ASSOCIATION BETWEEN COLLABORATIVE STRATEGIES AND PERFORMANCE

IN THE AIRLINE INDUSTRY

Track 04

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ABSTRACT

New organizational arrangements of a collaborative nature have been changing the traditional view of the business arena as a battlefield. An increasing number of studies have addressed the impact of collaborative strategies on the performance of members of strategic alliances. In the airline industry in particular the formation of multiple-partner alliances, or constellations, has gained the interest of scholarly work. The present research paper contributes to this line of research by providing additional evidence of effects on performance as a result of participation in alliances by airline companies in the 90's. Performance implications for two time periods – pre- and post-entry into an alliance – were empirically assessed by means of cluster analysis and MANOVA. Results seem to indicate that the mere entry into an alliance is not enough to assure better performance outcomes. On the other hand, some airline companies did experience performance improvement after they joined an alliance.

INTRODUCTION

Among the many environmental and organizational changes that have been reshaping the way businesses are run, collaboration among [once solely rival] firms has emerged as a relevant trend

(Koza and Lewin, 1998). In the airline industry, in particular, the emergence of alliances has been a major trend.

The nature of competition and the role of the playing firms have undergone severe transformations in the airline industry. Still following the 1944 Chicago Convention provisions, international air transportation is usually characterized by restrictive bilateral agreements. While industry participants behaved like a cartel until the 70's with restrictive policies and practices that went against consumer interests, important changes have been reshaping the industry since the 80's, including the relaxation of the many bilateral agreements, privatization and deregulation, so that market forces have been overtaking the influence of protectionist Governments. These changes notwithstanding, several legal, political and institutional restrictions (Putsay, 1992) have been obstacles on the way to efficiency and to the offer of service levels on a global basis. Moreover, the number of competing firms in the industry has been limited given some structural characteristics of the industry – e.g., high entry barriers and high fixed costs –, some still protectionist Government policies and incumbent firms' actions – especially oligopolistic behaviour and tacit collusion in price formation –, although this picture has been challenged by the new low-cost low-fare players since the 90's.

Airline companies have responded to the new conditions by establishing their own private services networks in other continents, while they also began to recognize that some global network, composed by companies from different continents, should be initiated (Oum and Taylor, 1995). Such global networks have enabled firms to attain better access to other continents, offer better services to their customers through the offering of complementary routes, gain access to valuable slots and hubs and has also led to the development and improvement of local services networks in several countries. Moving away from the initial bilateral agreements, arrangements have evolved to broader multilateral alliances with full marketing cooperation – including common brands, shared

access to airport facilities and code share in several flights. Such organizational arrangements have been termed constellations (Gomes-Casseres, 1996). Constellations can be characterized by multiple autonomous partners, who compete, as a group, with other companies in rival alliances, either in the same or in related industries, in order to gain access to clients in general as well as to potential new members (be them firms already involved in some other alliance or still independent players).

Although the formation of strategic alliances in the airline industry has been debated by specialists for over a decade (Debbage, 1994), few studies have examined the performance implications for the firms involved (Lazzarini, 2007).

The purpose of this paper is to investigate the impact of the adoption of collaborative strategies over the performance of airline companies that joined large constellations in the 90's. The paper is organized as follows. After this introduction, the literature on strategic alliances is reviewed. Methods and data are presented and, next, results are discussed. A discussion of the main findings closes the paper.

REVIEW OF LITERATURE

Studies in the Industrial Organization tradition (Bain, 1956, 1959; Caves, 1977; Caves and Porter, 1977) have strived to find way to attain competitive advantage, that is, sustained superior performance over rival firms. More recent works on strategic management (e.g., Barney, 2006) have stressed the importance of collaboration among firms as a way to achieve better performance for *all* firms involved *vz*. that of other firms outside the alliance.

According to Dunning (1995), “due to the increasing porosity of the boundaries of firms, countries and markets, the eclectic, or OLI, paradigm of international production needs to consider more explicitly the competitive advantages arising from the way firms organize their **inter-firm** transactions, the growing interdependencies of many intermediate product markets, and the widening of the portfolio of the assets of districts, regions and countries to embrace the external economies of interdependent activities” (p.461, emphasis added). Moreover, “[…] a number of events have occurred that, viewed collectively, suggest that world economy may be entering a new phase of market-based capitalism – or, at least, changing its trajectory of the past century. These events recognize no geographical boundaries; and they range from changes in the way in which individual firms organize their production and transactions, to a reconfiguration of location-specific assets and the globalization of many kinds of economic activity.” (Dunning, 1995, p.461)

In recent years, a growing number of researchers has been investigating firms’ cooperative moves and also the international integration of geographically dispersed resources and activities (e.g., Johanson and Mattsson, 1988; Forsgren and Johanson, 1992).

The review of the literature conducted here covers the concept of networks in international business research, the conceptualization and forms of strategic alliances, motivations of the involved firms, and performance implications.

International networks

In the international business literature, networks have been often addressed as part of the process by which firms first go abroad and then expand their international operations. According to Cunningham (1985), researchers from the Uppsala School initially led the efforts of studying the forms and impacts of international networks.

Johanson and Mattson (1988) emphasized the relationships among firms in business networks, which may be driven by a search for external resources and value creation for customers. In the long run, several links interconnect the firms involved (Madsen and Servais, 1997). As a result, in a networks perspective, firms do not act alone and cannot be separated from their environment by a distinct frontier (Havila and Salmi, 2002). This means that a given firm's decisions are not made in isolation, but rather are conditioned by its relationships with other firms in a business network (Ford, 2002).

Conceptualization of Strategic Alliances

Several definitions and designations for the concept of strategic alliances have been advanced. According to Williamson (1975), alliances would be hybrid forms, with varying degrees of integration between the extremes of market-governed relationships and full hierarchical control. At the market-governed extreme, there would be "natural" mechanisms that would drive the relationships between firms and their actions; prices would thus be determined by market forces. At the extreme of full hierarchy, a firm would exert total control over all the actions involved in the value chain of producing and delivering goods or services to buyers. At some middle position, firms involved in alliances could somehow benefit from changing (in their favour) the "natural" market balance mechanisms, while avoiding the possible operational and administrative inefficiencies of full hierarchical control, but would, on the other hand, be subject to opportunistic behaviour and exploitation by their partners.

As Ashley and Fombrum (1983) have put it, collaborative strategies would be a way to manage change arising from interorganizational dependency. In their words, "[b]usiness policy must pay attention to the institutionalization of these collective alliances for they play an increasingly important role in today's corporate society." (p.475)

Harrigan (1988) defined cooperative agreements as those that do not involve equity sharing, thus being more amenable to termination. On the other hand, they do not carry some of the benefits of joint ventures because partners do not bring in their resources.

Das and Teng (1998) defined strategic alliances as “interfirm cooperative agreements aimed at achieving the strategic objectives of the partners” (p. 491). According to the authors, cooperating members can contribute with four main types of resources: financial, technological, physical and organizational.

Morh and Spekman (1994) defined partnerships as purposive “strategic relationships between independent firms who share compatible objectives, strive for mutual benefits and acknowledge a high level of mutual interdependence.” (p.135)

Barney (2006) argued that cooperative strategies mean that firms work together in order to achieve a given goal. He made a distinction between two kinds of collaborative strategies: tacit collusion and strategic alliances. In tacit collusion, several firms in a given industry would cooperate in order to reduce the level of competition and, as a result, raise prices above the perfectly competitive level. In a strategic alliance, several firms also cooperate but the level of competition (with other firms outside the alliance) is not reduced.

Another definition for strategic alliances was provided by Gulati (1998): “any voluntary arrangements between firms involving exchange, sharing or co-development of products, technologies or services.” (p. 29)

Gomes-Casseres (1996) defined constellations as “alliances among multiple autonomous firms, such that these groups compete against each other in the same or similar industries for both clients and members” (p.66). Firms join constellations in order to deal with changes in the competitive environment, and gain competitive advantages that would not be possible for a solely independent entity.

Expressions such as “collective competition” (Gomes-Casseres, 1998) and “alliance capitalism” (Dunning, 1995) have been used to reflect this new attitude in the business context. Throughout this paper, the following terms and expressions will be used interchangeably: networks, constellations, strategic alliances, and collaborative strategies.

Forms of Alliances

Kogut (2000) stated that the structure of a network would be an emergent result of the rules that guide cooperative decisions by firms in specific competitive markets. The emergence of a structural collaboration pattern of behaviour would not be the result of some abstract choice between market vs. firm or between market vs. hybrid and cooperative forms of governance, but rather would derive from the specific initial conditions of any given industry.

The form of the interorganizational network, which can suffer important influence from exogenous factors such as the nature of competition and cyclical industry events (Madhavan, Koka and Prescott, 1998), is no longer constrained to bilateral relationships, since these may not be the most appropriate configurations in some industries. In such cases, alliances constellations have emerged since the 90’s.

Blankenburg-Holm et al. (1996) stated that the literature on international business had been focusing mainly on formal cooperation, such as international joint ventures, licensing, management contracts and strategic alliances (e.g., Contractor and Lorange 1988).

In the airline industry, alliances between firms can be described as “quasi-mergers”, where code-sharing arrangements are developed at a high level of integration (Holtbrügge et al., 2006). Another angle was provided by Kleymann (2005) who suggested that alliances can partially be seen as organizations in their own right, once these organizations are based on interdependent needs, rather than on common purposes, in such a way that airlines remain autonomous but interdependent.

Motivations to Become a Partner in a Strategic Alliance

Over two decades ago, Glaister and Buckley (1986) recognized that “[o]ne component of the alliance process that has recently received considerable attention concerns the motivations of a firm and its potential partner to establish an alliance” (p.301). In fact, a great deal of effort has been dedicated in recent years to understanding the motivations of firms to form or join an alliance (Kale, Dyer and Singh, 2000).

Gaining insight into the reason and motivations that lead to alliances formation is essential to investigating intra-alliance dynamics and the performance of its partners – individually and as a group. Although unanticipated benefits can occur, a faulty understanding of the motivations may cast doubt on any conclusions about other aspects of an alliance. Given the importance of strategic alliance in the business world, Rai, Borah and Ramaprasad (1996) contended that the reasons to form an alliance, as well as its costs and benefits, should be fully investigated.

Several researchers have pointed out that globalization would be the main driving force that has motivated firms to move from a pure competitive attitude into more cooperative behaviour (Ghemawat, 1986; Ohmae, 1989). Hwang and Burgers (1997) have added other causes of this shift to strategic alliances: rising R&D expenses, shortening of product life cycles, and technology convergence. Some other scholars have argued that at the industry level there are other influences, such as demand uncertainty, degree of competition, market development stage and competitive uncertainty (Burgers, Hill and Kim, 1993; Eisenhardt and Schoonhoven, 1996; Harrigan, 1988; Shan and Hamilton, 1991).

Eisenhardt and Schoonhiven (1996) argue that the formation of strategic alliances may derive from lack of resources. Through alliances, firms may gain access to value-creating assets, which are not available in the market and would demand time to be developed. Eisenhardt and Schoonhiven's (1996) results provide evidence that the behaviour that leads to alliances formation is systematically associated with benefits and opportunities, so that firms that are willing to share their resources will probably demand that their partners bring in assets above and beyond mere financial contributions.

The aviation industry can be described as a network since it is a system of links (routes) that connect nodes (airports) (Fridström et al., 2004). Also, costs and revenues for carrying passengers on different but interconnected routes are interdependent. Fridström et al. (2004) argued that airline alliances may provide large economies of scale, scope and density, that may either originate at the supply side (cost , production) or a the demand side (revenue, consumption).

On the whole, two main theoretical perspectives have been advanced in the literature about the motivations to adopt collaborative strategies (Burgers et al., 1993). One perspective is based on transaction costs and emphasizes alliances as an efficient mode to expand strategic capabilities. Another perspective sees alliances as a way to reduce competition by means of market power

concentration and collusion among member firms. Both perspectives have been empirically supported (Kogut, 1998).

Alliances and Performance

Observed performance differences across firms have been frequently discussed and investigated in Strategic Management research. Kogut (1999), however, argued that the impacts of cooperative relationships had not been (at least until then) sufficiently analyzed, thus making alliances a risky venture. It is worth mentioning that the lack of uniform agreement as to other aspects of alliances – such as their conceptualization –, lack of empirical support to proposed typologies, and difficulties in data collection have all contributed to this complex picture.

A further obstacle to understanding the relationship between alliances and performance is the lack of appropriate and agreed-upon, performance measures for alliances. Gulati (1995) argued that performance of alliances had received less attention because of some research difficulties, among which he cited measurement issues and logistic challenges in the collection of the necessary data. As a result, he argued, the relationship between alliances and performance still remained as one of the most promising and yet unexplored areas in strategy research.

Longevity has been suggested as a success measure (Baum and Oliver, 1991). However, given that some researchers have argued that an alliance may have infinite life (Osborn and Hagedoorn, 1997), this measure may not properly capture its success (Mohr and Spekman, 1994). Gulati (1995) also criticized survival as a performance measure since its importance would be limited for two reasons. First, taking the end of an alliance as an evidence of failure would not properly distinguish between natural deaths – that is, those planned in the case of an a priori conceived as temporary alliance – and premature (unintended) deaths. Second, not all on-going alliances could be considered winners,

since they might have been kept alive due to members' inertia or high terminations costs. Moreover, when the objective is to gain access to partners' resources, longevity and stability may not be good representations of collaborative success (Hamel, 1991).

Researchers in the relational perspective suggest that alliance partners are for the most part the sources of new ideas and information that lead to technological innovations, which can lead to performance improvement (Powell, Koput and Smith-Doerr, 1996). However, some of the partnering firms may attempt to protect their assets and thus prevent this flow of ideas and information (Kale et al., 2000).

Ariño's (2003) study of two types of Spanish firms – one group with equity participation and the other with mere contractual arrangements – employed two performance perspectives: organisational effectiveness measures, such as overall satisfaction with the alliance performance, attainment of strategic objectives and additional results, as well as operational measures, such as longevity, survival and number of contractual modifications. Ariño (2003) concludes that performance of an alliance is associated with the degree of objectives attainment – be such objectives intended or emergent, shared between the partners or specific to each partner – and also with the degree to which the number of iterations is considered acceptable by each partner.

Zajac and Olsen (1993) argued that each partner employs interorganizational strategies that crates more value than would be possible if each moved independently. They contended that the degree of success of an alliance may be defined as a tri-dimensional construct. Initially, firm-level success should be assessed, that is, to which extent has each firm gained access to the others' resources. Then, success at the alliance-level should be evaluated, that is, to which extent firms have attained shared objectives. Also, success at the industry level should be judged, that is, how much has industry competitiveness been improved as a result of alliances formation.

METHODS AND DATA

Sample

Three major alliances in the airline industry were chosen for the present study: *oneworld*, *SkyTeam* and *Star Alliance*. Together, they represented 53% of the total passengers-kilometres transported in 2001 (IATA, 2002), considering both domestic and international flights. After a search in the websites, we found the names of the participant firms, their electronic addresses and when each officially joined the respective alliance.

We needed a common definition, n years, for the pre- and post-alliance entry time periods. We initially considered $2 \leq n \leq 5$. We chose $n = 3$, taking 1994-1996 as the pre-entry period and 2001-2003 and the post-entry period because these were the time periods for which there was more information available.

After removing firms for which data was not available for all the years in the two time periods, the final sample was composed of 18 airline companies (Table 1). Only two of them were not included among the 50 largest in 2001 in terms of total transported passengers; the other 16 companies represented 52% of transported passengers among the 50 largest (IATA, 2002).

oneworld	***SkyTeam***	***Star Alliance***
American Airlines	Aeromexico	Air Canada
British Airways	Air France	Lufthansa
Cathay Pacific	Delta Airlines	SAS
Iberia Airlines	Korean Airlines	Thai Airlines
Finnair	CZA- Czech Airlines	United Airlines
		All Nippon
		BMI – British Midland
		Mexicana Airlines

Table 1 – Sample of airline companies and respective alliances

Data collection and data treatment procedures

Data were collected from *Aviation Statistics* provided by ICAO (*International Civil Aviation Organization*).

Performance differences between two time periods – before and after firms joined the alliance – were assessed by means of cluster analysis and multivariate analysis of variance (MANOVA) and also non-parametric methods. The unit of analysis was the individual firm. SPSS 11.0 was employed to run the analyses.

Selection of Performance Indicators

Several performance indicators are routinely used in the airline industry, not only by firms themselves but also by regulatory agencies and industry associations (such as IATA and ICAO). We selected 10 indicators (Table 2), which were judged to be most relevant in terms of breadth of coverage of several dimensions of performance.

Financial indicators – Operating revenues (OPREV) – Gross profit (PROF) – Operating cost per available ton-kilometre (UNICOST) – Operating revenue per passenger-kilometre (OPYIELD)
Accounting indicators – Breakeven occupation rate (BREVEN) – Current assets (CURASS) – Asset turnover rate (TURNOV)
Operational indicators – Tons-kilometres transported (TPERF) – Load factor (LOADFAC) (i.e., occupation rate) – Number of carried passengers (PSGCAR)

Table 2 – Performance indicators used in the study

Henceforth performance indicators will be identified by a suffix: “1” for the pre-entry period and “2” for the post-entry period. Performance indicators were average for each of the three-year time periods (pre- and post-entry) in order to smooth out uncontrolled for year-fluctuations.

All variables were transformed into their respective z-score.

HYPOTHESES OF THE STUDY

In order to investigate whether the adoption of collaborative strategies influences the performance of the member firms, five hypotheses were formulated:

H_1: There will be distinct clusters, in terms of performance indicators, that will reflect a priori theoretically-derived profiles.

H_2: The empirically-derived clusters confirm a priori theoretically-derived profiles.

H_3: The empirically derived clusters reflect similar aggregate performance results in the two temporal periods, pre- and post-entry.

H_4: The empirically-derived clusters, for each of the two time periods, will be statistically different.

H_5: Firms that adopted collaborative strategies will belong to the same cluster, respectively in the pre-entry and in the post-entry time period.

H_1 was tested by a k-means cluster analysis algorithm, where the k pre-specified (by the hierarchical clustering algorithm) averages define the centroids of the performance clusters according to the theoretical matrix used as input into the clustering program.

H_2 was tested by comparing empirically-derived (by the cluster analysis) vs. theoretically-expected performance matrices. Wilcoxon signed-rank tests were employed in order to verify whether the theoretically-expected matrices adequately corresponded to the empirically-derived matrices. Non-parametric tests were necessary since it was not possible to guarantee that centroids populations followed a normal distribution.

H_3 was also tested by a Wilcoxon signed-rank test. This time, the comparison was between pre- vs. post-entry matrices, so that we could confirm whether the matrices defined indeed corresponded to similar levels of performance in the two periods

MANOVA was employed to test H_4, with Wilk's lambda as the test statistic. The corresponding null hypothesis was "*There will be no difference in performance centroids*" against the alternative hypothesis "*There will be at least one pair of statistically distinct performance centroids*".

Follow-up analysis (as suggested by Hair et al., 1998) for multiple comparisons of averages and Bonferroni intervals were employed to test H_5.

RESULTS

The Kolmogorov-Smirnov test indicated that, at the 10% significance level, only $BREVEN_1$ in the pre-entry period could be said to be normally distributed. In the post-entry period, six variables followed a normal distribution: $TPERF_2$, $LOADFAC_2$, $OPYELD_2$, $UNICOST_2$, $BREVEN_2$ and $CURASS_2$. Although normality is one of the assumptions of cluster analysis and MANOVA, these procedures are robust to some violations of normality. Moreover, histograms revealed that non-normality was due to asymmetry and not to the presence of outliers, thereby allowing the use of the statistical procedures.

Cluster analysis can indicate whether firms belonged to the same or to different groups (defined by the 10 performance indicators) in the pre- vs. post-entry periods, thus allowing one to verify whether there was or not a (statistically significant) change in performance due to the adoption of collaborative strategies.

The averages and quartiles of the performance indicators were used to form the initial centroids matrices. The first quartile was used to define the theoretical centroid of cluster 1, and an analogous procedure was used to form the other two clusters in each time period. So firms were agglomerated in each cluster according to the similarity of their performance results and also their differences against performance results of firms in the other clusters.

The iteration process started from the generation of the centroids and proceeded with the calculation of new centroids until the final matrices were reached, respectively for the pre- and the post-entry periods.

Test of H_1. The ideal number of clusters was determined through a hierarchical clustering algorithm, whereby the greatest change in the agglomeration coefficient was sought. In the pre-entry period the greatest gains occurred in the transition from six to five clusters (21.73%) and from five to four clusters (23.78%). In the post-entry period the largest gains are obtained in the transition from four to three clusters (29.17%) and from three to two clusters (29.75%). Given that the differences between the possible solutions are not large, we considered that three cluster was the best solution to run the test.

Test of H_2. The observed changes in the values of the centroids indicate that there is no modification in their relative positions. This means that in most cases the theoretical matrices sere confirmed. A Wilcoxon signed-rank test was used to compare the centroids produced by the iteration of the k-means algorithm. The null hypothesis of equality of the matrices could not be rejected at the 1% significance level, both in the pre-entry as well as in the post-entry period. This means that the initial matrices adequately represent the performance clusters.

Test of H_3. Another Wilcoxon signed-rank test was employed to compare pre-entry matrices with their respective post-entry matrices in order to assess whether there had been any significant change in the performance level due to joining a strategic constellation. At the 1% significance level, we could not reject the null hypothesis of equality between matrices. So we can conclude that post entry matrices confirm the pre-entry matrices.

Test of H_4. The F-statistics of the MANOVA procedure were 10,369 and 2,808, respectively for the pre- and the post-entry periods, both significant at the .1% level. So the Wilk's lambda test leads to rejection of the null hypothesis, which means that the three cluster centroids (and correspondingly the performance results of firms in one cluster vz. firms in the other clusters) were statistically different.

Test of H_5. The results of the follow-up tests for the comparison of multiple averages and Bonferroni intervals are presented in Table 3.

Pre-entry			Post-entry			
$OPREV_1$	1 2	3	$OPREV_2$	1 2		3
$TPERF_1$	1 2	3	$TPERF_2$	1	2	3
$LOADFAC_1$	1 2 3		$LOADFAC_2$	1 2 3		
$PSGCAR_1$	1 2	3	$PSGCAR_2$	1 2		3
$PROF_1$	1 2 3		$PROF_2$	1 2 3		
$OPYIELD_1$	1 2 3		$OPYIELD_2$	1	2 3	
$UNICOST_1$	1 2 3		$UNICOST_2$	1	2 3	
$BREVEN_1$	1 2 3		$BREVEN_2$	1 2 3		
$CURASS_1$	1 2 3		$CURASS_2$	1 2		3
$TURNOV_1$	1 2 3		$TURNOV_2$	1 2 3		

Table 3 – Inequality relationships among the clusters for each performance indicator
Note: Clusters shown in the same cell do not present statistically different performance results between each other. Cluster in shadowed cells present statistically significant differences vz. the other clusters.

Four performance indicators – TURNOV, BREVEN, PROF and LOADFAC – do not present significant differences between the two time periods, thereby suggesting that they do not discriminate among the cluster. Three other indicators – CURASS, UNICOST e OPYIELD –

present significant differences only in the post-entry period. So, in the period before entry into the alliance they do not explain any significant difference among the clusters.

There are, however, three performance indicators that reflect significant differences among the three formed clusters:

- OPREV – The value of operating revenues of firms in cluster 3 was statistically different from the respective value in clusters 1 and 2, in both time periods, although there were no significant differences in this indicator between cluster 1 vs. cluster 2.
- TPERF – In the pre-entry period, the value of tons-kilometres transported by firms in cluster 3 was statistically different from its value in clusters 1 and 2; as for the post-entry period, the differences in this indicator were statistically different among all three clusters.
- PSGCAR – The number of carried passengers of firms in cluster 3 was statistically different from the respective value in clusters 1 and 2, in both time periods, although there were no significant differences in this indicator between cluster 1 vs. cluster 2.

Table 4 presents the classification of each firm across the clusters for each time period.

Constellation	Year	Firm	Pre-entry period	Post-entry period
Oneworld	1999	American Airlines	3	3
	1999	British Airways	3	3
	1999	Cathay Pacific	2	3
	1999	Iberia Airlines	2	2
	1999	Finnair	1	2
SkyTeam	2000	Aeromexico	1	1
	2000	Air France	3	2
	2000	Delta Airlines	3	3
	2001	Korean Airlines	2	3
	2001	CZA- Czech Airlines	1	2
Star Alliance	1997	Air Canada	1	1
	1997	Lufthansa	3	2
	1997	SAS	2	1
	1997	Thai Airlines	2	1
	1997	United Airlines	3	3
	2000	All Nippon	2	1
	2001	BMI – British Midland	2	1
	2001	Mexicana Airlines	1	1

Table 4 – Firms and their cluster assignment for the pre- and the post-entry periods

Two members in the *oneworld* constellation moved to a better-performing cluster after they joined the strategic alliance, while the other three remained in the same respective cluster (two of them in the highest-performing cluster). In the *SkyTeam* constellation, two firms improved their relative (vis-à-vis other airlines) performance while one moved down after joining the alliance. In the *Star Alliance* constellation, five firms experienced performance decreases, while three remained in the same respective cluster. Besides, in general, *Star Alliance* concentrates the worst-performing firms, while *oneworld* is composed by the best-performing ones.

Lazzarini (2007) suggested that firms can achieve performance improvement by capturing positive network externalities. Such benefits would come as a firm manages to employ its own resources and focus in its markets in, total or partial, articulation with the resources and markets of other firms in the constellation. He argued that in the airline industry such advantage is derived from increase in the number of carried passengers – which can be confirmed by noting that PSGCAR was one of the three indicators that explained performance differences among the three clusters in the two time periods.

Table 5 presents additional information that can help elucidate performance differences among the airline companies.

It seems reasonable to conjecture that the earliest the starting date of the alliance, the more time its members would have enjoyed for coordination, which would be expected to lead to better performance. Also, the higher the number of countries and destinations, the more the expected performance results, at least in terms of some of the operational indicators. However, empirical results do not confirm this expectation, since *Star Alliance*, the first formed constellation and the one with the greatest capillarity, concentrates most of the firms with the worst performance level in

general. As for the observed differences between *oneworld* members vs. *SkyTeam* members, data in Table 5 does not seem to provide enough information to explain such differences.

Constellation	Starting date	Number of firms (2005)	Number of countries and destinations	Firm	Country	Average load factor (1998)
oneworld	1999	8	135 countries 575 destinations	Aer Lingus	Ireland	60,68%
				Lanchile	Chile	
				Qantas	Australia	
				American	United States	
				British	United Kingdom	
				Cathay	Hong Kong	
				Ibéria	Spain	
				Finnair	Finland	
SkyTeam	2000	9	133 countries 684 destinations	NWA	United States	59,11%
				KLM	Netherlands	
				Alitalia	Italy	
				Continental	United States	
				Aeromexico	México	
				Air France	France	
				Delta	United States	
				Korean	South Korea	
				CZA	Czech Republic	
Star Alliance	1997	18	139 countries 795 destinations	US Airways	United States	60,24%
				Air New Zealand	New Zealand	
				ANA	Japan	
				Asiana	South Korea	
				Austrian	Austria	
				LOT	Poland	
				Singapore	Singapore	
				Spanair	Spain	
				TAP	Portugal	
				VARIG	Brazil	
				Aircanada	Canada	
				Lufthansa	Germany	
				SAS	Denmark, Norway and Switzerland	
				Thai	Thailand	
				United	United States	
				BMI	United Kingdom	
				Mexicana	Mexico	
				All Nippon	Japan	

Table 5 – Additional information about three constellations in the airline industry

There is one aspect that distinguishes *oneworld* from the other two constellations. Its average load factor (i.e., seat occupation rate) was higher (although not to a great extent). Moreover, it should be noted that the worst-performing constellation also had the largest number of participants, which may suggest that the inclusion of more participants as an alliance grows older may negatively affect

the coordination mechanisms among its members. This increased complexity may make it difficult to capture the expected positive network externalities.

CONCLUSIONS

This study investigated whether joining a strategic alliance would have significant effects on firm performance. The scope was limited to the airline industry and three major constellations – *oneworld*, *SkyTeam* and *Star Alliance* – from 1993 until 2003. Data were obtained from secondary sources provided by the *International Civil Aviation Organization* (ICAO).

We found evidence that the adoption of collaborative strategies affected the relative (vis-à-vis competitors) performance of 10 out of 18 firms studied. Results indicate that participants in the *oneworld* constellation experienced more positive impacts, given the fact that two of the members improved their performance and the remaining three remained stable. In *SkyTeam*, the most recent constellation among the three, one firm improved its performance level, three remained stable and one experienced decrease in performance. As for *Star Alliance*, the first formed constellation and the one with the greatest number of members, results were not as expected: none of the eight firms in the sample improved its performance, three remained stable and five witnessed performance deterioration.

One can question whether or not the three alliances studied here had already had enough time for the expected positive externalities to come up. As a matter of fact, it may take some time before partners learn how to collaborate and manage to extract benefits out of the increased managerial and administrative complexity that an alliance imposes. So, positive results may lag for quite a while.

Empirical findings indicate that the mere adhesion to an alliance may not be enough to warrant better performance results on an individual firm's basis. Nonetheless, some firms did manage to improve their performance level after joining an alliance. Although the present study does not allow one to reach unequivocal conclusions about the impact of alliances in the performance of individual firms, it joins other research works (e.g., Parkhe, 1991; Oum et al., 2000; Wang et al., 2004; Lazzarini, 2007) in an effort to build incremental evidence.

Although the longevity of an alliance has been suggested (Baum and Oliver, 1991) as a performance metric, empirical findings indicate that other performance indicators may not correlate well with longevity. Such finding suggests that other aspects of an alliance – e.g., coordinating mechanisms or definition of shared objectives (Teece, 1992; Mohr and Speakman, 1994) –, as well as some characteristics of the industry itself that can associate with firm performance – e.g., characteristics of the product, the market conditions and the structure of operational costs (Holtbrügge et al., 2006) – may also play a role in terms of performance effects and should be investigated in future studies. Another question that seems to remain unanswered relates to the significance of cost reductions and revenue enhancement to airlines *vis-à-vis*. the need for these benefits to offset the cost of management of the participation in constellations (Alamdari and Morrell, 1997).

The fact that collaborative strategies have been adopted more frequently in recent times may signal a new attitude of managers to cope with increased environmental complexity and the proliferation of competing and substitute offers. However, since merely joining an alliance may not guarantee better performance, managers will have to pay close attention to whom their firms partner with.

The airline industry is still undergoing relevant modifications, so that one can expect a distinct configuration of partners and relationships among them in the near future. The fact, however, is that

collaborative strategies will most probably continue to be part of firms' strategic positioning, especially in an industry where competition is defined on a global basis. So, further understanding of the impacts of alliances should remain as an important research topic.

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