joint ventures are more likely than minority equity alliances (p < 0.001). However, no significant
### Table II.
Multinomial logistic regression of tendency to form different types of alliances

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minority equity</td>
<td>Joint venture</td>
<td>Contractual</td>
</tr>
<tr>
<td>Intercept</td>
<td>-4.48***</td>
<td>-3.98***</td>
<td>-3.23***</td>
</tr>
<tr>
<td></td>
<td>(0.43)</td>
<td>(0.43)</td>
<td>(0.43)</td>
</tr>
<tr>
<td>Joint R&amp;D</td>
<td>0.02</td>
<td>0.04</td>
<td>0.07**</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Joint marketing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliance management experience</td>
<td>0.11***</td>
<td>0.05**</td>
<td>0.03***</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>International partners</td>
<td>-0.11**</td>
<td>-0.15**</td>
<td>-0.12**</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Percent minority equity</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Percent joint ventures</td>
<td>0.04**</td>
<td>0.05**</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Y95</td>
<td>0.02</td>
<td>0.11</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Y96</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.12</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Y97</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Chi-square of likelihood ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p value</td>
<td>0.38</td>
<td>0.58</td>
<td>0.99</td>
</tr>
</tbody>
</table>

Notes: n = 765; all two-tailed tests. *p < 0.05, **p < 0.01, ***p < 0.001. Coefficients are effects of covariates for each alliance type relative to their effects for the base category, which is contractual alliances for models 1, 2 and joint ventures for model 3, respectively. Standard errors are in parentheses.
difference was found between minority equity alliances and contractual alliances in model 2. Thus, $H1b$ is mostly supported.

$H2$ suggests that firms with more alliance management experience tend to form less equity-based alliances. Significant and negative coefficients in model 2 confirm that more alliance experience makes minority equity alliances and joint ventures less likely ($p < 0.01$). However, no significant difference was found between minority equity alliances and joint ventures in model 3. Overall, $H2$ is largely supported.

$H3$ predicts that international alliances tend to have more equity-based governance structures. The positive coefficients in model 2 suggest that, consistent with $H3$, joint ventures are more likely than contractual alliances in international alliances ($p < 0.001$). Yielding additional support, model 3 shows that minority equity alliances are less likely than joint ventures in international alliances ($p < 0.001$). No significant difference was found between minority equity alliances and contractual alliances. Thus, $H3$ is mostly supported.

Overall, there is strong and consistent support for our hypotheses. In sum, the level of equity in the governance structures will be high when:

- there is a joint R&D objective or a joint marketing objective;
- the partners have limited alliance management experience; and
- the partners are from different nations.

Discussion
This study aims at understanding alliance structural choices in terms of the three key factors, namely, alliance objectives, alliance management experience, and international partners. The empirical results are strongly supportive of our hypotheses and thus lead to several conclusions. First, the results support the idea that the bifurcated approach toward alliance structure (i.e. equity vs. non-equity alliances) needs to be refined. Previously, researchers often used the bifurcated approach to understand alliance structures for purposes of simplicity and for highlighting the role of equity arrangement (Das and Teng, 2000; Gulati, 1995; Osborn and Baughn, 1990). However, as Gulati and Singh (1998) argued, within equity alliances, joint ventures and minority equity alliances could be significantly different. Our results support their position and suggest that the three categories used in this study are warranted. Of the four independent variables, only one (i.e. alliance management experience) fails to show a significant difference between joint ventures and minority equity alliances (see model 3).

Second, we found that alliance objectives, alliance management experience, and international partners are important determinants of alliance governance structure. In a previous study, Gulati and Singh (1998) examined the effects of joint R&D and international alliances on alliance structure. They found that alliances with an “expected technological component” (i.e. joint R&D) preferred more equity involvement. Based on partner nationality, their study showed some evidence that cross-regional partners tended to use more equity involvement. This tendency was most significant with European firms, partly significant with Japanese firms, but non-significant with US firms. In our current study, we confirm that joint R&D alliances indeed have more equity involvement. Regarding partner nationality, our dummy variable is based on a cross-national classification rather than the...
cross-regional classification used by Gulati and Singh. Our study generally confirms that international alliances have more equity involvement. The results are highly significant between joint ventures and the other two forms but not significant between minority equity alliances and contractual alliances. Importantly, Gulati and Singh use contractual alliances as the base category in all regressions, so that they do not examine the difference between joint ventures and minority equity alliances. By comparison, our analyses cover all possible comparisons among the three kinds of alliance structures.

We also tested two additional factors, namely, the alliance objective of joint marketing and alliance management experience. Previous studies often used the total number of prior alliances between two specific partners as an indicator of interfirm trust. In contrast, our measure includes all prior alliances formed by the firms (with any partner) and is thus better reflective of the notion of “collaborative know-how” (Simonin, 1997). Our confirmative result indicates that firms’ overall experience with alliances matter substantially in the choice of the alliance structure. In addition, we have included another important and under-tested alliance objective – joint marketing – which turns out to be highly significant as well. Thus, this study makes a contribution in identifying additional determinants of alliance structures.

Our findings are subject to the following limitations, which point to directions for future research. First, since all data for this study came from a single source, there is some potential for common method bias. Second, our data were based on a published source that relies upon press announcements of alliances. Although this approach has been popular among alliance researchers, there is a potential bias toward larger alliances in the selection process. Smaller alliances tend to be reported less and thus are less likely to be included in the database. Obviously, the solution lies in developing a comprehensive alliance database that would allow studies with a focus on specific industries or strategic groups. Third, since this study used a large multi-national sample, we were not able to collect firm-specific information for some common control variables such as firm size, performance, and SIC codes. Future research using a survey method may be needed to gather information regarding these additional control variables.

The findings of this study hold important implications for alliance managers. First, we find that joint R&D alliances need more equity-based governance structures. The implication is that knowledge acquisition and protection are both important in R&D alliances. Joint ventures not only provide a setting for legitimate knowledge transfer to take place, the equity arrangement also serves as a control mechanism against illegitimate knowledge acquisition. Thus, alliance managers should pay special attention to ensure the appropriate balance between knowledge acquisition and knowledge protection. Control mechanisms other than alliance structure (such as close monitoring and tight knowledge regulation) should be considered as well.

Second, joint marketing alliances also have more equity-based structures. Many alliance managers face a difficult task of determining outcome allocation early on in order to avoid possible disputes later, especially as an alliance can be vulnerable to termination. When an alliance involves considerable intangible assets, such as brand image and reputation (as in a joint marketing alliance), such ex ante allocation could be challenging. Thus, managers ought to use alliance structures to help deal with the residual allocation issue.
Third, alliance management experience leads to a less emphasis on equity involvement. This finding suggests that many firms carefully evaluate their collaborative know-how prior to alliance formation. The cognitive process seems to aim at a balance between flexibility and stability. While equity structures promote stability and confidence in cooperation, their level of flexibility is lower. Thus, they are usually preferred when firms lack alliance experience. In contrast, experienced firms may find the equity structures to be unnecessarily rigid and thus prefer more flexible arrangements. This appears to be a rational approach that managers could explicitly develop in choosing alliance structures.

Finally, the fact that international alliances have more equity involvement highlights the importance of resource management in alliances. The conventional wisdom views structural choices of international alliances through a risk perspective, which suggests that international alliances should have flexible structures since they are more risky due to cultural and regulatory factors. Our result shows that managers do not follow such logic. Equity structures are used instead, presumably to better deal with high resource heterogeneity in international alliances. Indeed, resource management should be a critical consideration in structuring alliances (Das and Teng, 2000). For instance, managers could choose desirable alliance structures by systematically examining the types of resource contributed by each partner.

In conclusion, this empirical investigation advances our understanding of governance structure choices in strategic alliances. The four determinants of higher equity involvement include a joint R&D objective, a joint marketing objective, limited alliance management experience, and international partners.

References
Alliance Analyst (1994), Newcap Communications, Alliance Analyst, Philadelphia, PA.


**Further reading**


**Corresponding author**

T.K. Das can be contacted at: TK_Das@baruch.cuny.edu

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