The Market Share Impact of Inter-Partner Learning in Alliances: Evidence from the Global Auto Industry

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Abstract

We investigate how inter-partner learning in alliances impacts the competitive positions of the involved partner firms. We identify two types of alliances: scale alliances in which the partner firms contribute similar resources to their joint endeavor, and link alliances in which the partners contribute complementary resources. Our study shows that the relative market share of the partners varies significantly more in link alliances than it does in scale alliances. This result suggests that "link" alliances lead to greater levels of inter-partner learning. A longitudinal study assessing 135 strategic alliances formed by competing firms in the global automotive industry from 1966 to 1995 supports this analysis.

Key words
- Inter-partner learning
- Resource transfers
- Change of competitive position
- Automobile industry
- Alliances between competitors
- Scale alliances
- Link alliances
- Market Share
- Alliance outcomes
- Alliance dynamics
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This study investigates how strategic alliances affect the relative market shares of the partner firms and argues that these changes in competitive position stem from learning that occurs during the collaborations. We define strategic alliances as arrangements between two or more independent companies that choose to carry out a project or operate in a specific business area by coordinating the necessary skills and resources jointly rather than either operating on their own or merging their operations. This definition of alliances includes equity joint ventures as well as partnerships that did not entail the creation of a separate legal entity. In this study, we focus on alliances formed by competitors.

Research on interfirm collaboration has recently begun to explore the issue of alliance dynamics (Ring and Van de Ven, 1994; Singh and Mitchell, 1996; Gulati, 1998; Koza and Lewin, 1998). The main emphasis has shifted from examining conditions that favor alliance formation (Harrigan, 1985; Teece, 1986; Contractor and Lorange, 1988; Hennart, 1988; Kogut, 1988; Oliver, 1990; Williamson, 1991) to investigating the impact of alliances on the partner firms (Kogut, 1989; Blodgett, 1992; Lorange and Roos, 1992; Dussauge and Garrette, 1995; Doz, 1996; Mitchell and Singh, 1996; Park and Russo, 1996; Nakamura, Shaver and Yeung, 1996; Park and Ungson, 1997; Hennart, Roehl and Zietlow, 1999). This paper aims at contributing to our knowledge of alliance dynamics. Our arguments focus on the potential for strategic alliances to help partners learn about each other’s capabilities.

Our primary underlying concepts draw from an inter-organizational version of the resource-based view of the firm. The resource-based view suggests that firms’ competitive advantages derive from their preferential access to idiosyncratic resources, especially tacit knowledge-based resources (Penrose, 1959; Wernerfelt, 1984; Conner, 1991; Amit and Shoemaker, 1993). However, it has long been recognized that no one business can create all resources needed to prosper and grow. Instead, collaboration among businesses that possess complementary resources is often necessary for survival and growth, and provides a means of combining resources held by different firms in order to exploit new business opportunities. Collaboration provides an effective way of combining resources that are subject to a high degree of knowledge-based market failure (Itami and Roehl, 1987; Mitchell and Singh, 1993, 1996; Gulati, 1998). Moreover, collaboration helps firms to protect the value of their
resources through financial and organizational safeguards against opportunistic behavior (Teece, 1986; Hennart, 1988; Bresser, 1988; Kogut, 1988; Jorde and Teece, 1990; Williamson, 1991; Chi, 1994). Thus, collaboration provides potential benefits to all partners.

Despite the potential advantages of collaboration, collaboration also may create favorable conditions for inter-partner learning and may allow one partner to appropriate and internalize resources that another partner contributed (Balakrishnan and Koza, 1993; Nakamura, Shaver and Yeung, 1996; Lane and Lubatkin, 1998; Kumar and Nti, 1998). Such appropriation is a particularly critical issue when alliances associate competing firms. When the partner firms in an alliance are also competitors in a product market, there will be many opportunities for inter-partner learning and major competitive consequences of such learning (Pucik, 1988; Hamel, Doz and Prahalad, 1989; Hamel, 1991). Alliances between competitors can lead to the loss of critical proprietary knowledge, to increased dependence of one partner vis-à-vis the other, and even to the takeover of one partner by the other (Bleeke and Ernst, 1995). Distinguishing between alliances that are likely to contribute to all partners and alliances that will tend to favor some partners is conceptually and managerially important (Hennart, Roehl and Zietlow, 1999).

We discriminate between two types of alliances that will provide different opportunities for learning. We argue that alliances in which the partners contribute asymmetric knowledge, which we refer to as link alliances, tend to favor skill transfers. In contrast, we argue that alliances in which the partners contribute similar knowledge, which we refer to as scale alliances, are more likely to continue without substantial skill transfer. The analysis focuses on changes in relative market share that occur as a consequence of collaboration. We assume that changes in relative competitive position reflect changes in the resource endowments of the allied firms and that learning that occurs during alliance activities influences such shifts. Consistent with the argument that link alliances are more conducive to inter-partner learning, we expect significant changes in relative market share to be more prevalent in link alliances than in scale alliances. The empirical analysis examines 135 alliances among competing firms in the global automobile industry, from 1966 to 1995.

**Learning in alliances**

Many studies show that strategic alliances are an important mechanism through which firms can acquire capabilities (Pucik, 1988; Hamel, Doz and Prahalad, 1989; Hamel, 1991;

A first stream of research on learning in alliances has linked the extent of resource transfers or the ease with which capabilities are acquired to particular features of the partners, the partnerships, or the resources to be transferred. Hamel, Doz and Prahalad (1989) as well as Hamel (1991) have argued that three main factors influence the extent to which learning and transfers will occur in an alliance: (i) the "strategic intent" of each firm with respect to learning from its partner, (ii) the "transparency" of each partner, i.e., its openness vis-à-vis its ally, and (iii) the "receptivity" of each partner, i.e., its ability to learn from the other firm and to diffuse the captured skills within its own organization. Simonin (1999) has shown that tacitness, asset specificity, prior alliance experience, complexity, partner protectiveness, cultural distance, and organizational distance all affect technological knowledge transfer. Kale, Singh and Perlmutter (2000) demonstrate that relational capital based on mutual trust associated with interaction at the individual level create a basis for learning and know-how transfer.

A second stream of research has linked inter-partner learning in alliances to alliance outcomes and to the impact of alliances on each partner-firm. Khanna, Gulati, and Nohria (1998) stress the impact of learning on the evolution of alliances, linking the relative competitive or cooperative nature of the relationship to the extent to which the partners can exploit the skills they acquire in the alliance within the context of their own activities. Nakamura, Shaver and Yeung (1996) identified two contrasting patterns of joint venture evolution that they link to learning. They observe that the parent firms’ intangible competitive capabilities tend to either converge or diverge, and argue that capability convergence stems from learning. Their study shows that convergence of capabilities reduces the life expectancy of a joint venture, whereas partner specialization leads to longer duration of the joint venture.

Our study aims at narrowing the gap between these two streams of research by demonstrating that alliance type strongly influences inter-partner learning, which in turn is a determinant of changes in relative competitive position. We address issues concerning
learning by alliance partners in link and scale alliances, and then offer predictions concerning how learning will produce changes in the market shares of the partners.

Research on inter-organizational learning (Argyris and Schön, 1978; Fiol and Lyles, 1985; Dosi, 1988; Moingeon and Edmondson, 1996) has shown that firms are better able to acquire new capabilities when they already have a competence base that is similar to the new knowledge that they seek. Cohen and Levinthal (1990) use the term absorptive capacity to express this idea. In this view, firms are more likely to graft a new skill successfully to a closely related competence base. Firms operating in the same business typically share a common competence base because they use similar technologies, satisfy similar customer needs, serve similar customers, and offer related products. Building on this idea, Lane and Lubatkin (1998) argue that firms that share similar concerns and face similar problems, and therefore have similar dominant logics (Prahalad and Bettis, 1986; Bettis and Prahalad, 1995), can more easily learn from one another. Competing firms, because they operate in a similar context, often confront similar issues and, hence, develop overlapping dominant logics. Therefore, alliances between competitors tend to create contexts that particularly favor inter-partner learning (Hamel, 1991). Park and Russo (1996: 878) argue that "the potential for appropriability in a joint venture setting clearly is higher when the partners are direct competitors" and offer empirical evidence that supports this argument.

But, for learning to occur within an alliance, an overarching condition is that the partner-firms actually have significant skills to learn from one another. Although they operate in a similar context, firms that compete in the same industry also tend to possess specific idiosyncratic skills and capabilities (Nelson and Winter, 1982; Nelson, 1991; Rumelt, Schendel and Teece, 1991). Differences in the resource endowments of factors such as technologies, engineering, and production capabilities, products, and market presence create the potential for firms to combine complementary assets, through alliances, in order to pursue new business opportunities. At the same time, firms with complementary resource endowments potentially have significant opportunities to learn from one another. Despite the organizational safeguards that firms set up to limit uncontrolled information disclosure (Bresser, 1988), firms can use the alliance as a means of acquiring new resources from their partners in those areas where they have deficiencies. If collaboration is to be a mechanism by which firms acquire such resources, then not only do the partners’ resource endowments need
to differ, but the firms must also make different contributions to the joint endeavor. In other words, not only must the partners possess different capabilities for skill transfer to occur in the context of cooperation, but the partners also must contribute different resources to the alliance for the other party to enter in contact with the skills or capabilities they seek to acquire.

**Scale and link alliances**

Analysts recently have begun to categorize alliances in terms of the similar or different nature of the respective contributions that the partner firms make to the alliance. Porter and Fuller (1986: 336) contrast "X form" and "Y form" coalitions between competitors, stating that "... in X coalitions, firms divide the activities within an industry between themselves (for example, one partner manufactures while letting the other market). In Y coalitions, the firms share the actual performance of one or more value activities (for example, a joint marketing agreement)". Drawing on transaction cost economics, Hennart (1988) identifies scale joint ventures on the one hand and link joint ventures on the other. According to Hennart, (1988: 362) "Scale JVs are created when two or more firms enter together a contiguous stage of production or distribution or new market...[while] in link JVs, the position of the partners is not symmetrical". Dussauge, Garrette, and Mitchell (2000) showed that alliance outcomes vary with the scale-link distinction. Building on the transaction cost theoretical background, meanwhile, Park and Russo (1996: 878) argue that "a key factor in joint venture outcomes is the nature of the partners' contributions to the operation".

The scale-link distinction tends to reflect different objectives and contributions that firms assign to alliances. Scale alliances, in which the partners contribute similar resources pertaining to the same stage or stages in the value-chain, produce significant economies of scale for activities that firms carry out in collaboration. That is, scale alliances allow the partners to achieve scale economies and to reduce excess capacity. Such scale alliances can include joint R&D efforts, the joint production of a particular component or sub-assembly, or the manufacture of an entire product. The PRV alliance set up in 1971 by Peugeot, Renault, and Volvo to develop and manufacture a common V6 engine falls into the scale category, as does the Ford-Volkswagen Auto-Europa alliance formed in 1991 to jointly produce a minivan for the European market. Such scale alliances provide a way of avoiding, or at least postponing, mergers in industries undergoing strong concentration processes (Dussauge and Garrette, 1999).
Link alliances, in contrast with scale alliances, aim at combining different and complementary skills and resources that each partner contributes. Link alliances include partnerships in which one partner provides market access to products that another firm developed, such that the two allies create a form of customer-supplier relationship. The 1971 agreements between Chrysler and Mitsubishi, as well as the agreements linking General Motors to Isuzu in the 1970s and 1980s, are examples of link alliances. Link alliances may involve joint manufacturing in some cases, such as in the 1983 NUMMI joint venture between General Motors and Toyota, if the other components of the value-chain remain distributed between the partner firms.

All alliances create the potential for mutual dependence between the partner firms, which may or may not change as an alliance unfolds. In link alliances, mutual dependence associates with the complementary nature of the resource endowments of the partners. The dependence will shift if one of the partners is able to acquire resources that the other partner initially held and/or acquire greater understanding of the partner’s resources. While firms tend to undertake explicit exchange in order to acquire tangible resources, they can, as we argued earlier, acquire intangible knowledge-based resources through an ongoing learning process associated with the alliance activity. Firms involved in link alliances have incentives to reduce their dependence by acquiring the skills and other intangible capabilities that underlie the other partner’s contributions. This dependence incentive increases owing to the fact that complex intangible resources are, as the resource-based view suggests, a more sustainable source of competitive advantage because of causal ambiguity problems (Barney, 1991) and are difficult to exchange outside an organizational context that makes learning possible (Chi, 1994). Because of the causal ambiguity and organizational difficulties, firms may be able to use tacit resources more effectively within a single organization rather than through coordination across organizational boundaries.

In scale alliances, in contrast with link alliances, the very similarity in the resources that each partner contributes limits the extent to which the collaboration will cause the firms to gain new skills and other intangible resources. Therefore, dependence is less likely to shift during the life of a scale alliance than in the case of a link alliance. Hence, the extent to which partner firms learn from each other is likely to vary systematically in scale and link alliances,
with greater learning opportunities in link alliances. The learning, in turn, will shape the impact that inter-firm collaboration has on the relative competitive position of the partners.

**Hypotheses**

This study examines to what extent scale and link alliances between competing firms lead to different levels of inter-partner learning. We first test that link alliances offer significantly larger opportunities for inter-partner learning than do scale alliances. Second, we investigate whether greater inter-partner learning does actually take place in link alliances; we do so by testing whether link alliances produce more significant shifts in the relative competitive positions of the partner firms than do scale alliances. Our prediction that link alliances offer greater opportunities for inter-partner learning is based on the argument that such opportunities are created by pre-existing differences in the resource endowments of the partner-firms. We examine two dimensions along which partner firms may differ: firm size and geographic origin.

First, most of the literature in economics and strategy links differences in firm size to different sources of competitive advantage, notably economies of scale, bargaining power, innovative capacity, product differentiation, flexibility etc (Schumpeter, 1939; Porter, 1980; Figenbaum and Karnani, 1991). If link alliances are indeed aimed at benefiting from partner complementarities, they should associate firms with greater differences in size than do scale alliances. For instance, a large volume auto maker seeking to enter a new segment is more likely to form an alliance with a niche player than with another large producer. When Renault entered the minivan segment, it chose to do so by forming a link alliance with Matra-Automobile, a small specialized auto manufacturer, not with Peugeot or Volkswagen. In the same way, General Motors formed a link alliance with Isuzu, one of the smaller Japanese car makers, to produce micro delivery vans. In contrast, as scale alliances are formed in order to benefit from increased economies of scale, partners will not choose each other on the basis of their resource complementarities and will therefore have no reason to seek each other based on size differences. In addition, each partner will only agree to engage in a scale alliance if the increased volume or size contributed by the other partner is large enough to produce significant savings that will outweigh the increased cost and complexity due to the collaboration itself. In other words, it is rarely worthwhile for a firm to engage in a scale
alliance with a small partner, relative to its own size, because the expected additional economies of scale will not exceed the cost of collaborating. Hence, in scale alliances, partner firms have an incentive to team up with partners of a similar size. This argument is consistent with the transaction cost theory of joint ventures developed by Hennart (1988). It also corresponds to the view of Porter and Fuller (1986) who argue that Y coalitions tend to be formed by partners that are more similar in strengths and weaknesses. On this basis, we can formulate the following hypothesis:

H1a: The greater the difference in partner size, the more likely an alliance will be a link alliance rather than a scale alliance.

In the same line of reasoning, the geographic origins of alliance partners is another significant source of diversity or similarity between the partner firms (Parkhe, 1991). Porter (1990) in particular, has argued that companies originating from a specific geographic location where a strong industry "cluster" has emerged develop unique sources of advantage. Therefore, if firms form link alliances in order to benefit from combining their complementary skills and resources, we should expect to see more geographically diverse partners forming link alliances. Hence the following hypothesis:

H1b: Alliances among partners from different geographic areas are more likely to be link alliances than scale alliances.

We now turn to changes in competitive position. Several authors argue that learning, technology transfers, and skill appropriation in alliances are the main factors that lead to one partner strengthening its position vis-à-vis the other (Reich and Mankin, 1986; Hamel, Doz and Prahalad, 1989; Hamel, 1991; Dussauge, Garrette and Mitchell, 2000). In this perspective, alliances are sometimes seen as "Trojan Horses" giving one firm access to its partner's critical skills and resources (Ohmae, 1989; Hennart, Roehl and Zietlow, 1999). We have argued above that link alliances offer a greater potential for inter-partner learning than do scale alliances. If such learning and skill appropriation does actually take place, then we should expect link alliances to produce more significant changes in the relative competitive position of the partners than scale alliances. On this basis, we can formulate the following hypothesis:
H2: The relative competitive position of the partner firms will change more over time in the case of link alliances than in that of scale alliances.

**Data and variables**

We focused on one industry setting, the automobile industry, in order to assess the market share impact of alliances. We tested our hypothesis on a set of alliances associating automobile manufacturers originating from North America, Europe, or Asia (Japan and Korea). All the alliances involved operations in one of these three zones. We excluded agreements with purely local purposes, where none of the partners’ main markets was involved (e.g., we did not consider agreements such as the Australian General Motors-Toyota joint venture, or the Autolatina alliance that Ford and Volkswagen formed to jointly operate in Brazil and Argentina). We also excluded the supply of components and sub-assemblies (e.g., engines and transmissions) from one manufacturer to another, because the exchanges are closer to market transactions than to strategic alliances. In addition, we excluded government-sponsored research consortia, associating numerous participating firms, such as those set up by the European Union. Other multiple partner alliances were broken down into a set of bilateral partnerships involving each possible pair of allies. Our definition of alliances includes both equity joint ventures (Killing, 1983) and contractual alliances that do not involve freestanding alliance facilities.

The data has the following characteristics. Each data point corresponds to an agreement between two partners, covering one of the following four business areas: cars, trucks, parts and sub-assemblies, and research. Each agreement operates in at least one of three geographic zones: Europe, North America, or Asia. Each agreement corresponds to a specific allocation of tasks among the two partners and the alliance. In this approach, an alliance between an American and a Japanese automaker by which they each agree to market one of the other's models in their respective home markets would be broken down into two cases: one for the marketing of the American car by the Japanese partner in Japan, the second for the marketing of the Japanese car by the American partner in North America. Unlike many studies, we did not consider renewed alliances between the same partners in the same business and geographic areas as different data points, provided that the organization remained similar.

We gathered the data from secondary sources. Examples include industry reports, manufacturer associations' publications, and journals specializing in the automotive industry (such as *Automotive News*). An annual survey issued by the French Automobile
Manufacturers' Association (Comité des Constructeurs Français d'Automobiles) on the evolution of alliances formed by automobile producers throughout the world provided longitudinal data on all alliances in the industry.

Table 1 reports summary statistics for the variables. Three variables describe each alliance at the time of formation. The type of alliance (LINK ALLIANCE) is a dummy variable taking on the value 1 in the case of link alliances and 0 in that of scale alliances. Each examined alliance was determined to be either a scale alliance or a link alliance according to the criteria mentioned in the "scale and link alliances" section of this paper. This variable was coded independently by three different coders, including two authors and an industry expert. In this process, three cases were dropped because of conflicting coding from the coders.

The relative market share (RMS0) of the partner firms in the business area covered by the alliance, the year the alliance was formed, is the volume output of the smaller partner on the volume output of the larger partner. That is, RMS0 takes a larger value (closer to 1) when the market shares of the two firms are similar and a smaller value (closer to 0) when the market shares are very different. In this formula, the volume output of cars, trucks, or all vehicles was considered according to whether the alliance was for cars, trucks, or research, respectively. In the case of parts and sub-assemblies, a case-by-case decision was made, depending on the type of component involved.

The variable denoting geographic origins of the partner firms (INTERCONTINENTAL ALLIANCE) took on the value 1 when the partner firms originated from different continents, and 0 when both partners originated from the same continent. In order to test hypotheses H1a and H1b, concerning alliance type, we used a logistic regression using LINK ALLIANCE as the dependent variable. RMS0 and INTERCONTINENTAL ALLIANCE were the key independent variables.

The alliance-type analysis includes several control variables. The year in which the alliance was formed (FOUNDING YEAR) controls for changes in the environment (e.g., increasing economies of scale, globalization of the automobile industry) that might influence the likelihood of forming either scale or link alliances. The geographic zone in which the alliance is formed (ALLIANCE ZONE) has three categorical values (EUROPE, NORTH AMERICA, ASIA) and describes the main market targeted by the alliance. The business in
which the alliance was formed (TRUCKS) is a dummy variable taking the value of 1 for alliances formed in the truck business and 0 otherwise. TRUCKS controls for peculiarities of the truck business (e.g., lesser concentration and globalization, smaller output levels, less economies of scale) that might affect the type of alliances formed.

To test hypothesis H2, we estimated multivariate least squares regressions on two dependent variables. \( dRMS_3 \) and \( dRMS_7 \) record the absolute variation in relative market share three years and seven years after the alliance was formed.

\[
\begin{align*}
dRMS_3 &= \frac{|RMS_3 - RMS_0|}{RMS_0} \\
dRMS_7 &= \frac{|RMS_7 - RMS_0|}{RMS_0}
\end{align*}
\]

In these formulas, \( RMS_3 \) and \( RMS_7 \) are calculated in the same way as \( RMS_0 \), using volume outputs of the partners in the third and seventh year after the alliance formation date. The variables can be easily interpreted since they correspond to the percent growth or decline in relative market share following formation of the alliance. We chose the two time periods in order to examine both short-term and longer-term influences on competitive positions.

When testing hypothesis H2, the type of the alliance (LINK ALLIANCE) is the key independent variable. In addition, we controlled for the relative geographic presence of the partners, differentiating between the origin of the smaller partner. INTERCONTINENTAL ALLIANCE: SMALL PARTNER IS HOST denotes whether the alliance was formed to operate in the home market of the smaller of the partner-firms. INTERCONTINENTAL ALLIANCE: SMALL PARTNER IS ENTRANT denotes whether the alliance was formed to operate in the home market of the larger of the partner-firms. INTERCONTINENTAL ALLIANCE: MULTIPLE COUNTRIES denotes a few cases in which the alliance was formed to operate globally, including in the home markets of both partner-firms. These three intercontinental alliance control variables are measured against the case where both partner-firms originate from the same continent (SAME-CONTINENT ALLIANCE). We identify the geographic status of the smaller partner because we wanted to determine whether small hosts tend to lose ground to larger entrants or, conversely, whether smaller entrants gain at the expense of their larger hosts. We also controlled for founding year, geographic zone, and truck segment, as we did in the analysis of hypotheses H1a and H1b.
**Results**

Table 2 presents the results of the logistic regression linking types of alliance to a set of determining factors, including relative market shares and geographic origins of the partner firms (H1a and H1b). Consistent with H1a, alliances formed by partner firms with different sizes tend to be link alliances; equivalently, alliances formed by similar-sized firms (RMS$_0$ close to unity) tend to be scale alliances. Consistent with H1b, alliances formed by firms with different geographic origins (intercontinental alliance) tend to be link alliances rather than scale alliances. Both hypotheses are supported at conventional statistical levels.

********** Table 2 about here **********

The results in Table 2 also show that alliances formed in North America and Asia are more likely to be link alliances than scale alliances, while alliances in Europe are more diverse. A possible explanation for this observation is that both the Asian and North American markets are more open to global competition and favor the formation of link alliances that firms use as market penetration devices. In the case of the North American market, more stringent anti-trust legislation may hamper the formation of scale alliances between competitors.

Table 3 presents the results of the regression analyses conducted to test hypothesis H2. We used subsets of the data in these models because of the longitudinal nature of the study: we could not observe changes in relative market share after three or seven years for some of the more recent alliances or in alliances that ended in less than three or seven years. We also removed five cases in order to avoid duplication of data: the formation of two alliances between the same partners in the same business must be separated by more than five years, for the same data on relative market share not to be computed twice.

********** Table 3 about here **********

The results in Table 3 support H2. Models 1a and 1b show that link alliances lead to greater three-year change in relative market share than do scale alliances. Model 1a assesses only the impact of the link alliance variable, while Model 1b adds the control variables. We undertake this two-step procedure to ensure that the significant link alliance coefficient in the full model (model 1b) does not arise because of endogeneity among the independent variables. Models 2a and 2b then show that link alliances lead to greater seven-year change in relative market share. Moreover, the parameter estimate for the independent variable LINK increases
notably from the three-year to the seven-year period, suggesting the impact of link alliances on changes in relative market share increases over time. Indeed, finding an effect that increases over time is consistent with the learning and skill appropriation argument underlying the hypothesis, because learning will tend to accumulate over time.

The only geographic presence variable that has significant influences is the small entrant-partner variable, after three years (less change in share). When the smaller partner is an entrant in the home market of the larger partner, there is less initial variation in relative market share, likely because smaller partners initially offer fewer learning opportunities. After seven years, by contrast, the difference in the impact on relative market share largely has disappeared, likely because firms manage to tease out learning opportunities over time, even from their smaller partners. This pattern suggests that alliances that survive for seven years or more have similar learning dynamics, no matter whether the smaller partner was an entrant or was based in the host country.

Discussion and conclusion

Our findings contribute to the understanding of alliance dynamics. We empirically support the theoretical distinction, suggested in the literature but rarely tested, between scale and link alliances. We provide two main results.

We first demonstrate that link and scale alliances fulfill different purposes. Our results indicate that firms of widely differing sizes or established in different regions of the world form link alliances more frequently than scale alliances. This result suggests that link alliances, by associating partners with different skills, create favorable conditions for inter-partner learning to take place. In contrast, the fact that scale alliances are formed between competitors with similar production volumes supports the idea that these partners are seeking primarily to benefit from increased economies of scale. Geographic proximity is also likely to enhance the potential for economies of scale. Capturing the partner's skills does not appear to be a priority objective in scale alliances.

We next show that the competitive positions of the partners vis-à-vis one another tend to change more significantly over time in link alliances than in scale alliances. This result suggests that capability transfers occur to a greater extent in link alliances than in scale alliances. By establishing the existence of a strong relationship between alliance type and
changes in relative competitive position, this study supports and extends previous results on the dynamics of scale and link alliances (Dussauge, Garrette and Mitchell, 2000).

The findings of this study should be interpreted with care. The fact that two competitors have formed a link alliance is unlikely, in itself, to explain the full variation in relative market share we observed. Other strategic factors, such as the pursuit of an aggressive growth and expansion strategy, which may be linked to the firm's decision to cooperate, are likely to influence variations in relative market shares. In this perspective, our results indicate that link alliances are one of the means firms can use to pursue aggressive market penetration strategies, while the rationale behind scale alliances is based more on efficiency considerations. Another limitation of our study is that we offer relatively simple motivations for firms to enter into either scale or link alliances. Instead, scale economies and skill appropriation objectives may coexist within the same alliance. One reason for such dual motivations is that the goals of both partners are not necessarily symmetric. A second reason is that firms sometimes can pursue scale and skill objectives concurrently. The relative weight of these motivations will then influence the selected type of alliance. Despite its limitations, the study complements previous research on strategic alliances and suggests interesting potential generalizations.

With respect to the automotive industry, our arguments and findings make it possible to further interpret and better understand results reported in prior work. Burgers, Hill and Kim (1993) found that the larger the size of a firm, the smaller, on average, the size of its partners. This finding, which is consistent with our results, was explained by the different attitudes of large, small and intermediate size firms towards demand and competitive uncertainties. Our study expands this argument by showing that alliances associating large and small firms are more likely to be link alliances triggered by skill appropriation and market penetration objectives, while economies of scale objectives result in the formation of scale alliances between mid-sized competitors. Our study also complements the work of Nohria and Garcia-Pont (1991). In their view, the global automotive industry structure should be analyzed in terms of firm membership in strategic groups and strategic blocks. While strategic groups are based on similarities in the strategic capabilities of firms, strategic blocks are networks of alliances. The authors suggest two types of strategic blocks: complementary blocks composed of firms from different strategic groups, and pooling blocks composed of firms from the same
strategic group. The complementary block notion is similar to the concept of link alliance, while pooling blocks correspond to networks of scale alliances. Our results thus complement the implications of strategic blocks for intra-industry performance differences.

In addition, assuming that results from the automobile industry generalize to other settings, the study sheds light on the underlying ambiguity that has made it difficult to gain a clear understanding of strategic alliances set up by competing firms and of their either competitive or anti-competitive impact. Some analysts have argued that alliances formed by rival firms are a means for one of the partners to strengthen its own position, while weakening that of its ally, through capturing skills and valuable resources. Another, opposing, view of alliances between competitors is that they are a modern form of coalition, that mutually benefit the partner firms but hurt outside competitors and that, unlike traditional cartels, create value and benefit for consumers (Berg and Friedman, 1978, 1981; Berg, Duncan and Friedman, 1982).

What our findings suggest is that alliances between rival firms as a whole are neither coalitions nor Trojan Horses. Instead, alliances fall into two categories. Link alliances, on the one hand, appear to be closer to the Trojan Horse view because of the opportunities for capability appropriation that they provide. Scale alliances, on the other hand, are closer to coalitions because, by increasing economies of scale, they strengthen the group of allied firms relative to other competitors.
References


Table 1. Descriptive statistics and product-moment correlations

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<td>-0.59</td>
<td>0.36</td>
<td>0.40</td>
<td>-0.03</td>
<td>0.11</td>
<td>-0.42</td>
<td>0.24</td>
<td>0.26</td>
<td>0.01</td>
</tr>
<tr>
<td>23-year change in market share (dRMS3)</td>
<td>0.22</td>
<td>1</td>
<td>0.38</td>
<td>-0.12</td>
<td>-0.06</td>
<td>0.14</td>
<td>-0.04</td>
<td>-0.06</td>
<td>0.17</td>
<td>-0.21</td>
<td>0.19</td>
<td>0.07</td>
<td>-0.06</td>
</tr>
<tr>
<td>37-year change in market share (dRMS7)</td>
<td>0.36</td>
<td>0.38</td>
<td>1</td>
<td>-0.30</td>
<td>-0.27</td>
<td>-0.12</td>
<td>0.38</td>
<td>0.14</td>
<td>0.10</td>
<td>-0.27</td>
<td>-0.05</td>
<td>0.32</td>
<td>-0.12</td>
</tr>
<tr>
<td>H1a: Relative market share (RMS0)</td>
<td>-0.23</td>
<td>-0.12</td>
<td>-0.30</td>
<td>1</td>
<td>0.11</td>
<td>0.02</td>
<td>-0.14</td>
<td>-0.06</td>
<td>0.01</td>
<td>0.10</td>
<td>-0.03</td>
<td>-0.07</td>
<td>0.03</td>
</tr>
<tr>
<td>Same-continent alliance</td>
<td>-0.59</td>
<td>-0.06</td>
<td>-0.27</td>
<td>0.11</td>
<td>1</td>
<td>-0.60</td>
<td>-0.60</td>
<td>-0.19</td>
<td>-0.18</td>
<td>0.37</td>
<td>-0.08</td>
<td>-0.30</td>
<td>-0.08</td>
</tr>
<tr>
<td>7 intercontinental alliance: Small partner is host</td>
<td>0.36</td>
<td>0.14</td>
<td>-0.12</td>
<td>0.02</td>
<td>-0.60</td>
<td>1</td>
<td>-0.22</td>
<td>-0.07</td>
<td>0.09</td>
<td>-0.19</td>
<td>0.24</td>
<td>-0.02</td>
<td>0.07</td>
</tr>
<tr>
<td>8 intercontinental alliance: Multiple countries</td>
<td>-0.03</td>
<td>-0.06</td>
<td>0.14</td>
<td>-0.06</td>
<td>-0.19</td>
<td>-0.07</td>
<td>-0.07</td>
<td>1</td>
<td>0.10</td>
<td>-0.14</td>
<td>-0.11</td>
<td>-0.07</td>
<td>-0.08</td>
</tr>
<tr>
<td>Founding year</td>
<td>0.11</td>
<td>0.17</td>
<td>0.10</td>
<td>0.01</td>
<td>-0.18</td>
<td>0.09</td>
<td>0.10</td>
<td>0.10</td>
<td>1</td>
<td>-0.40</td>
<td>0.39</td>
<td>0.00</td>
<td>-0.25</td>
</tr>
<tr>
<td>Alliance zone : Europe</td>
<td>-0.42</td>
<td>-0.21</td>
<td>-0.27</td>
<td>0.10</td>
<td>0.37</td>
<td>-0.19</td>
<td>-0.23</td>
<td>-0.14</td>
<td>-0.40</td>
<td>1</td>
<td>-0.65</td>
<td>-0.43</td>
<td>0.18</td>
</tr>
<tr>
<td>Alliance zone : Asia</td>
<td>0.24</td>
<td>0.19</td>
<td>-0.05</td>
<td>-0.03</td>
<td>-0.08</td>
<td>0.24</td>
<td>-0.09</td>
<td>-0.11</td>
<td>0.39</td>
<td>-0.65</td>
<td>1</td>
<td>-0.34</td>
<td>-0.21</td>
</tr>
<tr>
<td>Alliance zone : North America</td>
<td>0.26</td>
<td>0.07</td>
<td>0.32</td>
<td>-0.07</td>
<td>-0.30</td>
<td>-0.02</td>
<td>0.43</td>
<td>-0.07</td>
<td>0.00</td>
<td>-0.43</td>
<td>-0.34</td>
<td>1</td>
<td>0.06</td>
</tr>
<tr>
<td>Trucks</td>
<td>0.01</td>
<td>-0.06</td>
<td>-0.12</td>
<td>0.03</td>
<td>-0.08</td>
<td>0.07</td>
<td>0.07</td>
<td>-0.08</td>
<td>-0.25</td>
<td>0.18</td>
<td>-0.21</td>
<td>0.06</td>
<td>1</td>
</tr>
</tbody>
</table>

Cases  135  108  77  132  135  135  135  135  135  135  135  135  135
Mean  0.44  0.23  0.40  0.40  0.62  0.18  0.18  0.02  83.66  0.45  0.34  0.19  0.23
s.d.  0.50  0.28  0.43  0.29  0.49  0.38  0.38  0.15  7.56  0.50  0.48  0.39  0.42
Minimum  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
Maximum  1.00  1.52  2.00  1.00  1.00  1.00  1.00  1.00  94.00  1.00  1.00  1.00  1.00
Table 2: Logistic regression estimates of influences on formation of link v. scale alliances
(Please coefficients associate with link alliances, negative coefficients with scale alliances; n=135)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coef.</th>
<th>s.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a (-): Relative market share (RMS&lt;sub&gt;0&lt;/sub&gt;) close to unity</td>
<td>-2.85</td>
<td>1.06***</td>
</tr>
<tr>
<td>H1b (+): Intercontinental alliance</td>
<td>1.75</td>
<td>0.31***</td>
</tr>
<tr>
<td>Alliance zone : Europe</td>
<td>-0.45</td>
<td>0.49</td>
</tr>
<tr>
<td>Alliance zone : North America</td>
<td>1.44</td>
<td>0.60**</td>
</tr>
<tr>
<td>Alliance zone : Asia</td>
<td>1.48</td>
<td>0.53***</td>
</tr>
<tr>
<td>Founding year</td>
<td>-0.06</td>
<td>0.04</td>
</tr>
<tr>
<td>Trucks</td>
<td>0.43</td>
<td>0.33</td>
</tr>
<tr>
<td>Constant</td>
<td>5.91</td>
<td>3.03</td>
</tr>
</tbody>
</table>

** p<.05, *** p<.01
Table 3. Least squares regression analysis of impact of link alliances on change in partner relative competitive position
(positive coefficient = greater change in competitive position)

<table>
<thead>
<tr>
<th>Variable</th>
<th>3-year change in market share</th>
<th>7-year change in market share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1a Coef. s.e.</td>
<td>1b Coef. s.e.</td>
</tr>
<tr>
<td><strong>H2: Link alliance</strong></td>
<td>0.122 0.052**</td>
<td>0.125 0.070**</td>
</tr>
<tr>
<td>Intercontinental alliance: Small partner is host (a)</td>
<td>-0.027 0.082</td>
<td>-0.237 0.175</td>
</tr>
<tr>
<td>Intercontinental alliance: Small partner is entrant (a)</td>
<td>-0.165 0.088**</td>
<td>0.210 0.196</td>
</tr>
<tr>
<td>Intercontinental alliance: Multiple countries (a)</td>
<td>-0.248 0.207</td>
<td>0.291 0.431</td>
</tr>
<tr>
<td>Alliance zone : Europe (b)</td>
<td>-0.098 0.081</td>
<td>-0.055 0.159</td>
</tr>
<tr>
<td>Alliance zone : Asia (b)</td>
<td>-0.029 0.087</td>
<td>-0.111 0.191</td>
</tr>
<tr>
<td>Founding year</td>
<td>0.006 0.004</td>
<td>-0.002 0.008</td>
</tr>
<tr>
<td>Trucks</td>
<td>0.014 0.065</td>
<td>-0.108 0.112</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td>0.177 0.035***</td>
<td>-0.197 0.348</td>
</tr>
<tr>
<td><strong>R-square</strong></td>
<td>0.05</td>
<td>0.12</td>
</tr>
<tr>
<td><strong>Cases</strong></td>
<td>108</td>
<td>108</td>
</tr>
</tbody>
</table>

(a) Compared to intra-continental alliances
(b) Compared to North American zone

** p<.05, *** p<.01