

EMPIRICAL ANALYSIS OF THE ESSENTIAL BENEFITS OF STRATEGIC ALLIANCES BETWEEN AIRLINES BASED ON THE CO-OPETITION MODEL AND A PRELIMINARY PROPOSAL FOR PERFORMANCE INDICATORS

Abstract

Strategic alliances between firms based on the co-opetition model, have enabled their members to obtain benefits that they did not possess individually. Despite the risks inherent in alliances between competing firms, airlines have increasingly been establishing alliances to capture these benefits. Various studies have dealt with this issue, but none have been based on empirical research. This article shares the results of an empirical investigation involving 41 IATA member airlines. Data was collected in different ways and treated using a variety of statistical techniques: factor analysis to identify essential benefits, linear regression to identify the latter's intensity and hierarchical regression to assess the importance of these benefits for the alliance. The most significant results were the ones pertaining to those metrics that are important for firms taking part in strategic alliances in the air transport sector, based on the co-opetition model. The research presents a proposal for indicators to assess alliance performance. Notably, for the "access to new markets" factor that was perceived to be the main benefit conferred by alliances in the sector, the research suggests using "sales volume" of interline sales, as an indicator to assess how much value this benefit adds to member firms.

Key-words: Strategy, Strategic Alliance, Co-opetition, Performance Assessment, Airlines.

1. Introduction

Many strategies have been developed in recent decades, and one of the most important and recent is the strategic alliance between airlines (Hanlon, 1999). As examples we may mention the Star Alliance, One World and Sky Team (IATA, 2005). These global alliances, based on the co-opetition (cooperation and competition) model (Brandenburger; Nalebuff, 1996), have enabled their members to derive benefits that they did not possess individually (Dennis, 2005; Gimeno, 2004).

Despite evidence that alliances based on the co-opetition model are risky, in that competition encourages opportunistic behavior even when there is cooperation between firms (Park; Ungson, 2001), strategic alliances provide opportunities for the creation of benefits for their partners (Agulló, 2000; Anslinger; Jenk, 2004; Bengtsson; Kock, 1999; Das; Teng, 2000; Gnyawali; Madhavan, 2001; Gudmundsson, 1999; Park; Zhang, 2000; Russo; Motta, 2005; Russo; Bertrand, 2006).

Many studies have been carried out highlighting the benefits derived from alliances based on the co-opetition model, especially between airlines, without, however, grounding their hypotheses in empirical research. An exception is the study undertaken by Russo and Bertrand (2006). Assuming that alliances provide benefits for their members, this study carried out a survey of perceptions of Star Alliance executives with a view to identifying the latter's most essential benefits and to verifying whether the companies actually measured them. The study achieved its objective and concluded that the Star Alliance members did not in fact measure the benefits derived from this alliance.

This article shares the main results of an empirical investigation that extended Russo and Bertrand's (2006) study to all companies in the air transport sector that belong to the IATA (International Air Transport Association). Based on the assumption that, without appropriate performance indicators, organizations will be unable to achieve their goals and

conduct their strategies successfully (Macedo-Soares; Ratton, 1999), this investigation sought to identify the metrics that are important for organizations that take part in co-opetition type of alliances worldwide in the air transport sector, to measure companies' degrees of satisfaction and to present inputs for the development of a set of indicators to be used to assess the performance of strategic alliances in this sector.

With a view to increasing the sample of airlines in the sector under study, we established a partnership with the IATA to facilitate access to this international association's members. Thus, at the end of 2006, the research focused on a universe of 246 companies, with a view to performing a statistical generalization of the results for organizations that operate in strategic alliances based on the co-opetition model in the air transport sector.

This article is divided into eight parts. The first one discusses the theoretical underpinnings of alliances based on the co-opetition model and the second describes the benefits of strategic alliances. The third part demonstrates the importance of performance indicators and the fourth contains the methodology used in the research. The fifth part shares the main results of the investigation that are discussed in the sixth part. Some proposals for performance indicators are presented in the seventh part. The last one includes a general assessment of the study's contribution, as well as conclusions and recommendations for future research in this field.

2. Theoretical References

2.1. Alliances Based on the Co-opetition Model

With the new business environment beginning to demand new types of business relationships, some alliances organized in traditional networks have transformed themselves into co-opetitive partnerships, as the most effective way of responding to environmental threats and opportunities (Zineldin, 2004), thus contradicting Florês' (1998) affirmation that alliances generally do not possess the necessary requirements for their survival. The co-

opetitive relationship is a business situation in Which Independent Organizations Cooperate While, At The Same Time, Competing With Each Other (Brandenburger; Nalebuff, 1996; Gulati; Kletter, 2005; Palmer, 2000; Zineldin, 2004).

Thus strategic alliances based on the co-opetition model are those that establish a collaborative relation between two or more independent firms, each with their own planning, strategy and culture, in order to generate more value in their activity, while maintaining a certain balance between competition and cooperation. (Agulló, 2000). Cooperation is the process of interaction developed by the relationship established on the basis of common interests of individuals, groups and organizations, while competition is the result of the behavior of competitors focused on a certain objective (Chien; Peng, 2005). In the investigation at issue, we defined co-opetition as a synergic relationship between rival firms based on the presence of mutual benefits (Alexander; Colgate, 1998; Martinelli; Sparks, 2003). For more details regarding co-opetition concepts, see Bengtsson and Kock (1999), Brandenburger and Nalebuff (1996), Gnyawali and Madhavan (2001), Palmer (2000), Russo and Bertrand (2006), Zineldin (2004), Zineldin and Bredenlow (2003).

Thus, through cooperative and competitive relationships, organizations work together to, at once, enhance group performance and improve their own specific results (Russo; Bertrand, 2006). In alliances between airlines, the benefits of alliances are absolutely essential for their members' competitiveness. (Gudmundsson; Lechner, 2006).

2.2. Benefits

In principle, airlines that enter into alliances are able to obtain greater benefits than if they operated alone (Gulati; Kletter, 2005; Hemphill, 2000). The bibliographical study undertaken by Russo and Motta (2005) and complemented by Russo and Bertrand's (2006) analysis revealed the type of benefits resulting from strategic alliances described in the literature. The growth in the number of strategic alliances, based on the co-opetition model, is

a sign that these partnerships confer effective benefits on their members. Between 1994 and 1998 the number of alliances increased from 280 to 502, a growth of around 80% in five years (Gudmundsson, 1999).

Although previous studies showed that resource limitations lead organizations to establish strategic alliances in a quest for mutual benefits, many of these alliances never achieved their performance potential (Ramaseshan; Loo, 1998).

According to Vaara, Kleymannand and Seristö (2004), most of the benefits mentioned by companies, amount to mere speculation regarding benefits created over time, and not benefits that have actually been obtained. In spite of this, the benefits mentioned have been used as arguments to justify starting an alliance, suggesting that the benefits declared are in reality overestimated and the obstacles to achieving them underestimated.

In sum, there are indications that one of the main reasons for alliances' lack of success is the fact that organizations do not adopt appropriate tools for assessing their performance (Anslinger; Jenk, 2004; Russo; Bertrand, 2006).

2.3. Performance Indicators

Given that alliances are voluntary agreements between firms, it is to be expected that declarations of their common objectives include a description of the benefits desired by all partners (Gnyawali; Madhavan, 2001). However, in contrast with commercial contracts, the contracts that govern alliances are incomplete and do not provide specific details of the conditions of exchange between parties (Gimeno, 2004; Masutti, 2005).

Thus, research into performance indicators must be undertaken in an attempt to fill in this gap. If performance indicators do not exist, or if they are not aligned with the organization's objectives, the latter will be extremely difficult to achieve (Macedo-Soares; Lucas, 1996; Macedo-Soares; Ratton, 1999). An alliance is more likely to be successful when, amongst other variables, it manages to make a correct analysis of its benefits (McKee,

1994), which implies the existence of appropriate performance measurement systems (Tavares; Macedo-Soares, 2003). In reality, by taking part in alliances the partners' aim is to improve their competitive performance, so as to achieve positive results in terms of profitability and market share (Holtbrügge; Wilson; Berg, 2006). According to research undertaken in Brazil by Macedo-Soares and Ratton (1999), organizations' measurement systems are often inappropriate in most firms in the country, in that they still lack the necessary integration and consistency.

The results of Kleymann's (2005) research indicated that from alliance members' viewpoint, taking part in an alliance is necessary for firm survival (Vinod, 2005). The author reported that during the interviews executives rarely replied in any detail when asked: "Is it good for the firm to be a member of an alliance?" The executives usually changed the subject and began to talk about day-to-day problems. As previously mentioned, Russo and Bertrand's (2006) study confirmed that alliances are perceived to bring benefits. At the same time, however, it revealed that most airlines do not possess metrics to measure expected benefits. On the other hand, it is obvious that an alliance would not be maintained if its benefits were not equal to or greater than its costs (Smith; Carroll; Ashford, 1995). According to Smith et al. (1995), this is one of the reasons why benefits are a function of the satisfaction of alliance members or of its performance. This conclusion is similar to that of Mohr and Spekman (1994), who propose two performance indicators for alliances - volume of sales between partners and partner satisfaction – as well as to that of Ariño (2003) who also proposes general satisfaction with the alliance as a way of measuring its performance.

Segil (2005) emphasizes that the key factor for the success of alliances is to develop and implement metrics (Russo; Bertrand, 2006). The existence of metrics in alliances increases the ability of participants to monitor the alliance's health and the objectives attained (Segil, 2005). Tavares and Macedo-Soares' (2003) field research with firms that took part in

strategic alliances, revealed that although 40% of leading firms in Brazil used some kind of metric to assess alliance performance, in nearly all cases the indicators referred solely to financial measures (an example can be seen in Brouthers, Nakos and Brouthers, 2004).

However, although some studies have managed to assess respondents' perceptions, none of them, up to now, have identified and empirically tested the metrics used by airlines (Kleymann, 2005; Russo; Bertrand, 2006).

According to Tavares and Macedo-Soares (2003), organizations tend first of all to implement their strategies before slowly fitting performance indicators to the new objectives and targets.

3. Methodology

The sample for the research at issue in this article was collected using a questionnaire applied to IATA member airlines that operate globally. The IATA is currently the world's largest association of airlines and its primary objective is to encourage cooperation between airlines, promoting safe, reliable and economical air services for people throughout the world (IATA, 2007). This study considered only those airlines that took part in a strategic alliance based on the co-opetition model. Airlines constitute one of the clearest examples of the co-opetition model whose use has been increasing worldwide, thus providing a rich context for the study of the benefits of strategic alliances.

In order to obtain the sample for this investigation, we initially contacted the IATA to ask for its support in accessing its member airlines. With the IATA's agreement, we developed an online questionnaire that was made available at our website. An initial page was created at the website, explaining the study's objectives and importance. A summary of the investigation's results was offered to all respondents who wished to identify themselves, in order to encourage their participation. (Ramaseshan; Loo, 1998).

The questionnaire was based on the instrument used by Russo and Bertrand (2006). But, as in the case of this research, the universe covered all IATA member companies, it was necessary to include two more questions in the questionnaire. These aimed to discover whether the company belonged to a strategic alliance with another airline, and also the degree of satisfaction with the existing alliance, as perceived by the respondent (Ariño, 2003; Mohr; Spekman, 1994; Smith et al., 1995).

A pre-test was then prepared to assess the questionnaire's intelligibility and content, involving five specialists in the air transport segment, who were requested to assess the tool. The respondents made some suggestions for improvements that were then used to make adjustments.

At the end of 2006, using the IATA databank composed of 246 airlines throughout the world, e-mails were sent to executives responsible for international alliances (or the CEO, if the company did not specify an alliance manager), identified at the airlines' websites. To increase the number of replies, the IATA, in some cases contacted the airlines to ask the executives to participate. Four weeks later e-mails were sent once again to the airlines that had not yet replied to the questionnaire. This procedure was repeated for two more months. In parallel, the IATA made fresh contacts with some airlines. Of the 246 companies that received the questionnaire, 58 responded, although in the case of 13 the questionnaire was not completely answered, and four companies said that they did not take part in alliances with other companies. Thus we ended up with a total of 41 replies, corresponding to a response rate of 18.29%. This rate was similar to that achieved in other surveys of alliance managers (Krishnan; Martin, 2006).

Note, however, that this 18.29% rate did not reflect accurately the relative weight of these respondents in terms of their consolidated ASK (available seat kilometers), ATK (available ton kilometers) and RPK (revenue passenger kilometers) values, which accounted

for 48.50%, 44.51% and 48.45% respectively of total values of the 246 members of the IATA. In other words, in absolute value terms, the respondents accounted for approximately 50% of the total universe.

In order to identify a smaller group of benefits that were really essential for the firms analyzed, we used exploratory factor analysis. As they were constructs that summarized an original set of variables (Hair; Anderson; Tatham; Black, 2005), it was possible to extend the focus of analysis to the benefits identified. The resulting factors were used as independent variables in the multiple linear regression that sought to investigate the performance of the alliance, and also in the hierarchical regression analysis that examined the impact of benefits on the degree of satisfaction. In the latter analysis, the factors were inserted in the hierarchical regression in the order produced by the factor analysis (Gray; Densten; Sarros, 2003).

Although studies have been carried out into the performance of alliances, there is no agreement on how to measure this construct, given the measurement challenge posed by alliances' type of structure. (Krishnan; Martin, 2006). To overcome this difficulty some authors have used the assessments of managers to gauge an alliance's success (Isobe; Makino; Montgomery, 2000). This is acceptable when the respondent is a manager of the organization (Krishnan; Martin, 2006). In fact managers' perceptions are considered to be a reasonable way of mapping the performance of the partnership (Anderson, 1990; Anderson; Weitz, 1992; Das; Teng, 2000; Geringer; Herbert, 1991; Kale; Dyer; Singh, 2002). Geringer and Herbert (1989) confirmed the existence of a high correlation between subjective and objective assessments and concluded that they are interchangeable (Ramaseshan; Loo, 1998; Silva, 2006). For their part, Ramaseshan and Loo (1998) concluded that the assessment of partners' perceptions was enough to provide reliable results for an analysis of a partnership's

success. Weaver (2002) also discovered elements that suggest that assessments of only one variable are sometimes superior to those of two or three variables.

Thus, in the investigation at issue, we used the degree of respondents' satisfaction with the benefits provided by alliances as the dependent variable for the linear and hierarchical regressions. Considering that the average of the four variables in Table 1, that constitute the degree of importance of firm inter-relationship (generation, acquisition, measurement and importance of benefits) and that assess the effectiveness of alliance benefits in the air transport sector, resulted in the same value (3.50) as the average of the degree of satisfaction, we tested a second linear regression using the average of these four variables, as dependent variable. A benefit used by airlines to measure production capacity (Bretherton; Carswell, 2000) – “available set kilometers – ASK” was adopted as a control variable to minimize the effect of company size on the result of the equation.

Finally, a content analysis (Weber, 1990) was made of the replies to the open questions in order to identify ways of measuring benefits and the existence of other benefits, besides those identified in the literature review.

To analyze the data the research adopted SPSS version 12.0 statistical software. Respondents were assured that their replies would be treated with the utmost confidentiality. All results presented the collective perception of the airline companies that took part in the research.

4. Results

The sample permitted a statistical generalization of the results with a confidence level of 95% and a margin of error of 14%, in accordance with Rea and Parker's (1997) formula for calculating the size of samples of finite populations. The Alfa and Cronback measure of reliability was applied to analyze the internal consistency of the variables and resulted in 0.909.

Table 1 presents the respondents' perceptions with respect to the matters inquired about that were designed to assess the degree of importance of the inter-relation between the companies.

Table 1 – Degree of Importance of the Inter-Relation between Companies

	N	Média	Variância
Grau de satisfação com os benefícios da aliança	41	3,54	0,71
Oportunidade para geração de benefícios que a parceria promove para as empresas	41	3,39	0,89
Benefícios obtidos pelas empresas na parceria	41	3,44	0,84
Mensuração dos benefícios provenientes da aliança	41	3,56	0,78
Importância dos benefícios provenientes da aliança para as empresas	41	3,27	0,78
Cooperação existente entre as empresas	41	3,78	0,72
Compromisso existente nos acordos realizados	41	3,88	0,75
Compartilhamento de informações entre as empresas	41	3,49	0,81
Compartilhamento de ações (projetos em conjunto) entre as empresas	41	3,37	0,77
Concorrência existente entre as empresas	41	2,12	0,81
Determinação do retorno do investimento feito na aliança	41	3,05	0,84
Fatores negativos para as empresas provenientes da aliança	41	3,73	0,78

Table 2 presents the respondents' perceptions regarding the degree of internalization of the benefits deriving from the existing alliance.

Table 2 – Degree of Internalization of Benefits

	N	Média	Variância
R3_1 Economia de escala	41	2,88	0,84
R3_2 Compartilhar recursos e atividades eliminando duplicidade	41	2,85	0,96
R3_3 Desenvolvimento de produtos	41	3,10	0,92
R3_4 Redução de custos	41	2,85	0,79
R3_5 Expandir as oportunidades de negócio sem a necessidade de investimentos	41	2,98	0,82
R3_6 Acesso a novos mercados	41	3,56	0,81
R4_1 Network synergy	41	3,61	0,74
R4_2 Ser atrativo para passageiros participantes de grandes redes	41	3,88	0,71
R4_3 Acesso à tecnologia superior	41	2,88	0,78
R4_4 Controle de distribuição pelo acesso de grande número de agentes de turismo, especialmente os que fazem parte de um GDS	41	2,88	0,78
R4_5 Divulgar o voo do parceiro como se fosse seu	41	3,41	0,89
R4_6 Melhores Lucros	41	2,90	0,70
R4_7 Criar barreiras contra novos entrantes	41	2,49	0,87
R4_8 Evitar a interferência do governo que regula as fusões e aquisições e o Acesso aos mercados	41	2,15	0,79
R5_1 Aumento da receita por passageiro quilômetro (revenue passenger kilometers - RPK)	41	3,07	0,57
R5_2 Aumento dos assentos disponíveis quilômetro (available seat kilometers - ASK)	41	2,98	0,76
R5_3 Aumento do load factor	41	3,10	0,66
R5_4 Cooperação técnica na área operacional	41	2,71	0,78
R5_5 Reconhecimento da marca	41	3,46	0,67
R5_6 Incorporar conhecimento pode gerar a habilidade de solucionar problemas complexos	41	2,80	0,68
R5_7 Compartilhar riscos	41	2,32	0,79
R5_8 Acessar novas competências / Aprendizagem organizacional	41	2,80	0,78

The benefits were factorially analyzed using principal component analysis and the orthogonal Varimax rotation method with Kaiser normalization. The first application of the factor analysis with all variables, presented a Measure of Sampling Adequacy (MSA) with an acceptable interval (below 0.500) for the variable “create barriers to new entrants” (Hair et al., 2005), resulting in KMO 0.662 and a significant Bartlett test. In order to improve the result, the variable was removed and the factor analysis (Hair et al., 2005) was applied once again. The MSA showed another variable with an acceptable interval: “avoid the interference of government that regulates mergers and acquisitions and access to markets” resulting in KMO 0.725 and a significant Bartlett test. One more variable presented an MSA below 0.500 (“control of distribution through the access of a large number of tourist agents, especially those that belong to a GDS”), and was also removed. After excluding the three variables, all the MSAs were above 0.635, the KMO rose to 0.749 and the Bartlett test remained significant. The communalities of the factor analysis were all above 0.512 (Hair et al., 2005), indicating that the components extracted represented the variables adequately.

After the Vartimax Rotation the extraction using eigenvalues indicated four factors that explained 69.027% of the accumulated component variance. Table 3 presents the result of rotated loading using the ortogonal Varimax rotation method.

The multiple linear regression equation used to test the null hypothesis that all the coefficients, except the constant, were equal to zero, was rejected at a significance level of 0.001. The explanatory power of the R^2 equation was 0.390 and, when adjusted for degrees of freedom, the R^2 adjusted was 0.323. This shows that the model’s explanatory power was satisfactory and suggested that the respondents’ degree of satisfaction might be influenced by other factors not included in the model. The results of the Durbin-Watson test for serial autocorrelation of errors and the VIF colinearity test were within acceptable limits.

Table 3 – Results of the Rotated Factor Analysis

	Fatores			
	Acesso a Novos Mercados	Novas Competências	Redução de Custos	Reconhecimento da Marca
Expandir as oportunidades de negócio sem a necessidade de investimentos	0,629	0,098	0,530	-0,057
Divulgar o voo do parceiro como se fosse seu	0,656	0,208	0,034	0,256
Aumento dos assentos disponíveis quilômetro (ASK)	0,699	0,020	0,365	0,312
Melhores Lucros	0,709	0,149	0,275	-0,040
Network synergy	0,738	0,235	0,035	0,081
Ser atrativo para passageiros participantes de grandes redes	0,743	-0,020	0,335	0,153
Aumento da receita por passageiro quilômetro (RPK)	0,761	0,003	0,290	0,397
Acesso a novos mercados	0,770	0,104	-0,152	0,136
Acesso à tecnologia superior	-0,072	0,602	0,381	0,012
Compartilhar riscos	0,559	0,636	-0,153	-0,113
Economia de escala	0,366	0,670	0,365	-0,222
Incorporar conhecimento pode gerar a habilidade de solucionar problemas complexos	0,178	0,704	0,381	0,282
Cooperação técnica na área operacional	-0,034	0,711	0,118	0,417
Acessar novas competências / Aprendizagem organizacional	0,242	0,803	0,144	0,243
Desenvolvimento de produtos	0,098	0,521	0,641	0,169
Compartilhar recursos e atividades eliminando duplicidade	0,174	0,197	0,741	0,085
Redução de custos	0,179	0,310	0,781	0,234
Aumento do load factor	0,433	0,106	0,295	0,661
Reconhecimento da marca	0,210	0,249	0,068	0,753

Método de Extração: Análise do Componente Principal.

Método de Rotação: Varimax com Normalização Kaiser.

Whereas the regression equation was significant in model 1, only three factors were significant, as shown in Table 4. In model 2, with the inclusion of the control variable, there was an increase in the equation's explanatory power. The R^2 adjusted was 0.349 and in model 3, after excluding the variable "new competencies", there was a reduction in explanatory power and no significant change in the coefficients.

Table 4 – Result of the Linear Regression

Modelo	Variável Dependente: Grau de Satisfação					
	(1)		(2)		(3)	
	B	Desvio- Padrão	B	Desvio- Padrão	B	Desvio- Padrão
Constante	3,537***	0,091	3,700***	0,138	3,664***	0,136
Acesso a Novos Mercados	0,342***	0,092	0,307***	0,093	0,315***	0,094
Novas Competências	0,078	0,092	0,119	0,094	-	-
Redução de Custos	0,155*	0,092	0,166*	0,091	0,163*	0,092
Reconhecimento da Marca	0,223**	0,092	0,214**	0,091	0,216**	0,092
ASK	-	-	0,000	0,000	0,000	0,000
R^2 adjusted	0,323		0,349		0,338	

*, **, and *** correspond to the coefficients being significant at 10%, 5%, and 1%, respectively.

The second equation of the multiple linear regression (Table 5) with dependent variable resulting from the average of the four variables that composed the degree of

importance of the inter-relation between the companies (generation, obtention, measurement and importance of benefits) that tested the null hypothesis that all coefficients, except the constant, were equal to zero, was rejected at a level of significance of 0.000.

Table 5 – Result of the Linear Regression

Modelo	Variável Dependente: Grau de Satisfação (Média)					
	(1)		(2)		(3)	
	B	Desvio- Padrão	B	Desvio- Padrão	B	Desvio- Padrão
Constante	3,537***	0,091	3,700***	0,138	3,664***	0,136
Acesso a Novos Mercados	0,342***	0,092	0,307***	0,093	0,315***	0,094
Novas Competências	0,078	0,092	0,119	0,094	-	-
Redução de Custos	0,155*	0,092	0,166*	0,091	0,163*	0,092
Reconhecimento da Marca	0,223**	0,092	0,214**	0,091	0,216**	0,092
ASK	-	-	0,000	0,000	0,000	0,000
R ² adjusted	0,323		0,349		0,338	

*, **, and *** correspond to the coefficients being significant at 10%, 5%, and 1%, respectively.

The explanatory power of equation R^2 was 0.470 and when adjusted for degrees of freedom the R^2 adjusted was 0.411. This indicated that this model's explanatory power was greater than the previous one, but still suggested that the respondents' degree of satisfaction might be influenced by other factors not included in the model. The results of the Durbin-Watson and VIF tests were within acceptable limits. Although the regression equation was significant in model 1, only three factors were significant, as shown in Table 5. In model 2, with the inclusion of the control variable there was a reduction in the equation's explanatory power. The R^2 adjusted was 0.395 and there was no significant change in the coefficients. In model 3, with the exclusion of the "cost reduction" variable there was a small increase in explanatory power and no significant change in coefficients.

The hierarchical regression analysis demonstrated that the "access to new markets" factor accounted for 23.2% of the variance of the dependent variable "degree of satisfaction". Whereas, without considering the control variable, the "new competencies", "cost reduction" and "brand recognition" factors accounted for 1.2%, 4.8% and 9.9%, respectively, of the dependent variable's variance. Similarly, when adopting the average of the four variables that compose the degree of importance of the inter-relation between companies, the factors

accounted for the following variances in the dependent variable: 24.1%, 16.0%, 0.20% and 6.7%.

5. Discussion

The result regarding the degree of importance of the inter-relation between companies (Table 1) indicated that companies in the air transport sector were keenly interested in taking part in an alliance based on the co-opetition model, in keeping with Debbage (1994) who points out that companies that are not members of an alliance tend to put themselves at a competitive disadvantage. Possibly, the degree of satisfaction is a function of airline companies' need to survive. Comparing the results of this study with those presented in the article by Russo and Bertrand (2006), one verifies that the averages in Table 1 are similar in all items except two: "existing competition between companies" and "negative factors for the companies deriving from the alliance". In both items there was a perception of the lower impact of these items on the companies of the Star Alliance compared to companies in this study's IATA sample. The result seems to be intuitively correct, given that the Star Alliance had its own organizational structure (Russo; Motta, 2005), was able to identify and capture benefits and possessed an advanced level of integration and cooperation (Anslinger; Jenk, 2004; Macedo-Soares; Tauhata; Lima, 2005). Vinod (2005) lends additional credence to this idea when he affirms that the benefits of an alliance can only be attained when it operates virtually as a single organization.

The results regarding the degree of internalization of benefits conferred by an alliance (Table 2), demonstrated the particular importance of tangible benefits (product development, access to new markets, network synergy, attractiveness to passengers of large networks). This may indicate that, given the difficulty of measuring their benefits, companies sought to assure that tangible benefits were obtained. On the other hand, the average of the factor "avoid

government interference”, suggested that this was not a very important factor for airlines, and was similar to the result obtained from the survey of members of the Star Alliance.

According to the research, IATA member companies perceived that only a small part of the benefits cited in the literature were actually important for them. Only five of the 22 benefits analyzed had averages above 3.00. We believe that this was related to the way benefits were measured. For the respondents, even the return on investment was a variable with an intermediate average (3.05).

The analysis of the benefits revealed by the factor analysis, in accordance with the advantages of alliances presented by Zineldin (2004), suggested that the representatives of IATA member companies sought to obtain the following benefits from their partnerships: (1) “access to new markets”; (2) “access to new competencies / organizational learning”; (3) “cost reduction”; and (4) “brand recognition”. Thus, we understand that these are perceived to be the main metrics for organizations that take part in strategic alliances based on the co-opetition model in the air transport sector in the world.

The “access to new markets” factor included eight variables with values greater than 0.600 and was highly significant and correlated with the “degree of satisfaction” dependent variable as perceived by the respondents. The positive sign of the “access to new markets” factor suggested that airlines would remain in an alliance if it were possible to expand their business (new markets, expansion without investment, increasing revenues, higher profits). The effect of the “new competencies” factor on the dependent “degree of satisfaction” variable was not significant. In spite of this, this coefficient’s explanatory power was low (0.078). The “cost reduction” factor group consisted of three variables with values greater than 0.600. The positive relation between this factor and the dependent “degree of satisfaction” variable was also statistically significant at a 0.10 level. This result indicates that airlines’ continued membership of alliances also depended on their cost reduction potential

(sharing resources, reducing duplication, joint development of new products). The coefficient estimated for the “brand recognition” factor was also positive and statistically significant to a 0.02 level. The group related the publicizing of the brand to the increase in flight occupation capacity.

The degree of satisfaction of IATA member companies scored 3.54, in other words perceived as being above average. Participation in alliances is usually considered to be successful (Iatrou; Alamdari, 2005). According to Iatrou and Alamdari (2005), one third (33%) of participants assess levels of cooperation in their alliances as excellent, with the remainder considering them to be good.

The first regression equation (Table 4) was significant with a satisfactory explanatory power, but presented only two significant factors, with one at 0.05% and the other at 0.10. Although “access to new competencies” was considered a benefit by companies in strategic alliances (Gulati; Kletter, 2005), in the investigation at issue, this factor did not show individual significance. After adopting the “ASK” control variable, the “access to new competencies” factor remained insignificant but improved its intensity.

The result of the second regression equation (Table 5), when using the average of the four variables that compose the degree of importance of the inter-relation between the companies (generation, obtention, measurement and importance of benefits) as a dependent variable was different. Although the second equation was also significant and three of the factors were significant to 0.05%, there was an inversion in the levels of significance of the “new competencies” and “cost reduction” factors. Whereas in the first equation “new competencies” was not significant to a level of 0.404 and “cost reduction” was significant to a level of 0.100, in the second one, “new competencies” was significant to a level of 0.002 and “cost reduction” was not significant to a level of 0.703.

Due to the existence of a difference between the results of the two equations, we believe that the first equation, in which the dependent variable was obtained by means of a single reply, was the most adequate. (Isobe et al., 2000).

It is clear from the hierarchical regression analysis that the “access to new markets” variable was undoubtedly perceived as the most important by the firms surveyed. Alliances offer an opportunity for companies to access new markets at a low cost (Anslinger; Jenk, 2004).

This result is in keeping with the literature reviewed and is undoubtedly crucial for organizations taking part in strategic alliances in the air transport sector, despite the fact that, for some authors, alliances provide limited gains for their members (Vaara et al., 2004).

6. Proposal for Performance Indicators

As the results of investments in strategic alliances, especially those based on the co-opetition model, are uncertain (Zineldin; Bredenlow, 2003), and given the absence of performance indicators, mainly quantitative ones (Bucklin; Sengupta, 1993), that have been tested empirically in airlines taking part in strategic alliances, (Russo; Bertrand, 2006), models should be developed to help alliances achieve expected results. According to Zineldin (2004), an alliance, in order to be successful, must create value for its members.

Thus, despite the difficulties involved in developing quantitative performance indicators, this study proposes a preliminary quantitative metric, based on the results of our research, in an attempt to contribute to the creation of performance indicators for strategic alliances involving airline companies.

The main factor presented by our research was “access to new markets”. As this factor accounted for 23.2% of the variance in the dependent “degree of satisfaction” variable and is mentioned by several authors (Agulló, 2000; Anslinger; Jenk, 2004; Bretherton; Carswell, 2000; Das; Teng, 2000; Hemphill, 2000; Zineldin, 2004), we understood that a

significant contribution to future studies would be made by proposing a performance metric that reflected this factor.

In this connection, as can be observed from the result of the factor analysis, the “access to new markets” factor aggregates variables related to an increase in revenues (“increase in ASK and RPK”, “higher profits”). Thus, assuming that members of alliances expect to enhance joint performance (Russo; Bertrand, 2006), and also aim to distribute profits to all participants (Zineldin, 2004), we understand that the volume of sales is an appropriate performance indicator for airlines, so that they can assess the extent to which the access to new markets through alliances adds value for the companies involved. However, unlike the indicator presented by Mohr and Spekman (1994), the volume of sales, in the case of airlines, should take only interline sales into account, that is, the proportion of total sales revenue accounted for by sales of one member of the alliance to other airlines in the alliance (Russo; Motta, 2005).

Furthermore, although for some authors (Bretherton; Carswell, 2000; Lazzarini, 2007) it is possible to assess the performance of airlines using indicators such as RPK, ASK and CPF (cabin passenger factor or load factor), we recommend that this be undertaken jointly with the analysis of interline sales revenues.

As the literature indicates that the trend is for airlines to continue taking part in strategic alliances based on the co-opetition model, we believe that the development and systematic use of adequate performance indicators are critical to alliances’ sustained success, despite the difficulties posed by their measurement.

7. Final Considerations

Our research provided significant results regarding the benefits conferred by strategic alliances based on the co-opetition model in the air transport sector. Specifically, the study was able to identify those metrics that are important for firms that take part in strategic

alliances based on the co-opetition model in this sector in the world, to measure the companies' degree of satisfaction and to present a proposal for indicators to help assess the performance and benefits of strategic alliances in the sector at issue.

These benefits are relevant performance factors for researchers and organizational managers. They are considered to be strategic, for they can be measured before and during the existence of a strategic alliance based on the co-opetition model, and are able to assure competitive advantages for organizations and justify investments undertaken in alliances.

Our investigation's objectives were attained, at least in greater part. However, as it was a preliminary study, aimed at identifying and defining performance metrics, we recommend that researchers in the field of strategic management continue investigating the alliance benefits' issue, making use of the multiple case study method, with a view to understanding in greater depth the complicated exercise of measuring the performance of strategic alliances, based on the co-opetition model, and to refining and building upon our tentative proposal of pertinent performance indicators.

Indeed, our attempt to present a contribution to the development of performance indicators for airlines had its limitations. At the same time, it prompted several new questions that deserve being addressed. Amongst these, we consider the following one a priority: how to isolate the impact of alliances on an airline's overall revenues, given that an increase in its revenues may not necessarily be linked to the alliance's performance (Russo; Motta, 2005; Bretherton; Carswell, 2000).

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